THE OXFORD HANDBOOK OF

LINGUISTIC
TYPOLOGY

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TYPOLOGY

Edited by
JAE JUNG SONG

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To
Anna Siewierska
(for being my role model in linguistics)
and
my brother Jaetag Song [송재탁]
(for showing me the meaning of ebullience)

CONTENTS

PART III EMPIRICAL DIMENSIONS OF LINGUISTIC TYPOLOGY

PART IV LINGUISTIC TYPOLOGY IN A WIDER CONTEXT

ACKNOWLEDGEMENTS

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LIST OF ABBREVIATIONS

The abbreviations used in this handbook are based largely on the Leipzig Glossing Rules (available at: http://www.eva.mpg.de/lingua/files/morpheme.html).

1	first person
2	second person
3	third person
A	agent-like argument of canonical transitive verb
ABL	ablative
ABS	absolutive
ACC	accusative
ACT	active
ADEL	adelative
ADJ	adjective
ADV	adverb(ial)
AF	actor focus
AGR	agreement
ALL	allative
ANT	anterior
ANTIC	anticausative
ANTIP	antipassive
AOR	aorist
APPL	applicative
ART	article
ASP	aspect
ATTR	attributive
AUG	augmented (number)
AUX	auxiliary
BEN	benefactive
c	complementary number
CAUS	causative
CERT	certain
CF	circumstantial focus
CLF	classifier
CNT	continuative

COM	comitative
COMP	complementizer
COMPL	completive
COND	conditional
CONJ	conjunctive
CONN	connective
CONTR	contrastive
COP	copula
CVB	converb
DAT	dative
DECL	declarative
DEF	definite
DEM	demonstrative
DET	determiner
DIR	direct
DISCNT	discontinuative
DIST	distal
DISTR	distributive
DO	direct object
DS	different subject
DU	dual
DUR	durative
ELAT	elative
EMPH	emphatic
EPENTH	epenthetic
ERG	ergative
EXCL	exclusive
F	feminine
FAM	familiar
FOC	focus
FTV	factive
FUT	future
GEN	genitive
GER	gerund(ive/ial)
HAB	habitual
HUM	human
ICP	incompletive aspect
IM	immediate (before e.g., PST)
IMP	imperative
IMPS	impersonal
INCL	inclusive

IND	indicative
INDF	indefinite
INF	infinitive
INS	instrumental
INTER	interrogative
INTR	intransitive
INTS	intensifier
INV	inverse
IPFV	imperfective
IRR	irrealis
LGR	level-pitch grade
LNK	linker
LOC	locative
M	masculine
MID	middle
MOD	modification
MOM	momentaneous aspect
MONO	monofocal = 1st person or singular non-first person
N	non- (before e.g., SG, PST)
NAR	narrative tense
NEG	negation, negative
NEUT	neuter
NML	nominal (marking free stems)
NMLZ	nominalizer/nominalization
NOM	nominative
O	patient-like argument of canonical transitive verb
OBJ	object
OBJVRS	objective version
OBL	oblique
OBLIG	obligatory
OBV	obviative
P	patient-like argument of canonical transitive verb
PART	partitive
PASS	passive
PAT	patientive
PERM	permission
PERMUT	permutation
PFV	perfective
PL	plural
POSB	possible
POSS	possessive

POSTP	postposition
POT	potential
PRED	predicative
PREP	preposition
PREV	preverb
PRF	perfect
PRO	empty pronominal
PROB	probability
PROG	progressive
PROH	prohibitive
PROP	proprietive
PROX	proximal/proximate
PRS	present
PST	past
PTCP	participle
PTL	particle
PUNCT	punctual
PURP	purposive
Q	question particle/marker
QUOT	quotative
RECP	reciprocal
RED	reduplication
REFL	reflexive
REL	relative
REM	remote
RES	resultative
RESP	respect
RLS	realis
S	single argument of canonical intransitive verb
SAP	speech-act participant
SBJ	subject
SBJV	subjunctive
SBJVRS	subjective version
SEQ	sequential
SG	singular
SIM	simultaneous
SS	same subject
SUB	subordinator
TF	theme focus

TOP	topic
TR	transitive
V	verb (derivative)
VLZ	verbalizer
VOC	vocative

SETTING THE STAGE

JAE JUNG SONG

Handbooks like this one need little or no introduction. The very idea of writing a synopsis of the volume as a whole or an outline of the vast field of linguistic typology would be akin to trying to do, prior to their performances, imitations of the maestri who have been assembled for a special occasion. The audience would wait, with bated breath, for the maestri to take the stage, and would not be keen to endure the compère's (inevitably ungraceful) 'curtain raiser'. Nor would the maestri be willing to allow the compère to 'destroy' what they have come to perform for their appreciative audience. Everyone would rather let the maestri proceed, without further ado, with what they do best. I have chosen to be a judicious 'compère'; I have decided to dispense with a synopsis or an introductory chapter for this volume. I hope that this decision will be approved of with alacrity. Wearing the Editor's hat, however, I would like to give a brief account of how linguistic typologists' research perspective has changed over the last five decades or so. This will serve well as a backdrop against which to read the rest of the handbook.

1. LINGUISTIC TYPOLOGY: WHERE IT CAME FROM; WHERE IT IS NOW; WHERE IT IS GOING

The recent ascendancy of linguistic typology could not have been better described than when Nichols (2007: 236) opines that linguistic typology 'is on a roll and likely to continue'. There has been a sustained heightening of interest in linguistic

typology as a method of discovering the nature of language and also as a theoretical approach to the study of language (cf. Song 2010). Evidence in support can be drawn not only from within linguistic typology, as attested amply in the rest of the handbook, but also from a growing number of linguists working within, or switching to, linguistic typology in countries where linguistic typology had until recently been largely unknown, if not unheard of (i.e. Asia) as well as in countries which are associated traditionally with linguistic typology (i.e. Europe and the USA). This incipient popularity in Asia of linguistic typology is particularly noteworthy and encouraging, in that generative grammar has for over half a century dominated or, in my view, 'stifled' the discipline of linguistics in those countries, admitting of virtually no alternatives—so much so that it is believed by many in some of these countries that linguistics is generative grammar, and *vice versa*. (When I left South Korea in 1983 to do an undergraduate linguistics degree in Australia, I too had been under the impression that generative grammar was the only way to do linguistics.)

'[Linguistic] typology has the hallmarks of a mature discipline: a society, conferences, journals, books, textbooks, classic works, a founding father, and people who are called and call themselves [linguistic] typologists' (Nichols 2007: 231). While this remark may inadvertently suggest that linguistic typology is a newcomer to linguistics, nothing is further from the truth. Linguistic typology has a long tradition dating back to the nineteenth-century European interests in genealogical relationships among languages and in the evolution of human language. Initially embraced with much enthusiasm, linguistic typology soon came to be subsumed under other research interests, historical linguistics in particular, and then fell by the wayside, as it were, into near oblivion. This had been the state of affairs until the early 1960s.

The history of modern linguistic typology—with its precursors ignored for the sake of convenience—can be divided roughly into four periods: (i) Georg von der Gabelentz's (1840–1893) celebrated 'christening' (i.e. 'Typologie') in 1901 of linguistic typology to the 1950s; (ii) Joseph Greenberg's revitalization or resuscitation in the 1960s and 1970s of linguistic typology (e.g. Greenberg 1963b, Greenberg et al. 1978); (iii) the rejuvenation in the 1980s and 1990s of linguistic typology (e.g. Comrie 1981, Mallinson and Blake 1981, Dryer 1989, 1992, Nichols 1992); and (iv) the coming of age in the present decade of linguistic typology (e.g. Haspelmath, Dryer, Gil, and Comrie 2005; also see Bickel 2007, Croft 2007b, Nichols 2007, and Song 2007).

It was not until the appearance in 1963 of Greenberg's work on word order that linguistic typology was brought out of the intellectual wilderness and back into the fold of linguistics. The focus of linguistic typology, in line with the contemporary development in linguistics, also shifted from morphology to syntax or, more accurately, morphosyntax. More importantly, Greenberg 'opened up a whole field of research' (Hawkins 1983: 23) by revamping and revitalizing linguistic typology. Linguistic typology during this period was, in principle, concerned

primarily with the task of determining what is possible, as opposed to impossible, in human language, although its practitioners were generally cognizant of the poverty of absolute (or exceptionless) language universals. This early 'idealistic position', if it can be called that way, is evident from some of the important works from this period which made valiant but unsuccessful attempts to propose unified explanations of Greenberg's original work.

The 1980s and 1990s brought in linguistic typologists who recognized the importance in linguistic typology research of linguistic preferences, instead of (hard-to-obtain) absolute universals (e.g. Hawkins's (1983) distributional universals and Dryer's (1989, 1992) work on word order). In order to discover linguistic preferences, however, what is preferred *linguistically* must first be carefully separated from what happens to be widespread as a consequence of *non-linguistic* factors, such as population movements, language contact, geographical isolation, population size, and environment (e.g. Dryer 1989, Nichols 1992, Nettle and Romaine 2000, Bickel 2007). This 'epiphany' made it easier to accept the fallacy of absolute language universals. There are always bound to be non-linguistic factors at work in language, inevitably upsetting so-called absolute universals, which are motivated largely by human cognition, perception, etc. (No language develops or exists in a socio-cultural vacuum.) More to the point, there remain large amounts of undocumented, hence, unstudied, languages in the world— actually, more undocumented than documented. To claim that X, Y, and Z are absolute language universals, in the current state of our knowledge, is patently premature. In point of fact, rejection of the concept of absolute universals would better prepare linguists to deal with linguistic diversity. In conjunction with the 'new' task of determining what is probable in human language, research focus, not surprisingly, also began to turn to methodological issues, arguably the most prominent being language sampling.

Linguistic typology in the new millennium has witnessed the emergence of a salubrious outlook on theory and data. First, linguistic typologists have accepted the role of non-linguistic factors in typological distributions attested in the world. They have come to the realization that many typological properties are not evenly distributed in the world, and have begun to ask in earnest why (e.g. Haspelmath et al. 2005). Far more frequently than not, the source of possible or plausible explanations, as it turns out, seems to lie outside languages themselves. Second, they have also realized the urgent need to do something about the sheer underrepresentation of their database, especially because languages are fast dying out. This is not at all surprising in view of the fact that linguistic diversity will not reveal itself unless languages, living or extinct, have all been taken into account. What implications this holds for the validity of linguistic typologists' research is glaringly obvious, even to a layperson. This is not to say that previous generations of linguistic typologists were oblivious of this point (e.g. Song 2001a: 17). Of late, however, renewed emphasis has been placed on, and a great deal of effort has been

put into, language documentation, particularly for endangered or (close to) moribund languages. This new development, not surprisingly, is being spearheaded by linguistic typologists.

Over a span of a little more than five decades, the shift in typological perspective is from 'what is possible' (e.g. V(erb)S(ubject)O(bject) order implies the presence of prepositions, as in Greenberg 1963b) to 'what is probable' (e.g. the strong tendency towards OV&N(oun)A(djective), as in Dryer 1992) to, as Bickel (2007: 239) has it, 'what's where why?' One of the most recent and tangible outcomes of this shift is *The World Atlas of Language Structures* (Haspelmath et al. 2005). For instance, Dryer (2005i) demonstrates that the co-occurrence of OV and Rel(ative Clause)-N order is generally found in Asia, while in the rest of the world, OV languages have NRel order much more frequently than RelN. That is, OV&RelN seems to be a distinct areal feature of Asia. The explanation of this particular areality cannot be linguistic, but is most probably historical and socio-cultural (e.g. language contact). With the historical and socio-cultural basis of the areal feature recognized, the next level of explanation must be sought from outside linguistics (e.g. anthropology, sociology).

Linguistic typology, in the next five or ten years, is likely to continue to develop or refine its research methods—not least because such methodological exercises, more frequently than not, lead to the discovery of problems or issues of theoretical import as well as new empirical findings (e.g. Dryer 1989, 1992)—and also to the generation of 'theories that explain why linguistic diversity is the way it is [i.e. what's where why?]' (Bickel 2007: 239). This suggests that the kind of research that is willing and able to cross its boundaries into, or to borrow insights from, other disciplines—whether in pursuit of deeper explanations or because of researchers' own intellectual inclinations—is likely to occupy the centre stage of linguistic typology (as foreshadowed by Nichols 1992 and Hawkins 2004, for instance), while the nature of human language will continue to be the main object of inquiry in linguistic typology.

2. WHAT DOES THIS HANDBOOK AIM TO OFFER?

The handbook aims to be regarded as authoritative, or at least representative of the field of linguistic typology. To that end, I have recruited internationally recognized leading scholars to write the majority of the chapters. I have also invited a few young scholars in an attempt to mark the handbook as a *wharenui* (meaning 'a tribal meeting house' in the Māori language) for distinguished and emerging linguistic typologists. The handbook provides the reader with a critical, state-of-

the-art overview of major areas of linguistic typology. The chapters intend not only to serve as a repository for what linguistic typologists have so far learned about language as well as what they have contributed to linguistics (read: linguistic theory), but also to map out what directions—theoretical, methodological, empirical, or otherwise—linguistic typology will or should take, while identifying some of the challenges that it is likely to confront in the future. Many of the contributors, instead of resting on their own and colleagues' laurels, have raised some important theoretical and/or methodological issues or questions that need to be addressed or dealt with in linguistic typology or, generally, in linguistics. Thus the volume is introspective as well as forward-looking.

3. WHO IS THIS HANDBOOK FOR?

It is envisaged that the handbook will benefit linguists, regardless of their theoretical allegiance or philosophical orientation. Anyone interested in linguistic unity and diversity or simply the nature of human language should be able to draw a great deal of insight and data from the handbook. It will also be useful for specialists in individual languages or language families who wish to learn where their languages or language families stand in the grand scheme of things.

The handbook may be used as a textbook in that chapters can be selected in a variety of ways to suit individual lecturers' interests, preferences and needs. In fact, this particular option is strongly recommended to those who run an advanced undergraduate or a postgraduate course in linguistic typology, as all the available textbooks (i.e. Comrie 1989, Whaley 1997, Song 2001a, Croft 2003a) need to be supplemented by substantial amounts of additional reading. Furthermore, individual chapters can be chosen for other courses, such as historical linguistics, child language acquisition, second language acquisition, language documentation, and field linguistics.

4. HOW IS THE HANDBOOK STRUCTURED?

The handbook comprises four parts: (I) Foundations: History, Theory, and Method; (II) Theoretical Dimensions of Linguistic Typology; (III) Empirical Dimensions of Linguistic Typology; and (IV) Linguistic Typology in a Wider Context. Part I serves as the historical, theoretical, and methodological backbone for the

rest of the volume. This part is to be read with a view to understanding where linguistic typology came from and how it came into existence. Also discussed therein are some fundamental theoretical and methodological issues that have shaped, and will continue to shape, linguistic typology as it is known today. Part II deals, in great depth and detail, with various theoretical dimensions of linguistic typology, some of which are alluded to in Part I. The chapters in Part II also discuss some of the major theoretical contributions made by linguistic typologists that extend beyond linguistic typology and to other theoretical approaches (e.g. Optimality Theory). Part III showcases typological research on various grammatical areas and topics, ranging from phonology to semantics, and from person marking to voice. The final part of the handbook situates linguistic typology in the context of other major pursuits in linguistics, ranging from historical linguistics to second language acquisition. The chapters in Part IV survey and explore the application of linguistic typology to other areas of linguistics, or the interface between linguistic typology and other sub-disciplines of linguistics.

5. ENVOI

Given the size of the volume, it proved impractical to cover all the vast field of linguistic typology. There are a number of topics or areas that I would very much have liked to include in the volume. For example, given the role of historical and socio-cultural factors in the distribution of typological properties in the world's languages, something that addresses the interface between linguistic typology and sociolinguistics (e.g. Trudgillian sociolinguistic typology, which explores the relationship between typological structure and social structure) would have made a great chapter in a volume like the present one. Quantitative analysis and interpretation of linguistic diversity or preferences would also have added an important theoretical dimension to the handbook. The shopping list went on, but alas, one had to stop somewhere. For these and other omissions, however, I offer sincere apologies to the reader.

Now, without further ado ...

PART I

FOUNDATIONS: HISTORY, THEORY, AND METHOD

THE (EARLY) HISTORY OF LINGUISTIC TYPOLOGY

PAOLO RAMAT

1. INTRODUCTION

As Graffi (this volume) writes, it is hard to state when the history of linguistic typological studies properly started. The more so when dealing with the very early phases of this branch of linguistics—just as it is difficult to state when, say, neurology or neurolinguistics began. Broca is a pioneer, but certainly his interests did not arise from scratch. People such as Franz Joseph Gall (1758–1828) had already proposed a cerebral localization of mental faculties. Every science or discipline experiences what can be called an 'incubation phase', during which the bases of the scientific problems are laid in general terms before they become the object of scientific research in the proper sense, endowed with a method of its own, fitting its specific research domain.

The same holds for linguistic typology. The more so if we compare it with the previous example of neurolinguistics, since studying languages according to their structures and systems does not entail problems from the ethical or religious point of view. This has not been the case for neurolinguistics. The study of language

structures did not and does not require one to handle corpses and has never been forbidden for religious or ethical reasons, so it can be said that the study of linguistics (in the broader sense) started some millennia ago. This does not mean that philosophical, moral, and/or religious points of view did not influence the approach to language—but this is not the topic of this chapter.

2. THE FIRST STEPS: CLASSICAL ANTIQUITY

By linguistic typology, we mean the systematic cross-linguistic comparison that aims to discover the underlying universal properties of human language. If we adopt such a definition, it is clear that the first sections of this chapter may be only marginal to typology in the modern sense of the term. Nevertheless, it is interesting to follow the evolution of (Western) thought which can be considered as a preliminary step towards typology.

Though Greeks and, later, Romans did show a real interest in 'exotic' populations (suffice it to think of Herodotus's *Historíai* or Tacitus' description of the Germanic tribes), linguistic diversity was never the focus of the interest in classical antiquity.

There are very important theoretical discussions on language, the most relevant being Plato's *Kratylos* and Aristotle's *Categories*; but the difference among languages ('differentia linguarum') is not the focus of those discussions. Even the term *grammatiké* from the 3rd century BC onwards refers to what we would now call 'philology' or 'literary criticism', including also rhetoric. The most relevant contribution of the *grammatiké* has doubtless been the theory of the 'parts of speech' (*mérē toû lógou, partes orationis*), such as noun, verb, pronoun, and adverb. They represent linguistic categories and have formal features, such as singular/dual/plural, masculine/neuter/feminine, present/future/past. Thus they are defined according to formal properties, endowed with semantic values. Such categories and features have constantly been used in Western typology up to present times.

The borrowing of *grammatiké* in the Latin tradition (*gram[m]atica*) refers both to the teaching of linguistically correct forms and, again, to literary criticism; and later on, also to rhetoric (Donatus, 4th century AD) and dialectic (Augustin, 4th century AD). From Varro (2nd century AD) and Isidor (6th–7th century AD), we know that there was a keen interest in etymology as the search for the 'true' (*étymos*) meaning of words. But also in this particular field, no cross-linguistic comparison was attempted. Given the cultural primacy of the Greek language all over the eastern part of the Mediterranean, when Rome came in contact with Greece, Roman *gramatici* simply tried to adapt the categories elaborated in the

tradition of the *grammatiké* (Dionysios Thrax, 2nd–1st century BC; Apollonius Dyskolos, 2nd century AD, etc.) to their own language (cf. Matthews 1990: 195). The 'parts of speech' which Dionysios Thrax had singled out in his grammar (*téchnē grammatiké*) were taken over by the Romans with only a few minor changes. Unfortunately, the syntactic description of Latin which formed the second part of the *De lingua latina* written by Varro (106–27 BC)—probably on the lines of Apollonius' *Perì syntákseōs*—has been totally lost. We know very little of the syntactic theories of classical antiquity.

The most popular grammar in the Middle Ages—that of Priscian (Mauretania, 6th century), who is the author of a voluminous treatise, *Institutio de arte grammatica*—was directly inspired by Apollonius Dyskolos' *Perì syntáxeos*. Indeed Ancient Greek and Latin are morphosyntactically very similar, so there was no real need to develop a contrastive study of the two languages (which is often the basis for a typological approach).

3. THE MIDDLE AGES

Reasons of space do not permit us to tackle here the important contribution of the Middle Ages to the general discussion on language, namely, the logical-semantic analyses of the 12th–14th centuries by scholars such as Petrus Abelard, Thomas of Aquin, Duns Scotus, or Wilhelm of Ockham. In our frame of reference, which looks at the attention paid to linguistic differences as the starting point for a possible typological approach, the medieval *scholastica* does not play an important role, though its role in defining the parts of speech according to the inherited Latin tradition has, on the contrary, been very important: the grammar of a specific language (Latin) became the basis for a general theory of grammar. Thanks to the so-called *modistae*—such as Martin of Dacia (*d.* 1304), Michel of Marbais (13th century), and Thomas of Erfurt (14th century), who commented on Priscian's treatise—much attention was paid to the ways of expression (*modi significandi*) in the frame of a general, universal *grammatica speculativa*, which disregarded how this *grammatica* was implemented in different languages. The *grammatica speculativa* is not a grammar in the modern sense of the word; rather, it represents a philosophical, purely theoretical approach to language. The *modi significandi* are described with reference to the different 'parts of speech' of the Latin and medieval tradition.

Things changed when attempts were made to describe new languages according to Latin grammar. This is the case with the Irish 'Auraicept na n-Éces', the Icelandic so-called 'First Grammatical Treatise' (second half of the 12th century), and the

'Donatz Proensals' (c. 1240). The Irish phonetic system, with its consonantal lenition, and the Icelandic vowel system presented problems of transcription into the Latin alphabet. At the grammatical level, Provençal, with just two different cases (nominative plus the so-called 'cas régime' for all other traditional Latin cases), did not match the Latin system. Thus, the problem of the existence of different linguistic systems was implicitly posited (cf. Vineis and Maierù 1990: 85–92).

Dante Alighieri (1265–1321) recognized that all humans are endowed with speaking ability, though languages may vary according to different dispositions of their nature. Thus, it was implicitly maintained that language differentiation is not the consequence of the Babel sin but a natural fact (see below, section 5 on Leibniz). Then, in his *De vulgari eloquentia* (1303?), Dante considers three language families in Europe (Germanic, Latin, and Greek); furthermore, he makes the well-known distinction of the Romance area among the *oïl-*, *oc-*, and *sì*-languages, according to the way in which these languages say 'yes'. We are, of course, still far from linguistic typology, but it is noteworthy that the first step toward a classification according to linguistic characteristics had been taken.

4. THE RENAISSANCE

The Renaissance was the period wherein the European 'vulgars' received their standardization, and consequently, the difference among languages became a problem to be discussed. A competition arose among scholars of different countries as to which language might boast primacy. The cross-linguistic comparison was, however, conducted without the scientific—that is, falsifiable—tools which we have been accustomed to since the 19th century. Rather, political, ideological, and religious considerations were invoked to 'prove' the *précellence* (primacy) of this or that language. The idea of a primitive, pure language before Babel is a key point in many discussions: the language which could be 'proved' to be nearest to this lost original language deserves the *précellence*.

So, for instance, French humanists maintained that French derived from Hebrew, the language Adam spoke in the lost Paradise and his son Noah brought to Gallia, whilst the Florentine humanistic Accademia maintained that Tuscan was the heir of Etruscan, which sprang from Aramaic—the language spoken by Noah after the Flood. The Flemish Johann Goropius Becanus (1519–72) is perhaps the clearest example of these writers of 'linguistic' treatises, whose religious belief in the Bible narration and national pride played a prominent role: in his *Origines antverpianae*, he affirms that the dialect of Antwerp is the oldest and hence the purest language of

Europe, since the town was founded by the *Cimmerii* or *Cimbri*, who descended from Japhet's eldest son, Gomer (called also Cimen/Comen).

In the midst of such very speculative dissertations, some more data-based works deserve to be mentioned, such as the *Grammaticae quadrilinguis partitiones* (1544) by Johannes Drosaeus (Jean Drosée), the first comparative grammar of French and the three 'holy languages', Hebrew, Greek, and Latin. Drosaeus makes the comparison on the basis of traditional Latin grammars (Priscian and Donatus) and shows that the tools for the analysis of Latin are valid also for the three other languages. Not only were the first grammars of English and German written in Latin, but they also used the well-established categories of that language.

Be that as it may, it is a historical fact that the cross-linguistic dimension was established in the Renaissance period (Tavoni 1990: 216 ff.).

5. THE 17TH–19TH CENTURIES

The nearer we approach our times, the more relevant to the present linguistic discussion are the problems dealt with by scholars such as Francis Bacon, Antoine Arnauld, and Claude Lancelot (*Grammaire générale et raisonnée* [1660]), Thomas Hobbes, John Locke, Gottfried von Leibniz, Giambattista Vico, Etienne Bennot de Condillac, Du Marsais, and Beauzée (in Diderot and d'Alembert's *Encyclopédie* [1751–72], to mention just the most prominent. There exists a large literature on these names, starting with Chomsky's *Cartesian Linguistics* (1966), which has the significant subtitle *A Chapter in the History of Rationalist Thought* (see Rosiello 1967).

However, since this chapter is dedicated to the (early) history of typology, the problem of mental and linguistic universals and predispositions in the perspective of what could be labelled 'cognitive linguistics' will be dealt with just inasmuch as it has (had) substantial consequences for linguistic typology in its narrow sense. A thorough discussion of this topic would by far exceed the limits of this chapter.

What is relevant in the present context is that in the 17th, 18th, and 19th centuries a main problem was how to reconcile the essential basic homogeneity of all languages as the expression of the human mind with the great differences obtaining among languages. Leibniz (1646–1716), for instance, was looking for a *characteristica universalis*, a kind of algebraic metalanguage for all humans, where every possible thought could be expressed—the more so as all existing languages derive from a lost original language whose roots are, however, still present in the languages of the world. At the same time, Leibniz was convinced that the 'differentia linguarum' is not the consequence of the Babel sin but a necessary consequence

of human nature and its different cultural evolutions. He studied dialects and different languages while doing field research as well (see Gensini 1990).

The idea of producing large collections of texts in as many different languages as possible was already present in the 16th century. In 1555, the Swiss Konrad Gesner published his *Mithridates, sive de differentiis linguarum tum veterum tum quae hodie* ('Mithridates, or the Differences among the Ancient as well as the Modern Languages'). Between 1613 and 1619, Claude Duret wrote a *Thrésor de l'histoire des langues de cet univers*. So-called 'missionary linguistics' played a highly important role in acquainting European scholars with the languages of the Americas, which had remained unknown until the discovery and conquest of the New World. The Jesuits in Asia also contributed much to the widening of linguistic horizons. 'Missionary linguists' produced a series of first-hand grammatical and lexical descriptions which, for some languages that disappeared after the European invasion, constitute the only extant documents. It is impossible to mention all the books which laid the basis of modern comparativism, which has been the precondition for the birth of typology, too (see De Mauro and Formigari 1990). Evident in these works is the difficulty of adapting the descriptions of exotic languages to the patterns of the Latin-based grammatical tradition. We have to mention at least the famous *Catálogo de las lenguas de las naciones conocidas* ('Catalogue of the Languages of the Populations We Know' [1800]) composed by the Spanish Jesuit Lorenzo Hervás y Panduro (1735–1809), who used the previous works of his missionary colleagues.

In 1767, Nicolas Beauzée published a *Grammaire générale ou exposition raisonnée des éléments nécessaires du langage, pour servir de fondement à l'étude des toutes les langues* ('General Grammar or Language Philosophical Explanation, Serving as the Basis for the Study of All Languages'). The title reveals the two aspects of 18th-century linguistics. The aim is to arrive at a general, scientific, and speculative (*raisonnée*) theory of language, but to attain this goal, it is necessary to have empirical knowledge of many different languages. In his *Grammaire*, Beauzée mentions not only Greek, Latin, and Hebrew but also Swedish and Lappish, Irish and Welsh, Baskish, Quechua, and Chinese (along with Spanish, Italian, German, and English).

Some years later, Johann Christoph Adelung collected a very large language sample, which, after his death (1806), was completed and edited between 1806 and 1817 by Johann Severin Vater under the title *Mithridates, oder allgemeine Sprachenkunde mit dem Vater Unser als Sprachprobe in nahe fünfhundert Sprachen und Mundarten* ('Mithridates, or General Language Science with the "Our Father" as Language Specimen in almost Five-Hundred Languages or Dialects' [1806–17]). The underlying idea was that the cross-linguistic comparison of very different languages may be able to uncover the general philosophical principles—that is, the *characteristica universalis*—and, at the same time, recover the evolution of man's faculty of language.

The *allgemeine Sprachenkunde* (which could also be translated as 'general linguistics') thus had a twofold goal, already alluded to: first, to describe the many new languages encountered during the colonial expansion of the European states, also for practical interests, such as Christianization or trading; second, to arrive at the very nature of human language—in Platonic terms, we could say the 'idea' of language *per se*. That is the reason why 'linguistic comparison' meant both the philosophical comparison of languages (*philosophische Vergleichung*), as in Herder's *Ideen zur Philosophie der Geschichte der Menschheit* ('Ideas about the Philosophy of Humankind's History' [1784–5]), and comparative grammar, as in Vater's *Lehrbuch der allgemeinen Grammatick* ('Handbook of General Grammar' [1805]) (see Morpurgo Davies 1994: 93, Ramat 1990: 200). Even in the book which is traditionally considered to mark the beginning of modern linguistics—Franz Bopp's famous 'Conjugation System' (*Über das Conjugationssystem der Sanskritsprache in Vergleichung mit jenem der griechischen, lateinischen, persischen, und germanischen Sprache* [1816])—we see that philosophical speculations are strictly intertwined with a historical approach (*das Sprachstudium als ein historisches und philosophisches zu behandeln*, i.e. 'to treat the study of language both as a historical and philosophical one', as K. J. Windischmann wrote in his introduction to the *Conjugationssystem*). Bopp's idea was to compare similar forms in order to examine their inner structure. His goal was, in fact, not to reconstruct the original form but to confirm his typological hypothesis that all sentences are formed by a subject and its attribute linked by the verb 'to be': *homo est mortalis* is the prototypical sentence of the Indo-European languages.

Both viewpoints are present in the work of Bopp's admirer Wilhelm von Humboldt (1767–1835), who can really be considered the bridge between the Enlightenment rationalistic, more philosophical and speculative approach to language(s) and the Romanticism of the first part of the 19th century. The title of his most important work, posthumously published [1836] as *Über die Verschiedenheit des menschlichen Sprachbaues und ihren Einfluss auf die geistige Entwicklung des Menschengeschlechts* ('On the Difference in Human Linguistic Structure and Its Influence on the Intellectual Development of Mankind'), seems to be oriented more towards the relativistic position of Romanticism, which was interested in linguistic diversity as a mirror of the spiritual and intellectual differences among cultures. But in many pages of the *Verschiedenheit*, it is clearly stated that all languages are just reproductions (*Abbilde*) of human nature with its ability for speaking. We can say, he writes, that all humankind has a unique language and that at the same time every human being has his own particular language:

since the natural predisposition towards language exists in general in man and all men must have in them the key to understand all languages, it automatically follows that the form of all languages must be essentially the same [. . .] The difference may consist only in the means and restrictions affecting the possibility of achieving this goal. (Humboldt 1836: 251; translation by P. R.)

(Recall Dante's approach, illustrated in section 3.) In point of fact, it was precisely these differences and 'restrictions' which interested Humboldt most. He was interested in the linguistic structures of the many languages that he dealt with. The structures correspond—he said—to the languages' character or, to use his own word, their *genius*. Humboldt hypothesized that languages, as products of speech communities, reflect the character of those communities, their *genius*; in this respect, we may consider Humboldt a forerunner of ethnolinguistics (on Humboldt's typology, see below and Graffi's [this volume] observations).[1]

It has to be noted that from the very beginning typology has been something more than a simple language taxonomy. Humboldt and his forerunners, when speaking of the linguistic *genius*, looked at an extralinguistic explanation for the 'diversitas linguarum', oriented towards a psychological or ethnological perspective. As we shall see in the following sections, where we discuss Gabelentz and Hjelmslev up to Greenberg, typology has always been seeking an intralinguistic principle or principles capable of explaining the differences between existing (and possible) linguistic types.

6. From Humboldt to Gabelentz

Meanwhile, the new historically oriented comparativism of August Wilhelm Schlegel (1767–1845) and his brother Friedrich (1772–1829), Friedrich Bopp (1791–1867), and Jacob Grimm (1785–1863) had differentiated philosophy more and more from linguistics. Empirical research of pure linguistic facts in the new positivistic attitude gradually won over the philosophy of language.

The studies by Friedrich and even more by August Wilhelm Schlegel led to a first typological division of languages. In his *Observations sur la langue et la littérature provençales* (1818), A. W. Schlegel says that all languages can be divided into three

[1] The notion of 'genius of language' deserves a detailed discussion, but it can only be summarized here (see Rosiello 1967: 79–87, Hüllen 2001: 242 ff.). The term, probably introduced by Amable de Bourcey in a discourse before the French Academy (1635), had a period of fashionable usage in the 17th century, which shows an almost ridiculous arbitrariness of judgement. Spanish is considered a 'langue orgouilleuse'; Italian, 'une langue coquette'; and French is said to be 'prude'. Though totally deprived of any non-impressionistic criterion, such judgements, which unfortunately still form part of the prejudices which many Europeans have against each other, are a first step in linking anthropological, cultural, historical, and linguistic facts, and a first step along the path that ethnolinguists, in the wake of Humboldt, Sapir, and Whorf, would later walk in a much more serious manner. This appears evident already in Condillac's *Essai sur l'origine des connoissances humaines* ('Essay on the Origin of Human Knowledge', 1746): 'génie de la langue' means the particular system of semiotic signs that the language of a particular nation makes use of. Language is thus the picture of the character and genius of the nation speaking it.

classes: (a) languages without any grammatical structure, like Chinese; (b) languages with agglutinated affixes, like Turkish; (c) languages with inflections, to be distinguished in their turn as (c′) synthetic and (c″) analytic languages. As examples of (c′), Schlegel quotes Latin and Ancient Greek, whereas to (c″) belong languages such as French which, contrary to the classical languages, make use of articles, personal pronouns before the verb, auxiliaries, and prepositions. The Germanic languages are located between (c′) and (c″). Schlegel notes that this basic tripartition had been developed by his brother Friedrich ten years earlier (*Über die Sprache und Weisheit der Indier* ['On the Language and Knowledge of the Indians', 1808], with the significant subtitle *Ein Beitrag zur Begründung der Alterthumskunde*, 'A Contribution to the Founding of the Science of Antiquity') and was first inspired by Adam Smith's *Considerations Concerning the First Formation of Languages and the Different Genius of Original and Compounded Languages* (1759). Actually, Smith had divided languages into two types: (a) primitive, simple, original, and uncompounded languages; (b) compounded languages. Ancient Greek is a good example of the first type: its strongly developed inflectional system is self-sufficient in order to express the relations among the various elements of a sentence. On the contrary, languages such as Italian or French, which have a poorer inflectional system, must have recourse to phrases ('compositions'). Basically, we are faced with the opposition between synthetic and analytic languages, which will be basic for many further typological researches (cf. Coseriu 1968). From the evolutionary point of view, Smith's idea was that the synthetic type is more ancient than the analytic one—and even preferable.

A twofold division had been proposed some years earlier by the abbot Gabriel Girard (1677–1748) in his *Vrais principes de la langue française* ('True Principles of the French Language', 1747). This division is based on syntax rather than on morphology. Girard contrasted the 'analogous' languages to the 'transpositive' ones. The former include Hebrew, French, Italian, and Spanish. They are called 'analogous' because their basic SVO order is analogous to—that is, corresponds to—the 'natural', logical way of thinking: first comes the Subject, then the verbal Predicate, and finally the Object: *John loves Mary, Bill writes a letter*. Languages such as Latin and Old Slavic are, on the contrary, 'transpositive' because they prefer an SOV order (*Brutus Caesarem necavit* 'Brutus killed Caesar'), which transposes the natural way of thinking (cf. Ramat 1995: 29). Finally, there are 'mixed' (*amphilogique*) languages, such as Greek and German. (On the late classifications based on word order, especially on H. Weil's classification, see Graffi, this volume.)

Schlegel's subdivision was basically accepted by Humboldt, though with an important refinement. He considered a fourth language type, namely, the incorporating (*einverleibend*) one which unifies in a single word many concepts, which in our European languages are necessarily expressed by more words in a sentence (but cf. Graffi, this volume). To this type belong Delaware and other American languages. Considering this fourth type represents a shift from a morphologically

oriented classificatory typology to a more syntactical, constructionally oriented one (Ramat 1987: 206 ff.). Indeed, it has to be noted that Humboldt does not classify languages but refers to language types, that is, to constructional principles. Anticipating Vladimir Skalička, he recognizes that no language belongs to a single type. A 'linguistic type' is rather an ideal construction which is realized completely in no language (Coseriu 1973: 253). It is important also to note that, in Humboldt's eyes, the types represent different stages of an evolution, starting with isolated words and ending with inflectional forms, into which erstwhile isolated words are fused (*zusammengesetzt*): 'according to its origin every inflection is the fusion of different signs or, better, words' (Humboldt 1933: 158). There is here a clear influence of Bopp's *Conjugationssystem*, where verbal conjugation was explained via the affixation (i.e. agglutination) to the verbal root of the auxiliaries *asti* and *bhavati* 'to be'.

7. COMPARATIVISM AND TYPOLOGY

After Wilhelm von Humboldt, Indo-European studies became the main trend in linguistics, and typology was confined to a more marginal role. Also, dialectology played an important role in the renewed horizons of the discipline. The discovery of many 'scientific' laws (*Lautgesetze*), which had already begun with the Danish Rasmus Rask (1787–1832) and Jacob Grimm, became the hallmark of the so-called Neogrammarians (*Junggrammatiker*) who dominated the second part of the 19th century. The final point of this evolution may be represented by the famous statement by Antoine Meillet, one of the most prominent heirs of the Neogrammarians in the 20th century: historical linguistics is the only useful and valid linguistic classification (Meillet 1975[1914]).

This statement is contained in an article occasioned by the publication of Franz Nikolaus Finck's book on the language families of the world (*Die Sprachstämme des Erdkreises* [1909], followed by the better known *Haupttypen* [Finck 1910] on a very similar matter). Meillet criticizes the canonical classification into four linguistic types—that is, isolating, agglutinating, incorporating, and inflectional languages—as useless and non-scientific.

Long before Finck, August Schleicher (1848) had advanced a tripartite division into monosyllabic, agglutinating, and inflectional languages, not accepting the fourth type suggested by Humboldt, namely, the incorporating one. Later (1861–2), he refined this tripartition and introduced sub-classes by using A. von Schlegel's synthetic vs. analytic criterion for every type.

Heymann Steinthal (1860) proposed a new typological classification of languages, partly diverging from Humboldt's fourfold division (also see Graffi, this

volume). The subtitle of Steinthal's book indicates that the Humboldtian philosophical approach (see section 5) to classification was still operative. Note that Steinthal had been the editor of Humboldt's linguistic writings (Steinthal 1884). Like Humboldt, Steinthal underlines the psychological aspect of language: the evolution of the human mind matches the development of language. At the same time, Steinthal is faced with the same problem as Humboldt: why are languages different if the language faculty is common to all humankind? To give an answer to this question, Steinthal criticizes Humboldt's concept of *innere Sprachform*, but at the same time, he elaborates on some Humboldtian ideas and develops what will receive the name of 'ethnopsychology' (Wundt's *Völkerpsychologie*; see Wundt 1912 [1900], cf. Graffi 2001: 40 ff. and this volume, and the already mentioned concept of 'language *genius*'). But already, Graziadio Isaia Ascoli had maintained a very sceptical position towards the so-called 'psychological grammar' based on 'speculative observations of the different linguistic types in order to provide a firm basis for a psychology of nations' (Ascoli 1877[1867]: 31–61). The strongly data-oriented dialectology of which Ascoli was one of the most authoritative representatives was not ready to accept impressionistic conjectures as a basis for classifying language types, and even less to draw psychological conclusions from these conjectures.

As for the classification of languages, Steinthal states that it is necessary to find feature(s) which may characterize and determine the entire 'organism' of a language (on holistic typology, see section 8). He introduces the concept of 'form' and distinguishes two main types: (a) languages without form (*formlose Sprachen*), that is, without formal expression of the grammatical relations; and (b) languages endowed with form (*Form-Sprachen*). In type (a), grammatical relations are expressed by full words; for example, the plural is expressed by words meaning 'many, all, etc.', tenses are expressed by particles such as 'time ago', etc. Siamese and Birman are representative of this type. Chinese, contrary to the received classification, belongs to the languages endowed with form, since grammatical relations are expressed by the juxtaposition of words (*Nebensetzung*) in the sentence. The best examples of *Form-Sprachen* are, however, the Semitic and, above all, the Indo-European languages, which modify (*abwandeln*) the form of the word. Note in any case that juxtaposition and modification can be found in both types. Thus, Turkish and, more generally, the Uralo-Altaic languages are ascribed to the (a) type, but they have derivative suffixes like the Indo-European languages which belong to type (b). Similarly, Siamese and Birman (type (a)) make use of the *Nebensetzung* and so does Chinese (type (b)). Steinthal's classification, based on 'ethnopsychology', is not without contradictions (see Ascoli's criticism on the 'gazzarra psicologica' (psychological din) of his time).

Franz Misteli revised Steinthal's typology (Misteli 1893) and modified the opposition 'formless' vs. 'form languages' into 'non-word' vs. 'word languages'. The classifying parameters are the relation of the word to the sentence (syntactic criterion) and the inner structure of the word (morphological criterion). Misteli's

concept of 'word' is very strict and echoes Humboldt's ideas. According to Humboldt, only the inflectional languages fully realize the inner fusion of meaning and syntactic function in the word: the synthesis realized in this word unity is the most brilliant solution, since by using this strategy, every element of the sentence shows at the same time its objective meaning and its relation to the underlying thought. Thus, the 'best' word has to have some internal mutation, such as the Ablaut or the Semitic vowel insertion in the three-consonant root. On the contrary, agglutinating languages simply add more elements (suffixes) to an unchangeable root in a mechanical way.

Using these parameters and building on Steinthal's typology, Misteli proposed the following subdivision:

(a) Formless languages
   (i) with sentence-words (*Ein-Wort-Sätze*, i.e., the incorporating type of Amerindian languages);
   (ii) without words (*nichtwortig*)
      α. root-isolating, such as Chinese
      β. stem-isolating, such as Malay
      γ. juxtaposing (*anreihend*), such as Egyptian;
   (iii) with apparent words (*scheinwortig*), such as Turkish.
(b) Form languages with real words (*echtwortig*): Semitic and Indo-European languages.

We have already alluded to Finck (1867–1910), whose typology closely parallels Misteli's classification. His definition of 'word' is the following: 'the smallest constituent of the utterance, which is not bound in a rigid manner to other phonetic clusters'. On the basis of this definition, he distinguishes between languages having highly complex words (e.g. Inuktikut (Eskimo) and other polysynthetic languages) and languages whose words are 'fragmentary' structures and consist of only loosely related parts (e.g. the Bantus). The other languages of the world are located along a continuum between these two poles. Chinese, where each word is a single morpheme, is deemed to be a conceptually simple language, representing more or less the centre of the continuum. Finck's three main groups are (a) isolating; (b) inflectional; (c) combining but not inflected languages (such as Turkish or Inuktikut). We disregard here the subdivisions of (a–c) suggested by Finck, as these are not very different from those operated by Misteli.

Misteli's and Finck's suggestions were not accepted by the majority of linguists (see the previously quoted sharp dismissal by Meillet), because of the attempts of 'ethnopsychology' to find a link between race and language. The traditional fourfold division based on Schlegel's and Humboldt's suggestion became the typology 'vulgata'.

Finally, we have to mention Max Müller (1823–1900), who returned to Bopp's approach that considered roots as the basis for typology. Isolating, agglutinating,

and inflectional languages represent but different degrees of a unique strategy of composition between predicative and demonstrative roots. The fourth traditional type—the polysynthetic—is not necessary, since it simply represents a particular case of composition and not a different grammatical strategy (see Müller 1880 and Graffi, this volume).

8. MODERN TYPOLOGY

Georg von der Gabelentz (1840–93) can be considered as the 'final moment' in our sketch of the early history of typology. This is not only because he probably used the word 'typology' first in the well-known and often quoted page from the second edition of his book *Die Sprachwissenschaft* (Gabelentz 1901[1891]: 481):[2]

but what an achievement would it be were we able to confront a language and say to it: 'you have such and such a specific property and hence also such and such further properties and such and such an overall character'—were we able, as daring botanists have indeed tried, to construct the entire lime tree from its leaf. (Translated by Shibatani and Bynon 1995: 10)

And the text continues: 'If one had to baptize a not yet born child, I would choose the name typology. I see here a task for general linguistics, whose solution can already be tempted with the means we have now at our disposal'. As Song (2001a: 358) correctly suggests, the sentence by Gabelentz, taking post-Darwinian botany as a scientific model, envisages a holistic typology on the basis of a unique overarching principle or, to use an expression of W. P. Lehmann, of very few underlying ground-plans. A special issue of a linguistics journal was, in fact, devoted some years ago to comment on Gabelentz's wishful perspective (*Folia Linguistica* 20.1–2 [1986]).

The discussion of this important topic belongs to the following chapters (see especially Graffi, this volume), but one must not forget the remarks with which Louis Hjelmslev concluded the chapter on typological relations between languages in his book on language (*Sproget*):

An exhaustive linguistic typology is, in fact, the biggest and most important task facing linguistics [. . . .] Its ultimate aim must be to show which linguistic structures are possible, in general, and why it is just those structures, and not others, that are possible. And here it will come closer than any other kind of linguistics to what might be called the problem of

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[2] On the philological question as to whether the term really goes back to Georg von der Gabelentz or to the editor of the second edition of his book (1901), his nephew Albrecht Conon von der Schulenburg, see Plank (1991).

the essence of language. [...] Only through typology does linguistics raise [sic] to quite general points of view and become a science. (Hjelmslev 1970[1963]: 96)

It seems to me that the same need for a general overview and a possible all-embracing explanation constitutes an important link between Gabelentz and Hjelmslev. Also, some other points in Gabelentz's typological views show his very modern approach—so that it is correct to consider Gabelentz as the bridge between 19th- and 20th-century typologists.

Gabelentz clearly saw that if typology has to achieve reliable, non-impressionistic results, it has to make use of questionnaires (see section 5 above on Leibniz) prepared by experts, with a fine-grained research programme 'so that any question may be answered by "Yes" or "No"' (which is unfortunately not always the case). Statistics should then be used in analysing the data: this would finally enable researchers to overcome the many contradictory assessments which can be found in the literature concerning the presence of this or that linguistic feature. The presence of the features α and β in a given language will entail the presence of the features γ and δ, to use Greenberg's famous expression, with more than chance probability. It can easily be seen that Gabelentz's programme is really very modern: typology aims to become predictive. Another very modern point in Gabelentz's view is that, contrary to most of his predecessors, he considers linguistic change and linguistic type change in a really unprejudiced way. He thinks of diachronic evolution not as language decay (*Sprachzerstörung*, according to A. Schleicher) or as continuous improvement (a position held, for instance, by Otto Jespersen) but as a spiral movement (*Spirallauf*: Gabelentz 1901[1891]: 255–8) that may return to previous typological stages—though using different linguistic means. Agglutinated suffixes undergo phonetic erosion and disappear; their functions are taken over by more rigid syntactic word orders and/or full words (this is the case of isolating languages). But in their turn, these full words (recall the examples of Steinthal's *formlose Sprachen* in section 7 above) may be agglutinated into a new fixed form. The next step could be, again, their phonetic erosion and disappearance. Consequently, new periphrastic forms will become necessary to express the morphosyntactic relations of a word with the rest of the sentence. Periphrastic forms may again be reduced to a single word (e.g. Latin *vidē-fuō > vidēbō*, but late Latin developed a new periphrastic *videre habeo*, reduced to Italian *vedrò*, French *je verrai*, Spanish *veré*, whereas English *I shall see* is a periphrastic form).

As can be seen from this example, Gabelentz does not propose new typological classifications: his view is the canonical one, with two poles represented by the isolation and the incorporating polysynthesis, respectively. His relevance lies elsewhere: as a matter of fact, the idea of a spiral movement in language change has been taken up by many contemporary linguists as a very handy representation of the moving forces which cause a language or a linguistic type to drift from stage A to stage B and, eventually, to stage A'.

An implicit, though not always recognized, advantage of the spiral conception Gabelentz has passed on to the following generations of typologists is that nowadays linguistics has abandoned the idea that some language types are better than others. There are no longer value hierarchies in cross-linguistic comparisons. Finally, if we consider Greenberg's (1974) suggestion of a 'dynamicization of typologies' as the study of type change processes, we see that, from this point of view, Gabelentz represents the bridge between two different ways of approaching the complex problem of linguistic typology.

9. CONCLUSION

It is true that today's typology has adopted induction as its general strategy: starting from the comparison of large and representative language samples, chosen by means of statistical criteria and stored in very capacious data banks, it aims to establish the variation range among languages (and, consequently, the universals of language—recall Hjelmslev's word). Latin is no longer the model which has to be deductively applied to the description of other languages. Lehmann (1993) made a rather sharp contraposition between 19th-century typology based on morphology, not capable of illuminating the inner structure of language, and 20th-century typology based on syntax (from Greenberg on). But the history of typological studies I have summarized here does not show such a strong contraposition. Speaking of Humboldt, Bopp, Steinthal, et al.—and even earlier of the *Modistae*—we have seen that grammatical considerations were strictly intertwined with reflection on syntax. We can say that the main approach to typology has been a morphosyntactic one. Phonology and semantics, on the contrary, have not been paid the same attention in the period considered here (nor, to tell the truth, in the following periods).

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CHAPTER 2

THE PIONEERS OF LINGUISTIC TYPOLOGY: FROM GABELENTZ TO GREENBERG

GIORGIO GRAFFI

1. INTRODUCTION

It is a difficult task—and possibly a useless one—to try to establish the birth date of linguistic typology. For example, Renzi (1976) opens his overview of the history of the field with F. Schlegel's *Über die Sprache und Weisheit der Indier* (1808), but he subsequently remarks that the first scholar to deal with typological issues was A. Smith (1723–90), in his *Dissertation on the Origin of Languages* (1761). Rosiello (1987) offers an alternative starting point, seeing the origin of linguistic typology in the 18th-century discussions about word order across different languages, such as those developed by Girard and Beauzée. Actually, any of these dates (and many others as well) could be taken as the birth date of linguistic typology with some justification (see Ramat, this volume). However the case may stand, it can be assumed with certainty that linguistic typology originated well in advance of Gabelentz: why, then, describe him as a pioneer of the field?

The most immediate answer might be that it was Gabelentz (1894, 1901[1891]) who coined the term 'typology' to refer to a branch of linguistics. Before him, this branch was commonly called '(morphological) classification of languages' (see also Greenberg 1974). Secondly, he clearly distinguished between genealogical and typological classification, which, having developed together during the 19th century, were to a certain extent intertwined with each other (see 2.1 below). Thirdly, Gabelentz clearly stated that no language is more or less 'perfect' than another, thus abandoning the 'evaluative' classification which was typical of other scholars. Finally, Gabelentz's work represents the confluence of two trends of linguistic typology *avant la lettre*: on the one hand, the classification of languages on a morphological or 'psychological' basis, originated by F. Schlegel; and on the other, the cross-linguistic comparison of word order types, tracing back to the French Enlightenment and resumed by H. Weil around the middle of the 19th century.

Gabelentz can, therefore, be rightly considered as the originator of the typology of today, which is orthogonal to genealogical classification and excludes any assessment of languages on an evaluative scale. But his investigations of word order, as well as some hints for an 'implicational' typology, are good reasons to consider his work as the first stage of a process which eventually led to Greenberg's (1966c) classic essay.

As with any historical process, this one, leading from Gabelentz to Greenberg, is not at all simple and linear. To understand Gabelentz's background better, the two different trends alluded to above (classification of languages in Germany and word order typology in France) will be briefly discussed in section 2, while Gabelentz himself and some of his contemporaries will be the topic of section 3. Gabelentz's work remained somewhat unnoticed because of his premature death. In the age of structural linguistics, scholars such as Sapir and Hjelmslev, probably by different routes, developed partly analogous ideas, which will be examined in 4.1 and 4.2. The topic of word order as a typological feature, however, essentially remained extraneous to their research, while some important insights on it can be found in Tesnière's work (see 4.2). Jakobson, in his turn, paved the way to an 'implicational' view of typology (see 4.3), which was systematically developed by Greenberg shortly after him. And indeed, word order parallelisms seen within an 'implicational' perspective became the basic standard for linguistic typology with Greenberg's (1966c) essay, to which the final section (5) of this chapter will be devoted.

2. THE BACKGROUND TO GABELENTZ'S TYPOLOGY

2.1 'Morphological' and 'psychological' classification of languages

Genealogical and typological classifications of languages were not clearly kept distinct by many 19th-century scholars (see Morpurgo Davies 1975: 627 and *passim*). Both classifications have their source in F. Schlegel's (1772–1829) book mentioned above, but it can be immediately seen that the typological opposition introduced by him—between 'organic' and 'non-organic' languages—overlaps with the genealogical classification to a large extent, since, according to Schlegel, the only 'organic' languages are the Indo-European ones. It was therefore generally assumed during the first half of the 19th century, and even later, that languages that are 'morphologically' related should also be genealogically so, and the possibility that the diachronic development of a given language could bring about a change of its type was excluded.

As has been seen in Ramat's chapter (this volume), F. Schlegel's classification was later developed and improved by his brother August Wilhelm Schlegel (1767–1845), W. von. Humboldt (1767–1835; see, however, the qualifications immediately below), A. Schleicher (1821–68), and others: this process eventually led to the classification of languages into 'isolating', 'agglutinative', 'inflexional', and (for certain scholars) 'incorporating' or 'polysynthetic'. This fourfold classification is often ascribed to Humboldt, but this is not fully correct: Steinthal noticed that such an attribution was due to an error by Schleicher (cf. Morpurgo Davies 1975: 660). What is still more important, however, is to remark (see Ramat 1985 and this volume, section 5) that Humboldt's approach to language classification differs from A. W. Schlegel's for two reasons: first, because it is based on syntax rather than on morphology; second, because (though with some obscurity, as is frequent throughout Humboldt's work) it is conceived as a classification not of concrete languages but of abstract forms which can appear together in a given language (see, e.g. Humboldt 1968[1836]: cccxvii).

'Morphological' classification was not the only kind of typological classification during the 19th century: another was the so-called 'psychological' one. Such labels derive from F. Müller (1834–98), who actually distinguished three kinds of classification: (i) the 'morphological' and (ii) the 'genealogical' classification, which view 'language in itself and for itself, as an autonomous organism'; (iii) the 'psychological' classification, which views language 'in its relationship with thought' (Müller 1876: 63–82). Müller ascribes the psychological classification mainly to H. Steinthal (1823–1899), but he also remarks that its source can be seen in some of Humboldt's

pages. This is further proof of the inadequacy of putting Humboldt among the leaders of the 'morphological' classification (for more on this question, see Morpurgo Davies 1975: 654, 661). At any rate, scholars developing psychological classification (like Steinthal himself) did not dismiss the morphological one, but went on to employ the labels 'isolating', 'agglutinative', etc., generally linking them to the 'outer form' of languages, while the 'psychological' kinds of classification were considered as pertaining to the 'inner' form.

As Morpurgo Davies (1975: 667) writes, Steinthal's starting point was a critique of Humboldt's definition of *innere Sprachform*: this was judged as inadequate, since Humboldt 'tended to identify it with the general form of thought', without considering its relation to the problem of language diversity. To overcome this inadequacy, Steinthal had a means at his disposal: a new kind of psychology, dubbed 'ethnopsychology' (*Völkerpsychologie*), worked out by him together with his colleague and brother-in-law M. Lazarus (1824–1903). In their view, ethnopsychology had to account for the social nature of language and the diversity of languages (see Lazarus and Steinthal 1860: 5–6). Steinthal's 'ethnopsychological' language classification was therefore based on a new interpretation of the Humboldtian notion of 'linguistic form': one may recall Steinthal's fundamental opposition between 'formless languages' and 'form languages', illustrated in Ramat (this volume, section 6).

It was a common feature of both kinds of language classification, 'morphological' and 'psychological', that they eventually resulted in an assessment of the different languages or language groups on a value scale. This is a feature also of Steinthal's classification: the 'less developed' languages lie on the lowest steps and the 'most developed' ones on the highest. 'Ethnopsychology' is the starting point for adopting this assessment, and 'linguistic form' is the standard according to which the assessment is established. Furthermore, the different types of language listed by Steinthal always coincide with given languages or language groups: for example, all Uralo-Altaic languages fall into one of the classes of 'formless' languages; all Indo-European languages belong to one class of form languages. Hence, even if it is not stated explicitly, typological classification is still dependent on genealogical classification, as was the case with F. Schlegel.

2.2 New approaches to the word order problem: Weil

As has been shown in Ramat (this volume, section 5), G. Girard (1677–1748) and, following his lead, N. Beauzée (1717–89) opposed 'analogical' and 'transpositive' languages (see Girard 1747 and Beauzée 1767). One should remember that 'analogical' languages were so named because their word order would 'match the order of ideas', while that of 'transpositive' languages would not. According to Girard's and Beauzée's classification, French, Italian, and Spanish belong to the analogical class;

Greek, Latin, and German, to the transpositive one (on these matters, also see e.g. Haggblade 1983, Rosiello 1987).

Such a classification was the starting point of the French philologist (though German by birth) H. Weil (1818–1909). According to him, sentences like *Romulus Romam condidit* ('Romulus [nom.] Rome [acc.] founded'), *Romam condidit Romulus*, and *Condidit Romam Romulus* have the same syntax, but their 'march of ideas' is different: the 'point of departure' or the 'initial notion' (*point de départ, notion initiale*) is Romulus in the first sentence, Rome in the second, the action of founding in the last. In the same way, the 'goal of the discourse' (*but du discours*) of each of the three sentences is different. Hence, the difference between ancient and modern languages does not lie in the fact that the former are 'transpositive' while the latter are 'analogical'; rather, ancient languages realize the order of ideas by means of word order and the syntactic order by means of inflectional endings; by contrast, word order in modern languages expresses both the order of ideas and the syntactic order (Weil 1879[1844]: 28).

Weil then replaces the distinction between analogical and transpositive languages with the one between 'free construction' languages and 'fixed construction' languages. Within the latter group, some languages show SVO order (like French, the typical 'analogical' language in Beauzée's framework) and others, SOV (like Turkish or even German, in subordinate clauses) or still different orders. (Of course, SVO or SOV labels are not those of Weil.) Weil (1879[1844]: 41–3) accounts for the difference between these two kinds of fixed construction languages by distinguishing two different types of construction: the 'ascending construction' type, where the determining (or 'qualifying') word precedes the determined (or 'qualified') word, and the 'descending construction' type, where this order is reversed (Weil 1879[1844]: 51). Weil does not identify either type of construction with a given language or language group: both types can combine within the same language, bringing about different systems. The two opposed poles are represented by French (with some exceptions) and by Turkish for the descending and the ascending type, respectively: but there exist intermediate cases, such as German, English, and Chinese (cf. Weil 1879[1844]: 43–7).

This distinction of ascending vs. descending construction concerns the internal structure of word groups: to account for the verb position within the sentence in fixed construction languages, Weil adopts a second 'point of view', which allows him to adequately tackle one puzzling problem of German word order, namely, SVO order in main clauses vs. SOV order in subordinate clauses (cf. Weil 1879[1844]: 48). According to him, the main clause connects two ideas (it expresses a judgement), while the subordinate one takes such a connection as given. Since it is the verb that establishes the connection, it is found in the middle of the main clause, while it occupies the last position in secondary clauses, which express not a judgement that is being uttered but an already uttered one (p. 49).

Weil's assumption that 'the syntactic march is not the march of ideas' makes it impossible to judge some languages as 'more logical' than others. However, Weil's typology is still an evaluative one, to a certain extent, but its assessment standards are different from those of scholars like Steinthal. Consider the issue of ascending and descending constructions: from Weil's perspective, both are viewed as syntactic (i.e. not as stylistic) phenomena and are assigned equal dignity. Hence, the preference for either construction type cannot be taken as the standard for the assessment of a language; rather, a language is more perfect if it resorts to both types. German chooses this strategy, while Turkish is uniformly ascending; therefore, the former language is to be evaluated more highly than the latter (cf. Weil 1879[1844]: 61–2).

3. GABELENTZ AND HIS (NEAR-) CONTEMPORARIES

At the end of the 19th century, many linguists felt dissatisfied with the morphological classification of languages. For example, Müller (1876: 71), after presenting his distinction of morphological, psychological, and genealogical classifications of languages (see 2.1), criticized the two former kinds of classification for being intrinsically inconsistent: if they want to reach an accurate partition, they are obliged to resort to the genealogical classification, which therefore appears to be the most reliable one. This dissatisfaction led the majority of linguists to dismiss any attempt at a non-genealogical classification, with the consequence that linguistic typology became almost neglected until Sapir (see 4.1). Nevertheless, a number of non-mainstream linguists have attempted the challenge of working out a new kind of language classification, which was bound to a certain extent to the 'ethnopsychological' classification that can be traced back to Steinthal and ultimately to Humboldt, even if they were critical of this tradition in many respects (see Morpurgo Davies 1975: 652 ff.). Among those linguists, F. Misteli (1841–1903), F. N. Finck (1867–1910), and especially G. v. d. Gabelentz (1840–93) have been already dealt with in Ramat (this volume); here some further aspects of Gabelentz's thought will be investigated, given his special importance in the history of linguistic typology. Before presenting his works, some comments will be devoted to J. Byrne (1820–97) and to R. de la Grasserie (1839–1914). Byrne's (1885) book was praised by Gabelentz (1901[1891]: 426) as 'the most insightful work since Humboldt's masterpiece', and it was also a reference point for Finck (1901). The long paper by Grasserie (1889–90) apparently anticipates some of Gabelentz's ideas (as noted by Plank 1991: 438–45).

Byrne's book is a lengthy and ambitious attempt at explaining cross-linguistic differences and at classifying languages on the basis of some general psychological notions, on the one hand, and of some cultural-anthropological observations, on the other, which are essentially of a racist nature: 'race' is a key term throughout the book, and Byrne (1885 II: 274) states that 'the Indo-European and Syro-Arabian races have surpassed all other races of men'. Byrne (1885 I: 11) assumes that 'the natural order of thought' puts the noun before the adjective, the subject before the verb, and the adverb after the verb. To account for the occurrence of opposite orders (AN, VS, etc.), Byrne resorts to causes like the climate and the way of getting food (e.g. through hunting or agriculture), which bring about such orders 'in less favourable situations' (cf. e.g. Byrne 1885 II: 323–7). When a different order occurs instead of what would be expected under such conditions, some rather cunning explanations are offered, which refer to the particular historical situation of a given 'race' (Byrne 1885 II: 283).

Grasserie's views are much more circumspect. He neatly distinguishes between genealogical and non-genealogical classification (the first part of his essay is devoted to the former and the second to the latter), although he starts by stating (1889: 375) that 'the only real classification' is the genealogical one. Actually, much of his essay deals with non-genealogical classification. Grasserie (pp. 296–7) maintains that both the 'morphological' and the 'psychological' classifications are 'artificial' and 'subjective': a real 'objective' classification should be based on the principle of 'subordination of features' (*subordination de caractères*). For example, if a language has vowel harmony, it is also necessarily agglutinative, while a language can be agglutinative without showing vowel harmony: hence, the feature vowel harmony can be considered as dominant and that of agglutination, as subordinate. Grasserie works out this insight in a 'multidimensional' way which anticipates Sapir's approach (see 4.1) and is possibly even more complicated: the 'morphological' notions of isolating, etc., and the 'psychological' ones of formal vs. formless occur as classificatory features, but they are not the only or the most general ones.

Gabelentz was certainly inspired by Steinthal's ethnopsychology and, as has just been seen, by Byrne's psycho-anthropological approach, but his own approach is essentially independent of both. He states that 'comparative linguistics' consists of two parts: the 'genealogical' part and the 'ethnopsychological' one, the aim of the latter being to account for 'the possible relationship of linguistic expression and the concepts or thoughts to be expressed' (see Gabelentz 1874–75: 130). Hence, Gabelentz, like Grasserie just before him, seems to conceive the distinction between the typological and the genealogical classification of languages in a way that is much clearer than, for example, Steinthal. This clear distinction between the two kinds of linguistic relationship also allows him to admit language changes which bring about typological changes: such an assumption, which was untenable for the linguists preceding him, led him to the 'spiral' conception of language change, presented in Ramat (this volume, section 7).

However, Gabelentz especially differentiates himself from the linguists preceding him by his abandonment of an evaluative view of typology. As a consequence, the opposition between 'form languages' and 'formless languages' disappears in his system. Indeed, if a language only uses syntactic means to express grammatical relations, this fact does not imply that its grammar has a lesser 'forming strength'. For example, Gabelentz (1901[1891]: 362) notes that the effort towards form in Chinese has not been less than that which occurred in Indo-European. Steinthal (1860: 328) labelled the means used by Chinese to express the predication relation (i.e. word order) as 'rhetorical': Gabelentz views them as a wholly syntactic process. Gabelentz also remarks that many of the features allegedly showing the superiority of Indo-European are not restricted to it, and even that some features of Indo-European could be considered 'inferior'; for example, the occurrence of the nominative case both in the subject and in the nominal predicate: this is a confusion that Finnic languages, for example, do not invite (see Gabelentz 1901: 327).

Moreover, Gabelentz is deeply involved in the investigation of the connections between the structure of a given language (or a given language group) and the 'spirit' of the nation that speaks it. Compare, for example, Malay languages and Semitic languages, which show remarkable structural similarities, such as the verb in first position: Gabelentz states that remarkable affinities also exist between the histories of the two peoples. As Phoenicians were great seamen and Arabs great explorers, so Malays were sea-rovers (Gabelentz 1901[1891]: 411–15). We can therefore conclude that Gabelentz rejects the evaluation side of ethnopsychology—that is, the attempt to describe different languages as different degrees of realization of the 'idea of language'—while he fully accepts what could be called the 'ethnopsychological foundation' of linguistic typology, namely, the assumption that an inseparable connection exists between the structure of language(s) and the structure of thought.

Gabelentz's analysis of word order is based on the partition of the sentence into 'psychological subject' and 'psychological predicate', which essentially corresponds to Weil's distinction between 'initial notion' and 'goal', as was stressed by Weil himself (1879[1844]: vii–viii). The 'psychological subject' is the thing towards which the attention of the addressee is directed; the 'psychological predicate' is what the addressee is made to think about it. Any part of speech can function as the psychological subject even if it is not a substantive or a substantive-like element. The natural order puts the subject before the predicate: such an order is a rule for grammatical subject and predicate, whereas it is an unbreakable law for the homonymous psychological categories (Gabelentz 1869: 379).

With respect to Weil, Gabelentz introduces (although not explicitly) an important innovation in his analysis of the German sentence (see especially Gabelentz

1874–75), which does not assign any privileged position to the subject, but only to the verb. The first 'partition' of the sentence can contain several kinds of element (the grammatical subject, the object, or several kinds of adverb and prepositional phrase); the verb function is no longer that of connecting the two parts of the judgement (as was the case with Weil; see 2.2), but the psychological subject and its predicate. Hence, Gabelentz especially develops the second of the two 'points of view' singled out by Weil for an investigation of word order: namely, the one that deals with the whole sentence. Unlike Weil, however, Gabelentz no longer resorts to the division of the sentence into grammatical subject, copula, and grammatical predicate, essentially inherited from the tradition of General Grammar. Gabelentz also investigates word order under the first of Weil's points of view, namely, the arrangement of elements within each word group. Like Weil, he compares the determining–determined and the determined–determining order (cf. Gabelentz 1869: 382–3, 1874–75: 337). He deems the first kind of order to be more unitary, the second more analytical.

For other important achievements by Gabelentz, the reader is referred to Ramat (this volume, section 7) and to Plank (1991). Among these, one should recall the suggestion of employing questionnaires to reach a non-impressionistic overview of languages, his sketch of the future tasks of linguistic typology in terms which today would be labelled 'implicational' (and which can already be noticed in Grasserie's work), and his coining of the term 'typology' itself (see Gabelentz 1894, 1901[1891]: 481). Is this new label only a terminological innovation, or does it actually represent a shift, if not a break with previous views on the topic? The second alternative seems to be more convincing. Neither in his 1894 article nor in the pages of his *Sprachwissenschaft* does Gabelentz present a systematic classification of languages, be it 'morphological' or 'psychological' (while an attempt at such a classification can be found in the final section of Grasserie 1890: 335–8); rather, he stresses the fact that if a given phenomenon occurs in a given language, then other phenomena co-occur with it 'with such a great probability' (Gabelentz 1894: 5–6). The notion of 'type' hence tends to coincide with that of 'cross-linguistic feature', not with that of 'class'. It has been mentioned (2.1) that this abstract notion of type already appears in some of Humboldt's pages; however, it becomes much clearer with Gabelentz.

Finck's two books (1901, 1910) dealing with language classification refer partly to the Steinthal–Misteli tradition, partly to Byrne. Finck, just like Byrne, asserts the superiority of Indo-European and Semitic languages (1901: 23), but the word 'race' is not a key word in his books, unlike the case with Byrne. His classification, presented in Finck (1901) and restated in Finck (1910), has been sketched in Ramat (this volume, section 6). The latter book by Finck, however, shows some interesting novelties, beginning with its title, which speaks of language types and no

longer of language classes. Furthermore, Finck (1910: 6) states that he does not conceive the difference in linguistic types as the instantiation of a historical progress or of an ideal progress from a simpler type to more developed ones. At the end of the book (1910: 155), he also states that 'the different types are not unchangeable': a given language could change its type in the course of its historical development. Gabelentz's influence can be conjectured, even if it seems difficult to prove definitely.

The linguistic work of W. Wundt (1832–1920), however, seems totally independent from Gabelentz: Wundt's ethnopsychological classification of languages is still an evaluative one. Hence, 'more developed' languages are opposed to 'less developed' ones. This assessment is based on the lexical and grammatical systems of the different languages. For example, Wundt divides 'the contents of linguistic thought' into 'concrete' content and 'abstract' content (e.g. 'hand' vs. 'five'). These types of thought can be considered as matching different degrees of development (cf. Wundt 1912[1900] II: 436–58).

Wundt (1912[1900] II: 362–3) was possibly the first scholar to employ the labels SVO, VSO, etc. Their identity with Greenberg's (1966c) labels is, however, only apparent. Wundt's aim is not to find word order parallelisms within constituents belonging to different categories. He only aims at noticing the possibility, in a free word order language, of putting any of the three elements—S, V, and O—at the beginning of the sentence, according to his 'principle of putting the stressed concepts first'.

Relatively speaking, far more space is devoted to word order correlations in W. Schmidt's (1845–1954) book (1926: 380–496); it appears as a late offspring of ethnopsychology, hence it will be dealt with in the present context, despite its publication some thirty years after Gabelentz's work. Schmidt investigates the positions of the genitive, of the personal pronoun, of the accusative, and of the adjective with respect to the noun and to the verb. He notes that, throughout his language sample, when the genitive precedes the noun, the accusative precedes the verb in 49 languages vs. 18 (both orders are possible in seven languages); in the opposite scenario, when the genitive follows the noun, the accusative follows the verb in 28 languages vs. 5 (both orders are possible in three languages). Schmidt draws the conclusion that in all languages the genitive was originally prenominal and the personal pronoun preceded the verb. The shift of the genitive into the postnominal position was due not to linguistic factors but to migrations caused by the birth of 'matriarchal agriculture', which in their turn produced mixtures of populations. In languages of peoples who did not experience such migrations, the genitive preserved the original prenominal position. This positional shift of the genitive would have brought about an analogous shift of the accusative (from preverbal to postverbal position) and of the adjective.

4. TYPOLOGY IN THE AGE OF STRUCTURALISM

4.1 Beyond 19th-century typology

Structural linguistics abandoned any kind of psychology, and since ethnopsychology had been one of the major sources of linguistic typology, this implied a lessening of interest also in this last branch of studies. Nevertheless, some outstanding linguists belonging to the structural trend were involved in typological questions (e.g. Sapir, Hjelmslev, Jakobson) and achieved some significant results with respect to 19th-century 'classification of languages'. One such achievement was surely the neat distinction between genealogical and typological classification of languages. It was arrived at by Gabelentz (see section 3), and it was also very clearly stated by Saussure (1922[1916]: 313); nevertheless, it was still unclear to many scholars.

E. Sapir's (1884–1939) discussion of 'Types of Linguistic Structure' (Sapir 1921: ch. 6) does not contain any explicit reference to earlier scholars. Nevertheless, it is clear that he constantly refers to 19th-century linguistic typology stemming from the Schlegel brothers on the one hand and from Steinthal on the other, while the analysis of word order within a typological perspective appears wholly extraneous to him. In a sense, therefore, Sapir's typology could be labelled as 'pre-Gabelentz'; this is also shown by the lack of occurrence of the word 'typology' itself throughout the chapter, where he only speaks of 'classification' of languages, in the manner of 19th-century linguists.

Sapir rejects any kind of evaluative typology and, as a result, the opposition between 'form' and 'formless' languages (cf. Sapir 1921: 125). Then he stresses the insufficiency of the classification of languages into 'isolating', 'agglutinative', and 'inflectional', as well as the opposition between 'synthetic' and 'analytic': a language may, for example, be both agglutinative and inflectional, or it may show both analytic and synthetic phenomena. An adequate classification of languages, Sapir states (1921: 136), must therefore be based on another criterion: 'the nature of the concepts expressed by the language'.

Grammatical concepts are classified by Sapir into two main groups. The first group of concepts is further partitioned into 'basic' and 'derivational' concepts; the second, into 'concrete relational' and 'pure relational' concepts (Sapir 1921: 101). Basic concepts are 'objects', 'actions', and 'qualities'. Derivational concepts 'give a radical element a particular increment of significance'; for example, the English -er agentive suffix indicates such a concept. The difference between 'concrete' and 'pure' relational concepts lies in the fact that the former, but not the latter, have a residue of 'material content'; for example, gender and number belong to concrete

relational concepts, while grammatical relations (subject, object, etc.) belong to pure relational concepts. In principle, only basic and pure relational concepts must be expressed; hence, only basic and pure relational concepts are expressed in every language. The other two types can occur, singly or together, but they need not. The possible combinations of the four groups of concepts bring about Sapir's classification of languages into four 'conceptual types': (i) 'Simple Pure-relational' languages (containing only basic and pure relational concepts); (ii) 'Complex Pure-relational' languages (containing basic, derivational, and pure relational concepts); (iii) 'Simple Mixed-relational' languages (containing basic, concrete relational, and pure relational concepts); (iv) 'Complex Mixed-relational' languages (containing all four kinds of concepts). Within Sapir's 'multidimensional' typology, classification of languages is reached by combining the 'conceptual type' with two further dimensions labelled by him as 'technique' ('isolating', 'agglutinative', 'fusional', 'symbolic') and 'degree of synthesis' ('analytic', 'synthetic', 'polysynthetic') (cf. Sapir 1921: 142–3). The key notions of morphological typology are therefore reduced to secondary dimensions of language classification.

Within Sapir's 'multidimensional' typology, linguistic type becomes an abstract notion, of which no particular language can be an instance, but which is always combined with other features. Furthermore, as has been seen, he definitely puts an end to language classification seen as language assessment. Finally, Sapir (1921: 144) neatly distinguishes between typological and genealogical classification of languages by stating that a language can change its type. These points were already clear to Gabelentz and to Saussure (see above), but Gabelentz's book was not especially successful, and Saussure's remark belonged to the parts of *Cours de linguistique générale* which did not gain much attention. It is therefore reasonable to suppose that they became generally accepted by linguists because of the wider popularity of Sapir's (1921) chapter on typology.

Some years later, Trubetzkoy (1939) completely reversed the traditional perspective: genealogical relationship is indeed typological relationship. Indo-European languages, Trubetzkoy argued, are the languages which share six specified features (see Trubetzkoy 1939: 84–5); one or more of these features may be possessed also by other languages, but the whole set of features belongs to Indo-European languages only. Hence, a language, Trubetzkoy says, may cease to be Indo-European, and, vice versa, a language may become Indo-European. This fascinating hypothesis was empirically disproved by Benveniste (1966[1952–53]), who remarked that an Amerindian language, Takelma, shows all six features ascribed by Trubetzkoy to Indo-European languages only; however (Benveniste implicitly suggested), no one would classify it as Indo-European.

The distinction between genealogical and typological classification of languages definitely represents the starting point for L. Hjelmslev (1899–1965). Hjelmslev (1970[1963]: 9; the book actually dates back to the early 1940s) defines the 'genetic relationship of languages' as holding across languages which have a common origin

and the 'typological relationship of languages' as based 'on an agreement in structural features [...] conditioned by the general possibilities of language'. Hjelmslev (1970[1963]: 93) explicitly quotes Sapir's outline of a new typology, but he considers it as suffering from the same defect as 19th-century morphological typology, namely, that of being based on the analysis of word structure. Since, in Hjelmslev's theoretical framework, the word does not belong to the 'structure' of language but to its 'usage', and the latter is always derived with respect to the former, a linguistic typology aiming at being a science cannot be based on the analysis of the word. Rather, it must first of all investigate the cross-linguistic relationships between structural categories (such as accent, pitch, etc., on the 'expression plane', and case, gender, number, etc., on the 'content plane') and then those between the categories of usage (cf. Hjelmslev 1970[1963]: 95).

As mostly occurs throughout Hjelmslev's work, such assumptions essentially remain at a programmatic stage. Hjelmslev himself explicitly acknowledges this (1970[1963]: 96) by admitting that his presentation contains little more than 'sketchy suggestions' and an 'unrealised program'. The aim of this programme is, however, well expressed, and it still sounds fully up to date: the aim 'must be to show which linguistic structures are possible, and why it is just those structures, and not others, that are possible' (p. 96).

4.2 Word order analyses

Cross-linguistic analysis of word order was developed during the first half of the 20th century in an essentially independent way from the discussions about linguistic typology. The majority of structural linguists treated word order not as a phenomenon to explain, but rather as a phenomenon which explains other phenomena. A typical attitude is Sapir's: he treats word order only as a 'grammatical process', which, together with other processes (see Sapir 1921: ch. 4), has the task of expressing grammatical concepts. He does not investigate which principles determine which types of word order across different languages.

However, word order comparison forms the basis for the typological classification of languages worked out by L. Tesnière (1893–1954; see Tesnière 1966[1959]: chs. 8–9; note that Tesnière's book appeared posthumously and its composition actually dates back to the 1930s and 1940s). Tesnière (1966[1959]: 29) expressly opposed 'genealogical' to 'typological' classification of languages more or less in the same years as Hjelmslev. Like Sapir and Hjelmslev, he considers as unsatisfactory the classification of languages according to the isolating, agglutinative, and inflectional types, and proposes an alternative classification based on word order, in the framework of his syntactic model.

Such a model is based on the notion of 'connection'. Connection is an intrinsically hierarchical fact: a relationship of dependency holds between the connected

elements. In the simplest case, when the elements are only two, one of them is the 'governing' element, the other the 'subordinate'. Tesnière graphically represents the syntactic connection by means of his 'stemmas', where the governing element(s) is (are) always represented as higher than the subordinate one(s). The stemmas express the 'structural order' of the sentence, which is different from its 'linear order'.

Tesnière's classification of languages results from the way they realize structural order as linear order. There are two types of linear order: 'descending' (or 'centrifugal') and 'ascending' (or 'centripetal'); Tesnière's terminology is therefore partly identical to Weil's (cf. 2.2). In the centrifugal order, the structurally governing element precedes the subordinate one (French *cheval blanc*); in the centripetal order, the governing element follows the subordinate one (English 'white horse'). A language can show these orders in a 'strict' (*accusé*) or in a 'lax' (*mitigé*) way: for example, French is lax, because it shows both ascending and descending order. Languages are therefore classified by Tesnière into centrifugal and centripetal, and each of these two groups is in its turn subdivided into strict and lax languages. Here is an example for each combination: (i) strict centrifugal languages: Hebrew; (ii) lax centrifugal languages: French; (iii) lax centripetal languages: German; (iv) strict centripetal languages: Japanese.

4.3 Towards an implicational typology: Jakobson

Within Hjelmslev's (1970[1963]) largely programmatic sketch of linguistic typology, one point deserves special attention, a point which derives from his general conception of linguistic structures as a set of dependencies (cf. Hjelmslev 1961 [1943]). Given this conception, dependencies are to be examined according to their nature: between an element A and an element B, for example, (i) a relation of mutual dependency may exist (A presupposes B and the other way round), (ii) a relation of unilateral dependency may exist (B presupposes A, but A does not presuppose B, or vice versa), or (iii) there is no dependency relation at all (A and B are independent of each other). These insights pave the way for the idea that if a given category occurs in a given language, this same language must contain another category, the occurrence of which is presupposed by the occurrence of the former one. In other words, the possibility of an 'implicational' typology is suggested.

Such an implicational typology was already developed in R. Jakobson's (1896–1982) investigations on the acquisition of sounds by the child and the loss of sounds by aphasics, which indeed arrive at formulating some universal rules of implicational form (Jakobson 1941). Jakobson remarks that just as the child acquires fricatives after stops and the aphasic loses stops after losing fricatives, there exists no language which has fricatives without having stops; analogously, just as the child acquires velar stops after labial stops and the aphasic loses velar stops before

losing labial ones, there exists no language which has velar stops without having labial stops. Such a 'covert' linguistic typology was made explicit by Jakobson in his report presented at the 1957 International Congress of Linguists: 'typology discloses laws of implication which underlie the phonological and apparently the morphological structure of languages' (Jakobson 1958: 20).

5. WORD ORDER AND IMPLICATIONAL UNIVERSALS AS THE BASIS FOR A NEW TYPOLOGY: GREENBERG

J. H. Greenberg (1915–2001) explicitly recognizes his debt towards Jakobson's work on implicational universals (see Greenberg 1966c: n. 1). Actually, the entire 1961 Dobbs Ferry conference (whose proceedings appeared as Greenberg 1966b) appears to be strongly stimulated by such an insight. The kind of 'typology' which emerged from that conference shows other important features which distinguish it from preceding approaches. Nineteenth-century typology, as well as Sapir's 'multidimensional' typology and Hjelmslev's 'typological programme', was more interested in stating the differences across linguistic groups than in defining the universal standards against which such differences can be measured. On the contrary, this new typology is conceived of as strictly connected to language universals research. As Jakobson (1966[1963]: 264) states, 'typological confrontation of diverse languages reveals universal invariants'.

If language typology takes language universals as 'standards', the latter are no longer conceived of only as features that every language must possess. Indeed, Greenberg, Osgood, and Jenkins (1966[1963]: xix ff.) list six types of linguistic universals, the first three of which 'concern existence' and the remaining three 'concern probabilities'. The features shared by all languages—traditional linguistic universals—are called by Greenberg et al. 'unrestricted' universals. The other universals 'which concern existence' are 'universal implications' and 'restricted equivalence'. The three universals 'which concern probabilities' are 'statistical' universals, 'statistical correlations', and 'universal frequency distribution'. The widening of the inventory of language universals is achieved, on the one hand, by opposing 'universals concerning existence' to 'universals concerning probabilities' and, on the other, by adding 'implicational' universals to 'unrestricted' universals.

This is the methodological framework of Greenberg (1966c). As an empirical field of research, Greenberg chooses a rather traditional topic, that of word order. Rather surprisingly, he does not quote scholars such as Weil or Tesnière: he makes only a generic reference (note 4) to 'nineteenth-century linguistic literature' (only

quoting the *Nubische Grammatik* by R. Lepsius) and a definite one to Schmidt (1926). Why did he explicitly quote, among his possible forerunners, just one scholar whose results, he says, 'verge on the fantastic'? Perhaps scholars such as Weil or even Tesnière (whose work became really famous only at the end of the 1960s) were unknown to him; but it is also possible that he considered their works as unsystematic, since they were based on scattered remarks about some 'descending' or 'ascending' languages. His research, on the contrary, is based on a well-defined 30-language sample, and the only scholar who before him chose a language sample as his research basis was Schmidt.

Greenberg's (1966c: 76–80) basic criteria are three alternative linear orderings of elements: (i) Whether a language has prepositions or postpositions ('prepositional' vs. 'postpositional' languages). The choice of this criterion marks a further difference with respect to the earlier treatments of word order, which only gave secondary weight to the behaviour of pre- and postpositions. (ii) The position of the verb with respect to the subject and the object. Of the six theoretically possible positions (SVO, SOV, VSO, VOS, OSV, OVS), only three, according to Greenberg (1966c: 76), 'normally occur as dominant orders': VSO, SVO, SOV. (iii) The order of the adjective with respect to the noun it modifies: AN vs. NA. Greenberg remarks that the SVO type is 'more strongly correlated' with the occurrence of prepositions and the NA order than with the occurrence of postpositions and the AN order, and that '[. . .] the nominal subject precedes the verb in a large majority of the world's languages' (Greenberg 1966c: 77).

Universals 1–7 in Greenberg's list state the systematic correlations between the three bases of classification taken together and the genitive position, namely, the order G(enitive)N(oun) vs. N(oun)G(enitive). Universals 8–25 pertain to syntax. The remaining universals (26–45) are listed under the heading 'Morphology'.

Some universals (e.g. 4, 17, 22, 35, 39, 41) are statistical ('with overwhelmingly more than chance frequency', 'almost always', 'almost never'). Many others are not statistical; that is, they are not qualified by expressions such as those just quoted, and many of them also contain the expression 'always', 'never', 'no', etc. Greenberg would label such latter universals as 'concerning existence' and not as 'concerning probabilities', to use the terminology referred to above. The widespread opinion (possibly originating in a remark by Chomsky 1965: 118) that Greenberg's universals are uniformly statistical is therefore to be rejected. Their real distinctive feature is their form, which is almost always implicational and not 'unrestricted'.

The closing section of Greenberg's essay seeks to find some principles which could account for the observed correlations. Two pairs of key notions are discussed: that of 'dominant' vs. 'recessive' and that of 'harmonic' vs. 'disharmonic' (Greenberg 1966b[1963]: 97 ff.). 'Dominant', for Greenberg, does not mean 'more frequent' nor 'stylistically unmarked', but simply 'unconditioned'. Hence, VO order is dominant over OV 'since OV only occurs under specified conditions' (Greenberg 1966b: 97). Prepositions are dominant over postpositions (Greenberg 1966c: 98)

since they are found in all three types of language (VSO, SVO, SOV), while postpositions are never found within VSO languages.

According to Greenberg (1966b: 97), there is a 'very obvious connection' between the notions of 'harmonic' and 'disharmonic' and 'the psychological concept of generalisation'. For example, he accounts for the harmonic relations NG/Preposition, on the one hand, vs. GN/Postposition, on the other, by assuming that 'the relation of possession is assimilated to other relational notions, for example, spatial relations' (Greenberg 1966c: 99). Analogously, the harmonic correlation NG/NA is made to derive from the fact that 'both the genitive and qualifying adjectives limit the meaning of a noun'. In general, the harmonic correlations are Prepositions, NG, VS, VO, NA, on the one hand, Postpositions, GN, SV, OV, AN, on the other. By contrast, correlations such as NG/Postpositions and AN/Prepositions are labelled 'disharmonic'. The order NA is assumed to be dominant over AN (and, in fact, NA also occurs across SOV languages). Orders of genitive and of adjective are strictly harmonic with each other, and when the genitive is disharmonic with Postpositions, so is the adjective (Greenberg 1966c: 101). Greenberg (1966c: 102) also introduces the notion of 'hierarchy' to account for the fixed order of the various classes of modifiers with respect to the centre and of what will later be called 'iconicity' ('the order of elements in language parallels that in physical experience or the order of knowledge', Greenberg 1966c: 103; the term 'iconic' was introduced by Jakobson 1966[1963]: 269 to refer precisely to this observation by Greenberg; cf. Bybee, this volume, and Haiman, this volume).

The impact of Greenberg's essay did not lie so much in its explanatory proposals as in the neatness of the correlations it stated. It has been shown that such correlations had already been remarked on by other scholars, possibly from the 18th century onwards. Greenberg's presentation was, however, more detailed and, in particular, more systematic; moreover, it appeared in a period of strong revival of interest in language universals. Therefore, it represented a very apt starting point for a new kind of typology, one much more connected to the inquiry into language universals and much more centred on syntax.

In the 1970s, some scholars attempted to find a more principled explanation for Greenberg's 'harmonic orders'; for example, W. P. Lehmann (1973) worked out his 'structural principle', and Vennemann (1976) proposed what he called 'Consistent Basic Serialisation'. Subsequently, a more ambitious goal was pursued: that of accounting for Greenberg's 'disharmonic' orders; among such attempts, those by Antinucci (1977) and by Hawkins (1980, 1983) deserve special attention. In general, it can be said that Greenberg's essay originated what has been labelled 'typological syntax'.

This kind of syntax is often opposed to 'formal' syntax, stemming from Chomsky's work. This is not the place to inquire if this opposition is well grounded. Rather, it must be recalled that also in the framework of generative syntax, considerable attention was paid to Greenberg's results: within the framework of

Chomsky's 'Principles and Parameters Theory' worked out in Chomsky (1981), the 'head–complement parameter' was proposed to account for Greenberg's 'harmonic orders'. In recent years such a parameter has been abandoned, in favour of a theory which assumes that basic order is the same across all languages (see Kayne 1994). But the fundamental fact remains that any current syntactic theory has to face Greenberg's correlations and to find an explanation for them: this is why Greenberg's essay is still a cornerstone of today's linguistic research.

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CHAPTER 3

LINGUISTIC TYPOLOGY AND THE STUDY OF LANGUAGE

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1. INTRODUCTION

The aim of this chapter is to provide a typological perspective on the study of language; to situate the typological knowledge about human language among other types of linguistic knowledge; and to discuss the assumptions and limitations of the approach, including types of available data.

Section 2 defines the object of linguistic typology as cross-linguistic variation and language diversity. Section 3 contrasts linguistic typology with another influential approach to cross-linguistic variation: generative grammar (see Polinsky, this volume). Section 4 investigates the dual—relational vs. referential—nature of linguistic signs and the problems this creates for cross-linguistic comparison (see

Stassen, this volume, for more focus on practical methodology). Section 5 introduces various ways of reducing linguistic diversity to a system: taxonomies, universals, etc. (see various contributions to this volume, especially those by Cristofaro and Moravcsik). Section 6 describes typological approaches to language change, and discusses issues of language evolution. Section 7 introduces typological sampling (see Bakker, this volume) and discusses some problems of large-sample typology together with two relatively recent methodological alternatives. Section 8 is an overview of the range of data typologists may choose from (see Epps, this volume, on language documentation); section 9 follows as a conclusion.

2. CROSS-LINGUISTIC VARIATION AS THE PRIMARY OBJECT OF LINGUISTIC TYPOLOGY

Linguistic typology compares languages to learn how different languages are, to see how far these differences may go, and to find out what generalizations can be made regarding cross-linguistic variation. As languages vary at all levels, linguistic typology deals with all levels of language structure, including phonology, morphology, syntax, and semantics (see Part IV of this volume).

Is this definition specific enough? Most linguistic disciplines have cross-linguistic comparison in the background, if not as their main method or object of inquiry (one probable exception is the radical structuralism mentioned in section 4 below). Even isolated descriptive traditions of individual languages, such as traditional descriptions of English, German, Russian, etc., are not free from cross-linguistic assumptions. Although rarely referring to them directly, they are all based on ideas about the structure of human language (often projected from Latin grammars), implicitly suggesting parallels between different languages. Yet these approaches are not typological, because they focus on one language, even when they borrow metalanguage applied to a different linguistic system.

Typology is sometimes viewed as a member of a triad: historical linguistics vs. contact linguistics vs. linguistic typology. Each of the three does language comparison. But while historical and contact linguistics look for similarities motivated by common origins or geographical proximity, linguistic typology is said to look for similarities motivated by neither, probably reflecting some general properties of human cognition or the common communicative purpose all languages serve. For historical or contact linguistics, comparing languages is also the main source of empirical data; but while these linguistic methods compare languages that are genealogically or areally close, linguistic typology is traditionally based on data from unrelated languages.

But there is more to the difference between them than just ways of selecting the languages the data come from. Historical and contact linguistics are looking for similarities between languages, because it is the similarities that can be inherited and spread by contact. Typologists are keener on differences, because every new difference that is found extends our idea of the limits of cross-linguistic variation. Linguistic typology is interested in cross-linguistic similarities only inasmuch as they foreground limits to variation, while contact and historical linguistics peel differences away to arrive at what the languages have in common.

Thus, when saying that most languages use either ergative or accusative alignments, the main message is that all other structurally possible patterns are infrequent. This is again about differences: some kinds of variation (understood as divergence from the known types) are rare or not attested. When looking at alignment variation in a group of genetically or areally related languages, historical or contact linguistics would be more interested in the dominant pattern of alignment in the group, explaining that by common historical origins; cases of parallel evolution are thoroughly filtered out (whenever possible).

Another example that shows the status of similarities in typology is the approach towards the definition of word. Linguistic typology suggests that this concept is cross-linguistically universal (e.g. Dixon and Aikhenvald 2002). But this is not intended to mean that all languages are similar in that they have a unit with the identical properties. On the contrary, any relevant typological research would study cross-linguistic variation of various parameters of the concept of word. The message is, again, how different the guises are under which the category is manifested in the languages of the world.

Thus, while some other linguistic approaches also deal with diversity, this is not their main objective; most are interested in sifting out the diversity in order to find similarities. Linguistic typology is the study of linguistic diversity as such, an exploration of cross-linguistic variation as well as the rules that govern it and constraints that define its limits. It may be seen as looking for similarities, too—as when assigning languages to different types. But as a matter of fact, it deals with similarities only to sort them out and to form an idea about possible differences. To show this, let us contrast linguistic typology with another approach to cross-linguistic variation: the generative paradigm.

3. LINGUISTIC TYPOLOGY AND GENERATIVE GRAMMAR

Generative grammar is compared to linguistic typology in numerous publications (Bybee 1998a, Newmeyer 2005, Haspelmath 2008a, Evans and Levinson 2009, and some discussion in *Linguistic Typology* 11.1 (2007), to mention just a few

recent ones). In the following few pages, a summary of the present author's view is provided. See Cristofaro (this volume) on the different stances on language universals adopted by the two approaches and Polinksy (this volume) for perspectives on convergence between linguistic typology and formal grammar.

The generative approach starts from an observation about language acquisition. According to this observation, linguistic input available for a first language learner is utterly insufficient to build linguistic structures of the language he or she is going to speak. Not only are these structures extremely complex, but the set of possible utterances is unlimited, so that one may wonder how a child's poor linguistic experience may prepare him or her for such a complex and infinite diversity. It is equally stunning how a child learns not to produce ungrammatical utterances, although he is extremely rarely, if ever, explicitly taught what is wrong. These structures and constraints cannot be fully innate, because if there is a mismatch between the languages someone's (biological) parents speak and the linguistic environment someone is brought up in, his or her first language is determined by the latter.

To solve this problem, generative grammar posits a universal grammar which is not acquired through learning but is an innate property of the human mind, common to all humans and transmitted biologically in an invariable form. The objective of the generative study of language is to uncover this universal grammar and to explain how the diversity of actual linguistic structures observed in the languages of the world is derived from it. The existence of such universal grammar is thus a methodological prerequisite which is induced from one observation about language acquisition: the poverty of stimulus.

Although some research on language acquisition calls the latter into question (Tomasello and Barton 1994, Tomasello, Strosberg, and Akhtar 1996, Lacerda 2009), the proponents of generative grammar rarely defend it, most often taking it for granted. For this reason, below we will refer to the thesis about the poverty of stimulus, as well as the concept of an innate universal grammar which follows from it, as theoretical assumptions rather than empirical results.

From the 1980s on, generative grammar has further specified its approach to cross-linguistic variation (Chomsky 1981, Haegeman 1994). Universal grammar is no longer a set of universal rules, with language-specific rules on top. It has become a set of principles—common to all human languages—with variable parameters accounting for cross-linguistic variation. Language learning is viewed as a tuning process that adjusts the parameters of the built-in universal grammar so as to match optimally the linguistic stimuli perceived by a child. Principles of universal grammar are common to all languages; it is the values of the parameters that vary.

To a typologist, the objective of the generative study of language as formulated above sounds unmistakably typological, for he or she also studies cross-linguistic variation in the observed values of specific parameters. True, that kind of study

would be linguistic typology with peculiar assumptions about human cognition, research methodology, and the field of investigation—but a typology nonetheless. What, then, is the difference between the two views on language, if there is any difference at all?

First, despite its universalistic claim, in practice generative grammar has traditionally gravitated towards data from only a few of the world's major languages. English provided the starting point for all generalizations. Once initial generalizations were produced, inclusion of non-English data led to slow modifications of the rules previously assumed to be universal. One trend in the evolution of generative grammar is its gradual expansion from English to other languages and language groups, so that now 'exotic' languages are also being included in the scope of generative studies; but in terms of coverage, there is a lag as compared to linguistic typology, which from the very beginning was working with as many languages as practicably possible.

This is a bias for which typologists often criticize generativists, but there is a generative answer to it, coming from the methodological side. Once we accept that there is a universal grammar that is biologically inherited by the speakers of all languages, it does not matter whether we attempt to arrive at it by investigating cross-linguistic variation of all languages or the grammatical structure of one single language (Chomsky 1980, discussed in Evans and Levinson 2009; see Cristofaro, this volume). Of course, in the latter case we need some methods to distinguish universal principles from language-specific parameter values. But we only need the data from other languages to the extent that these methods are imprecise. In practice, starting from generalizations about English data, the generative approach has gradually expanded its empirical base to other languages, adjusting where necessary the apparatus of universal grammar to new linguistic evidence. The apparent advantage of this approach is that data from English and other major languages are more readily available, and in many cases the scholar is a native speaker of the language being described. Ideally, this provides a solid empirical basis for generative studies. This is in stark contrast with linguistic typology, where second-hand data are often the main source of linguistic evidence.

However, for someone who does not assume the existence of an innate universal grammar, this is a major problem with the approach. Missing one single language could mean missing a chance to discover a totally different linguistic structure. This possibility is stressed by the typological study of languages, which aims at covering as many languages as possible, even if that makes it necessary to use indirect sources (see section 8), and explains why language sampling is considered to be a major methodological topic in linguistic typology (see section 7), while it is not at issue in generative studies.

There is another data-related difference between the two methods which is not very significant at present but has the potential to grow into a stronger empirical clash in the future. Starting from the first versions of generative grammar, linguistic

description was understood in quite a specific way as a model generating possible (grammatical) syntactic structures without generating impossible (ungrammatical) ones. This understanding leads to elicitation being the main data source, as not all possible configurations are obtainable from other sources, such as corpora. In linguistic typology too, elicitation was and still is an important source of empirical data. However, the typological method started shifting to corpora and usage-based studies (see section 8), which inevitably leads to admitting the gradient nature of grammaticality judgement.

Second, generative grammar is essentially holistic—at least in principle. It posits an invariant system underlying the structure of every language, and studies this system as a whole, but at the same time it is mindful of the need to make necessary adjustments in the light of new data and to consider how these adjustments affect the various components of the system and its entirety. In linguistic typology, however, the holistic approach is only one among many possible approaches. Linguistic typology, with few exceptions, is a set of case studies (but see Polinsky, this volume, for a discussion of modern challenges), and it is rare that two typologists independently investigate the same phenomenon—the field is so vast, and languages are so many. These case studies are linked to each other much more by methodology than through having a single linguistic model. Only slowly do they come together into larger clusters of ideas, and only rarely do they form coherent models of language as a whole. This reluctance is data-driven, caused by the observed diversity of language structures. As a result, to be a typologist and to cooperate with others, it is not absolutely necessary to share one another's views about the nature of language. Most scholars have specific assumptions about it, but these assumptions are many and diverse, which is so unlike the major primary assumption of an innate universal grammar, common to all generative linguists. This is due in part to methodology.

The generative approach makes one assumption: the poverty of stimulus. This assumption is, however, very strong and immediately leads to positing the existence of universal grammar. Assumptions made by typologists about the nature of language may seem even less empirical, but the way they work in typology is very different. The same assumptions are hardly ever interpreted in exactly the same way by two different people, and there is probably none shared by everybody in the field. Within typology, assumptions do not have immediate consequences for the study of language. The same or similar general concepts of language might easily lead to different research methods and outcomes—as is the case with different understandings of cognitive or functional motivation of the linguistic form—and people with different theoretical views may efficiently cooperate in research projects.

In other words, assumptions in linguistic typology are less binding in terms of methodology. The whole edifice of generative grammar is dependent on its only premise to a much greater degree than various typological approaches are

dependent on their many assumptions. The distance between the philosophy/ phenomenology of language and the methods of linguistic study is far greater in linguistic typology than in the generative paradigm, where they form one single body. The latter is apparently characteristic of all formal approaches to language.

The generative model is highly consistent and may be checked against linguistic data in its smallest detail. This might at first seem to be an advantage of the generative paradigm over the typological method, where falsifiability often does not seem to be that straightforward. However, the abstract nature of the generative categories makes them practically immune to true falsification by empirical data, as universal grammar has an almost unlimited potential of superficially adapting itself to new data without changing any of its deeper elements; all most important changes in generative grammar (the introduction of principles and parameters, and the minimalist programme) were much more theory- than data-driven. In a way, generative models are too flexible to be considered genuinely falsifiable (cf. Evans and Levinson 2009). Note again that the fundamental assumption—that of the existence of an innate universal grammar—is not subject to falsification in principle, at least not from within the paradigm itself.

Third, generative ideology does not accept that language-specific facts can be truly diverse, but always derives them from underlying principles of universal grammar. Generative grammar assumes that languages are essentially identical in their structure, while this is not a necessary (although it is a possible) assumption for linguistic typology.

Put simply, generative grammar *knows* that all languages are essentially identical, while linguistic typology *ascertains* whether they are or not—and if they are, to what extent. In a sense, generative grammar is about cross-linguistic invariance, while linguistic typology is about cross-linguistic variation (see section 2). These are in principle two different views of the same data, but in practice they lead to very different methods and results.

The fourth important point is made by Evans and Levinson 2009. They explain that there is a substantial difference in generative grammar vs. linguistic typology's stances on cognitive foundations of human language. In linguistic typology, the focus on observed cross-linguistic variation, with very few universal facts true of all languages, makes it necessary to look for motivations of specific language structures outside the language itself, in various models of cognition—if anywhere at all. The advantages of this approach are that it is adaptive to the environment of the speaker and may in principle be connected to non-linguistic cognitive and/or behavioural functions (Bybee 1998a); in particular, human linguistic abilities may be compared to animal communication. When building a universal innate grammar which is yet supposed to account for cross-linguistic and cross-cultural variation, the generative approach simply has to posit abstract structures and entities that have no visible extralinguistic motivation; its cognitive vision is thus highly abstract, again based on the assumption of universal grammar

and more deductive than grounded in linguistically diverse empirical data. Its main commitment is not to explain the diversity but to derive it from one representation common to all languages. Human linguistic ability cannot have anything in common with primate communication under this approach, because this ability is nothing else but innate universal grammar, and innate universal grammar is exactly what primates lack. In other words, generative grammar seems to leave much less freedom than linguistic typology for language-based empirical cognitive research than linguistic typology. Ironically, it is generative grammar, not the typological approach, that has received so much attention in the domain of non-linguistic cognitive sciences.

To sum up, generative grammar is a deductive approach, aiming at a formal derivation of the observed data from a general model that precedes any empirical research. The process of generative exploration consists of ongoing modification of the formal model so that it may serve as a better interface between the invariable initial assumption (the existence of an innate universal grammar) and the observed facts. Its general features are as follows:

- Generative grammar is based on one fundamental assumption about language structure—an assumption whose empirical nature may be challenged; it is a linguistic philosophy which is rather uniform in its view of language; its development is a gradual modification of the formal apparatus intended to keep the basic assumption of the existence of universal grammar intact.
- It views grammar in an essentially holistic way, introducing an abstract structure that is to be adapted to the empirical data by adjusting its elements to the new input rather than inferring this structure from the data from the very start.
- In practice, it appeals to data from a small number of languages, and only gradually expands its empirical basis to languages that feature significantly different structures.
- It departs quite far from the empirical data in positing highly abstract levels of formal representation and structural entities whose existence is witnessed only very indirectly.
- It is more interested in the possible analytical reduction of the observed crosslinguistic variation, and more concerned with invariance than with diversity.

Linguistic typology, in contrast, is essentially inductive, attempting to build a view of language as a phenomenon starting from the observed empirical diversity of human languages. Obviously, it is a much longer route to take. In the end, it does not necessarily lead to any single language model at all. The process of typological exploration of language involves constantly changing assumptions about the nature of human language so as to account for the observed facts. Its main features, as compared to the generative approach, are as follows:

- A typological study is a rather pluralistic paradigm, with many philosophies of language coexisting side by side; these philosophies come and go as new interpretations become available.
- It relatively rarely produces generalizations about language structure as a whole; in practice, it concentrates on individual parameters without (necessarily) trying to link them into one single system.
- Formal apparatus plays a secondary role; as a result, typological statements are sometimes less easily amenable to testing.
- It involves data from as many languages as possible, and in practice tends to rely on secondhand data, often coming from non-native speakers.
- It regards formulating taxonomies as one of its main objectives and is generally more 'shallow', i.e. closer to the empirical data.

The generative study of language and linguistic typology are thus two views of linguistic diversity and cross-linguistic variation: two different perspectives to adopt and two different paths to take. The two approaches are so different that it is hard to make a comparative evaluation of their feasibility that goes beyond the general comparison given above. The two paths part at the very start. In a sense, which one to follow is a matter of personal choice.

4. THE INCOMPARABILITY PARADOX

In his *Cours de linguistique générale*, Saussure stressed the relational nature of any sign in general and of the linguistic sign in particular (Saussure 1995[1916]): the linguistic function of the sign is determined by its position in the system. This makes cross-linguistic comparison a difficult issue.

Linguistic categories such as verbs of giving, the nominative case, or the imperative in one language cannot be mapped exactly onto their functional equivalents in other languages. They have different scopes of application, in both semantic and pragmatic terms. To use Saussure's opposition of form vs. substance, every language is unique in how it carves the substance (a speaker's idea of the real world) into a system of forms (lexical and grammatical categories). One way to overcome this problem is to treat lexical and grammatical categories observed in individual languages not as simplex phenomena but as clusters of elementary meanings and functions. The phenomenological status of elementary typological categories must be confirmed by examples from languages where they are naturally separated, that is, assigned to different lexemes or markers. The role of this principle is similar to the role of the 'minimal pair' principle in phonology. In this way, cross-linguistic

differences in categorization become the object of, rather than an obstacle to, typological research; see Haspelmath (forthcoming) for an extensive methodological discussion of the problem.

From the point of view of a speaker, however, all uses of, say, a plural marker, covering typologically distinct elementary categories (regular plural, abundance plural, associative plural, approximative plural, etc.), may be perceived as one notional category. An analytical approach to linguistic categories of individual languages, naturally arising from cross-linguistic mapping, does not have to correspond to any psycholinguistic reality: it reflects a typological rather than language-internal perspective (see Haspelmath forthcoming). Only rarely is the simplex nature of a category questioned from within a language (see e.g. Gil 2004, Koptjevskaja-Tamm 2008, and Majid, Enfield, and van Staden 2006 on 'vagueness' vs. polysemy in the typology of body part categorization).

For Saussure, the emphasis on *valeur* probably had polemic rather than absolute value, opposing his new theory of language to the Neogrammarian paradigm. In his wake, however, this principle acquired a most radical reading. For many structuralists, the value of the sign had nothing to do with its reference in the 'world of reality' at all. Any reference to extralinguistic material, including properties of referents and situation types, was rejected. In his paper calling into question the Saussurean arbitrariness of the linguistic sign, Benveniste (1939) argued that, according to Saussure, linguistic categories were non-material entities having nothing to do with the real world. This turns every language into a hermetically isolated object and, in fact, seems to close possibilities of comparison.

Although radical structuralism is far from being mainstream in today's linguistics, the balance between the referential (i.e. determined by its reference to the real world) and relational (i.e. determined by its relations to the other elements in the system) components of a linguistic sign shows strong variation from study to study. This is very clear in the recent expansion of cross-cultural studies of categorization from psycholinguistics into lexical typology (Koptjevskaja-Tamm, Vanhove, and Koch 2007, Koptjevskaja-Tamm 2008). Starting from reference-based studies of colour designations in the line of Berlin and Kay (1969), categorization studies have developed through, for example, cross-linguistic investigation of the domain of movement in water (Majsak and Rakhilina 2007) to the ongoing projects on temperature perception categorization (Koptjevskaja-Tamm and Rakhilina 2006) and categorization of pain (Britsyn, Rakhilina, Reznikova, and Javorskaja 2009, Bonch-Osmolovskaja, Rakhilina, and Reznikova forthcoming). The pain project is highly relational research, because for pain, language is the only means of expression and description (unless an informant agrees to provide linguistic comments on his actual pain perception, simultaneously registered by an electronic or another device). Reference-oriented studies where a visual representation of a universal conceptual space is divided into language-specific

conceptual domains have been all but abandoned (see Majid, Enfield, and van Staden 2006 on body parts). Still, in the wake of this reference-to-relation shift in categorization research, new approaches are possible, even in the domain of traditionally reference-oriented colour studies (cf. Rakhilina 2007). An exclusively reference-based approach to language, as represented in conventional colour studies, can teach us too little about the language outside the colour domain (see Koptjevskaja-Tamm 2008 for a more general discussion of 'extralinguistic bias' in categorization studies). Typological research is thus characterized by a certain balance between reference and relation, by taking a position on a scale whose ends are either incompatible with (relational) or useless for (referential) the typological approach to the study of language.

On this scale, modern grammatical typology is probably too non-relational. In a natural reaction to the extreme relationality of the structuralism that yielded very abstract schemes and, ultimately, led to cross-linguistic incomparability, typologists needed new benchmarks for their research. New approaches, such as grammaticalization studies propelled by Bybee (Bybee and Dahl 1989, Bybee, Perkins, and Pagliuca 1994, Bybee 1998a), emerged. For the theory of grammaticalization, knowing where a marker comes from means having most of the relevant information about the category. In other domains of functional typology also, researchers were more interested in the variation of the category's functions and scope than in the paradigm it forms a part of. Increasing interest in the sources and functions of individual elements led to decreasing interest in their place within the system of language; the system was, at the least, backgrounded.

It seems that the rejection of structuralism has gone too far along the way of rejecting structures. A grammatical category is not exclusively defined by its reference value; it also relies on its relations to other categories. While the core meaning of a category is best understood by examining its cross-linguistic functional variation, describing its full scope in an individual language may call for structural analysis. The opposite is also true: a more adequate account of the system of relations requires a sound knowledge of the cross-linguistic functional variation of each category involved. Let us consider an example.

Structural considerations are inevitably relevant when describing the formal make-up of a language. For instance, only structural context provides proper terms to speak about the language-internal status of forms of address: is it a member of the case paradigm or an independent, stand-alone category? As opposed to the conventional structural analysis, looking at forms of address in a cross-linguistic perspective allows one to place some types of address between these two points (Daniel and Spencer 2009). Other functional clusters—such as spatial forms, possessive categories, and comitatives—may also manifest different degrees of what may be termed paradigmatization of a cross-linguistic category. Another example is the category of irrealis (see Plungian and Urmanchieva 2004 arguing against Bybee 1998b).

From this combined structural/functional point of view, the paradigm ceases to be a homogeneous row of forms and turns into a system of functional clusters differing in the degree of their formal co-integration. That several forms make a cluster is still best seen from a functional and thus cross-linguistic perspective. Obvious typological challenges would be to study which functional categories are either more or less cross-linguistically apt to be included in the same paradigm (or, more generally, co-involved in the same structure) and what consequences this may have for their functional scope.

I would suggest that typology stop looking for a specific well-balanced point on the scale between relational and referential extremes. Just as structuralism failed through discarding any reference to the real world, the typological mainstream suffers from underestimating structural phenomena (even though, at present, the toll might seem less heavy in the latter case). Linguistic typology should profit from both approaches, integrating structural analysis (the study of Saussure's form) with conventional methods of exploring cross-linguistic variation of categories (Saussure's substance) defined in referential terms.

5. ORDERING THE DIVERSITY: TAXONOMIES, SCALES, PARAMETERS, AND IMPLICATIONS

Once the problem of cross-linguistic comparability is resolved in a positive way, one should ask what exactly one wants to know about linguistic diversity. Many linguists and non-linguists alike are fascinated by the very fact of discovering structures drastically different from the way 'their own language does it'. A true study of diversity, however, suggests classifying languages according to the patterns they use and discovering regularities underlying cross-linguistic variation. These regularities deal with relative frequencies (more vs. less frequent patterns) and constraints (logically possible patterns that are not attested).

The first methodological problem that a typologist encounters is that the data do not easily lend themselves to classification. It is more than convenient if every language fits into one of a small number of classes, each with a clear value of the parameter used for classification. When structuralism was at its apex, language-internal parameters nicely broke down into a few values, most often two (cf. Jakobson 1971a[1936] and 1971f[1962] on case and Jakobson, Fant, and Halle 1952 on phonological contrasts). The number of distinct values of typological parameters was growing, which ultimately led typologists to the use of scales. With the scales, the variation of a parameter is spread along one dimension from one end of the scale to the other. Most often, scales emerge

where there is a set of strongly correlated but distinct parameters, such as the scale incorporating animacy, individuation, discourse prominence, and some other features of a noun phrase (see Corbett, this volume, on the Animacy Hierarchy).

But even when languages clearly tend to group around certain values of a parameter and seem to constitute classes, there are, more often than not, a number of intermediate cases which are hard to classify. In addition, within the classes, some cases seem to be closer to the prototype than others. To deal with such typologies, Cysouw (2006) suggests considering variation of a parameter not as a choice of one of several possible values but as a numerical function. This approach results in shifting from the original box-style discontinuous typology to placing individual languages in a unidimensional (for a combination of parameters, multidimensional) space. The areas of density in this space correspond to the conventional idea of discontinuous language types. Cysouw (2006) uses the approach for a typology of morphological language types.

Whether a classification will help to understand the variation depends on the right choice of the parameters of comparison. One of the most important typological parameters is case alignment, a parameter obtained by contrasting argument marking in transitive vs. intransitive predication: whether it is A or P that is marked in the same way as S (the only argument in intransitive construction). A and P may be seen as competing for the marking of S, and the typology of case alignment is essentially about which one wins (see Primus, this volume).

For ditransitive constructions, contrasting them with intransitive predicates will not work. Answering the question of who—the Giver, the Recipient, or the Theme (the object being transferred)—uses S-marking will simply not yield any interesting typology. The Giver always chooses the marking of the Agent. Whether it is identical or not to the marking of S depends on the case alignment, ergative vs. accusative.

The basis of variation in ditransitive constructions is discovered by contrasting ditransitive predicates with transitive ones: whether it is the Recipient or the Theme that takes the marking of P (Haspelmath 2009). This change in parameters of comparison when shifting from transitive to ditransitive alignment is quite easily explained. Out of the three roles, the Giver is by far most similar to A, so that the agentive marking is not subject to competition. It is only the patientive marking that is up for grabs, as both the Recipient and the Theme share some properties with the Patient. The typology of ditransitives is about whether the Theme or the Recipient wins the slot of P (see Dryer 1986). This example shows that cross-linguistic variation is similar to a landscape: how you choose your standpoint determines whether you can see it in its full beauty.

Even pure taxonomies put limits on diversity. Some patterns are less frequent than others, and some do not occur in known languages at all. Consider formal typologies exploring how a specific category is expressed in the languages of the

world. Such typologies list all the observed means of expression and thus implicitly (or explicitly) exclude other logically possible means. Grammatical number is most often expressed by suffixes; less often by prefixes, independent word, and clitics; very rarely by stem alternation, tone or reduplication (Dryer 2005a); in apparently exceptional cases by truncation (as reported in Nordhoff 2006 for Sinhala, an Indo-Aryan language of Sri Lanka); and never—to the best of our present typological knowledge—by reversing the order of the phonemes in the root.

Absence and rarity of a pattern may be interpreted in different ways. A rare pattern, as opposed to a more frequent one, may be thought to reflect some properties of human cognition: the fact that plurals are normally derived from singulars and not vice versa probably is not accidental. However, a pattern may in principle be rare or even unknown simply because some other languages that would fit in this type are extinct or undescribed; similarly, a pattern may be frequent because it is easily spread by contact (see section 7). Finally, that number is not expressed by 'mirroring' (i.e. the reversing of the order of phonemes) is not a useful generalization. It follows from a wrong choice of values: no known human language uses this operation as a morphological device. Logical possibilities and linguistic possibilities are thus not necessarily the same.

A very influential type of generalization is the implicational universal, linking several linguistic features that, in principle, would not need to be connected (Mairal and Gil 2006, Cristofaro, this volume). A clear example is the presence of a certain phoneme in any language where another phoneme is present: no language has the labial nasal m without also having the dental nasal n (see Universal no. 788 in Filimonova, Plank, and Mayer 1996–2001, which is also a more general statement). This is a very clear case of a combination of two separate but correlated features. Obviously, this implication can be re-formulated as a taxonomy (as a matrix of features, such as $\{-m, -n\}$ vs. $\{+m, -n\}$ vs. $\{-m, +n\}$ vs. $\{+m, +n\}$), but to show the constraint, the implicational representation is more convenient.

In addition to implicational universals of the absolute kind—those that hold in all known languages—there are also statistical (non-absolute) implications: strong correlations between values of different parameters that hold in most, though not all, known languages. How strong a correlation should be to be included in the inventory of implicational universals is probably not that important. In most general terms, implicational universals describe co-variation between parameters, which is a continuum from parameters that are not correlated at all (or not correlated in a statistically significant way) through statistical universals (tendencies) to absolute universals. For a full compendium of implicational universals, see Filimonova, Plank, and Mayer (1996–2001). An important type of co-variation is when several logically independent phenomena are controlled by the same hierarchy (see Corbett, this volume).

Apparently, the difference between distributional patterns discussed in the first part of this section and implicational universals is that the former show patterns of variation for one parameter while the latter observe co-variation of two or more distinct parameters. A co-variation of parameters might, however, indicate that what we have considered, from the viewpoint of general logic, to be independent parameters is one parameter from the viewpoint of the logic of human languages. In some types of correlations (especially for implications that work both ways), this allows one to reformulate the classification basis. Thus, a tendency, however loose, towards a complementary distribution between the presence of case marking on noun phrases and rigid word order is indicative of the fact that there might be one underlying parameter of cross-linguistic variation: a choice of formal means to mark grammatical relations.

Lahiri and Plank (2008) suggest an important extension of the practice of studying universals. Traditionally, universals deal with crosslinguistic co-variation of parameters and typically generalize over a set of languages. Lahiri and Plank note that when considering constraints on linguistic variation, dialectal, social, pragmatic, and other dimensions of variation within individual languages should also be taken into account.

In a recent paper on implicational universals, Moravcsik (2007) suggests a parallel between cross-linguistic implicational universals and distributional constraints in individual languages. Moravcsik indicates that while contextual constraints are syntagmatic, implicational universals may be viewed as cross-linguistic constraints based on paradigmatic contexts: systemic relations of the elements.

While many scholars note that absolute universals are very few if any (see e.g. Evans and Levinson 2009), implicational universals are not that contested. This is important because co-variation between parameters seems to be non-sensitive to the methodological problem of historical biases in the sample and to the more systemic problem of non-stationary distributions of feature values (Nichols 1992, Maslova 2000, Lahiri and Plank 2008; see 7 below for discussion). If truly independent parameters correlate in a number of areally and genetically unrelated languages, this might call for a language-internal (e.g. structural pressures) or extralinguistic (e.g. cognitive) explanation, even for those who argue that evidence from value distributions for individual parameters does not necessarily provide safe grounds for generalizations.

Implicational universals have been thought to produce holistic typologies, where various parameters imply each other, finally arriving at a limited set of consistent language types with no independent parameters left outside this classification (see Ramat 1986). So far, these expectations do not seem to have been met. Although some non-trivial implications are observed between logically independent parameters, no network of implications may be built for the entire structure of human language. In other words, no inductive typological counterpart to the deductively assumed universal grammar of the generativists has ever been created.

6. LANGUAGE CHANGE AND
THE EVOLUTION OF LANGUAGE

There is a correlation between the data available to linguistic typology and its method. In an attempt to cover linguistic diversity in as extensive a way as possible, linguistic typology necessarily deals with some languages whose history is completely unknown, because such languages form the vast majority of the world's languages. This type of research is based on observed states of languages and is essentially synchronic. However, typology is also interested in language change.

The differences between linguistic typology and historical linguistics lie in the final objectives of their diachronic commitments. Comparative linguistics establishes genealogical relationships between languages and thus sheds light on the history of specific speech communities. This is primarily a study of human history as reflected in linguistic evidence. Unsurprisingly, this branch of linguistic research readily cooperates with other disciplines and methods that focus on ethnic history, including, for example, archaeology and genetic anthropology. Sociolinguistics originated as a new approach to the study of the mechanisms of language change; the focus is on the way innovations spread within a language community, and how several communities may linguistically influence each other. Among other things, this focus provides additional information on the history of ethnic groups, complementing that coming from comparative research; but this is an application, not the true objective of the method.

Typology of language change is a totally different enterprise and does not rely on the actual timeline. The scope of the typological interest is universal laws of how elements in a linguistic system, or the system itself, develop over time—what kind of shift may or may not happen, independently of the actual mechanisms of change (in the sense of innovation spread in the speech community) or the time it took place. This covers both systemic changes, such as changing from words to adpositions to affixes to fusion, and the dynamics of individual categories, such as changing from perfect to evidential. Two closely related issues are how markers of grammatical categories evolve (where they originate from) and the paths the grammatical markers follow in shifting from one category to another (see e.g. Heine and Kuteva 2002). This type of research is often represented in the form of semantic maps (see e.g. Haspelmath 2003, van der Auwera and Temürcü 2006, van der Auwera and Gast, this volume). One major empirical result of this research is the idea of the unidirectionality of change. Thus, independent words develop into clitics and then into affixes, while the opposite development is exceptional.

But even such diachronic typologies are essentially synchronic by virtue of their method, as they are primarily based on observing various stages of linguistic change in the present-day population of languages. Although this solution is

extremely elegant—doing history without looking into it—one of its drawbacks is that the approach assumes that the laws of language change did not change over time themselves. The typological mainstream seems to be open-minded about the evolution of human language as a communicative system, and to assume that human language has remained basically the same during the period it deals with. These assumptions need to be reassessed; keeping in mind that language was not always in existence, it is obvious that the deeper we go into the history of mankind, the more we should take into account fundamental differences between various properties of modern language and the language of our ancestors. Mainstream typology (as well as generative and even historical linguistics) is anti-evolutionary, and is not yet ready to meet the challenges of glottogenetic perspective. A possible solution would be to limit typological research to a period of time in which language evolution was negligible for its purposes—but then we do not exactly know what period this is, and it is possible that this period varies depending on the specific research domain (e.g. phonetics vs. morphology vs. syntax).

Some insight into how human languages changed over time may be provided by Maslova's (2000) statistical analysis of language change as shifts of language types in a language population. Maslova's paired sampling method combines comparative and typological data and is based on probabilistic modelling of typological shifts. This method brings a new perspective to the field, considering the typological evolution of the totality of human languages as a population, that is, the evolution of the world's linguistic diversity. Still, no model of the development of human language as a communicative system immediately follows from this approach. In typology, only general concepts start to develop (cf. typological contributions in Givón and Malle 2002, concepts presented in Heine and Kuteva 2007, and the idea of increasing linguistic complexity in Dahl 2004a).

Eventually, some help may come from comparing spoken languages to other communicative devices. In the last decade, research on sign languages is becoming a more frequent contribution to typological volumes and conferences (Zeshan 2002, 2004, Cormier 2005, Perniss, Pfau, and Steinbach 2007). Animal communication is still significantly out of the range of typological study (however, see Wierzbicka 2004). This is not surprising, because the former are typologically quite close to spoken languages (although the difference in modality is important—see Evans and Levinson 2009 for a discussion), while the latter is too different from them. Again, we run into the same methodological limitation that we strive to overcome.

Ancient languages are another probable source of data. Obviously, on the scale of the linguistic history of mankind, the distance of 2,000–4,000 years is not very significant. It is also possible that the system of human language developed in jumps rather than gradually, and recorded ancient languages are much closer to modern ones than to languages of the time when writing systems did not exist; indeed, conventional grammatical analysis shows no fundamental differences

between modern and ancient languages. What one could try is more subtle methods, such as statistical corpus-based research. The existing corpora of ancient languages may, however, prove too small for that purpose, and they represent the language within too specific a usage/genre domain. Although this path is worth trying, one cannot be a priori very optimistic about it.

To sum up, an impediment to a way of generalizing on language evolution through the study of cross-linguistic variation is that we have objects either too similar to (sign languages, ancient languages) or too different from (animal communication) the conventional object of linguistic typology. What we miss is some kind of mid-range evidence, and it is unclear whether any kind of evidence would ever qualify. As a result, today we lack generally accepted typological tools to reconstruct linguistic structures that are significantly different from the languages we speak now. Many typologists who suggest their views on the origins of language have to abandon conventional typological methods. In a sense, this objective may amount to a different linguistic sub-discipline, as it means both developing new methods of analysis and extending the notion of linguistic diversity deep in time to significantly different communicative systems.

7. Representative sampling and typological explanation: intragenetic and areal typology

Describing linguistic diversity cannot be achieved by considering just a few unrelated languages. The history of cross-linguistic comparison shows a continuous enlarging of samples researchers worked with, from a couple of languages in ancient times to half-a-dozen languages for the Grammar of Port Royal to larger but still convenient sets of languages in early typological studies of the mid-20th century (for one example, see Forchheimer 1953 on systems of personal pronouns).

No typological study could cover all the languages of the world simply because not all of them have been described. Even if limited to the documented languages only, this study would be impracticable (not to mention the issue of the varying quality of the available descriptions). Modern samples, such as those used in the *WALS* project (Haspelmath, Dryer, Gil, and Comrie 2005), aim at modelling linguistic diversity on a representative basis, with several hundred languages distributed between genetic units and areas (see Rijkhoff, Bakker, Hengeveld, and Kahrel 1993, and Bakker, this volume). Even with representative sampling, one cannot exclude the possibility that a certain rare but existing linguistic type is not represented. However, such samples do help to form an idea of the variation

of the parameter and the relative frequency of its different values, as discussed in section 5.

The aspiration to cover linguistic diversity fully, and an interest in rare types, is not motivated exclusively by curiosity. The observed distribution of feature values in balanced language samples has been considered to indicate which languages are possible or impossible, and probable or improbable. It presented a challenge to look for extralinguistic motivations underlying the frequency of different types, and thereby to provide insights into human cognition and communicative ability. Most typologists have been assuming that the observed distribution of parameter values is stable and thus a characteristic of human language not only now, but at all times, past and future. Working with large and representative samples was anticipated as a major methodological achievement in linguistic typology.

However, objections have appeared from time to time. In various discussions, Plank (public lecture, 2000) suggested that the current language population may be biased due to historical and cultural factors leading to language death; languages that are no longer present could have been examples of now nonexistent language types, thus weakening the status of what we think are impossible languages to only improbable ones (cf. Evans and Levinson 2009). In Lahiri and Plank (2008), this argument is extended by suggesting that our notion of improbability may also be historically skewed. Much earlier, in her book on language diversity, Nichols (1992) argued that the observed feature distribution might be due to historical factors, and investigated which linguistic features are more stable and which are less so. A similar conclusion—this time provided with a specific historical scenario—is arrived at in Bickel (2006b), a study with a totally different object/background. A *WALS*-based statistical analysis of relative geographical density of rare typological features in Eurasia shows that rare features are more often reported in the mountains than in the plains. Bickel interprets this result as an indication of active feature sharing in the plains, caused by population shifts. This is a statistical argument for considering feature value distribution as significantly skewed by historical dynamics rather than as evidence for the nature of human language.

Maslova (2000) suggested that the distribution of feature values at any moment in time—including the currently observed distribution—is not (necessarily) stationary but develops over time (towards the stationary one) and thus cannot a priori be taken as direct evidence for more or less 'natural' frequencies of types. Consider a simple typology that divides the whole language population into two groups, a-languages and b-languages. As the languages change, an a-language has a chance to become a b-language and vice versa. Maslova considers the assumption that the probability of each shift is the same at any moment in the history of language. What follows is that stationary distribution is achieved only when the number of languages that shift from a to b becomes equal to the number of languages that shift from b to a, which is determined by the ratio between the two probabilities.

Motivations sought by conventional sampling typology are based on current feature distributions which are not necessarily stationary. As a matter of fact, these motivations should in general be sought not in frequency patterns, but in the ratio of the shift probabilities. Under some conditions, but not always, this ratio may be approximated (in particular, by showing that the current distribution is sufficiently close to the stationary one—which, according to Maslova, fortunately is the case with some of the received parameters of cross-linguistic variation). Ultimately, it is not the distribution of feature values in the population but its dynamics that may be motivated—if anything is motivated at all.

The problem with this approach is the question of whether these probabilities are indeed constant and determined by cognitive factors. (Note, however, that the assumption of traditional typology that the observed distributions are stationary by definition is already much stronger.) In addition, Maslova explains that her model works on condition that, population-wide, language contacts do not have significant impact on parameter shifts. Last but not least, we have to assume that cognitive motivation itself does not change over time (see section 6). Maslova argues, however, that this dynamic model of feature distribution is the only way of looking for motivations. It works as a last resort: it may fail or work, while the traditional approach fails in any case (however, see the discussion of implicational universals in section 5).

To sum up, Nichols, and Plank and Lahiri qualitatively introduce the historical factor which *might* have biased the observed feature distributions; Bickel quantitatively shows that this *is indeed the case* with some currently improbable language patterns; and Maslova suggests that no evidence from the current feature distribution may *in principle* be used in a way other than calculating the ratio of type shift probabilities. What is common to all these authors is that they call into question the straightforwardness of conclusions like *this feature value is more widespread and thus more closely reflects universal patterns of human cognition.* Some other ways of looking for cognitive motivations through exploring variation are discussed below.

Linguistic typology started as a study of genetically unrelated languages. However, as large-sample typology prospered, the drawbacks of the method became obvious. There is emerging interest in intragenetic typology (see e.g. Kibrik 1998), an approach that solves methodological problems such as representativeness of the sample or cross-linguistic comparability as well as some practical problems of working with large samples, including misinterpretation of unfamiliar phenomena and relying on second-hand data. Indeed, an expert in a language family may efficiently cover the diversity of the whole language group relying either on his own data or on structurally comparable data from the languages closely related to the one he or she works on.

Despite the common object of comparison, intragenetic typology is different from historical linguistics. While historical linguists look for features that are common and, even more specifically, commonly inherited, intragenetic typology focuses on differences between genetically related languages. In contrast to large-sample typology, when considering minor variations of structures against a largely common background, some details of linguistic mechanisms become more salient and may lend themselves to a more convincing analysis or modelling and to functional or cognitive explanation. Independently, microvariation has become an object of interest for various formal models aiming at modelling dialectal variation (e.g. Hualde 1991). In a certain way, intragenetic typology is similar to considering the distribution of, and usage conditions for, competing constructions in one language or in its varieties (see Lahiri and Plank 2008 on the relevance of language-internal variation for exploring language universals).

Another relatively new trend is areal typology. To some extent, it overlaps with the intragenetic approach, as areally close languages often include clusters of genetically related languages. Although the structural background may vary, similar patterns observed in languages forming linguistic areas suggest not simply contact-driven proliferation but also some shared functional (cognitive, communicative) motivations, while variation in the language-specific realization of these patterns may stem from the underlying structural differences. For examples of areal typology, see Dahl (1995), Koptjevskaja-Tamm and Wälchli (2001), and more generally Dahl (2001), and Koptjevskaja-Tamm, this volume). Similarly to intragenetic typology, this approach is especially adapted to describe micro-variation in linguistic parameters.

In a sense, areal and intragenetic typology are alternatives to sampling typology. But considering intra-family or areal variation in typological parameters *per se* cannot give us an idea about their world-scale variability; intragenetic and areal typology thus considerably modify the original idea behind the typological method. Linguistic diversity cannot be covered by considering languages from a sample whose linguistic diversity is limited. Are these new methods really a viable alternative to the more traditional approach?

An answer to this question may be as follows. Areal and intragenetic typology aim at establishing robust models of linguistic types that underlie microvariation. These models will be supposedly more robust than in sample-based typology, because they are based on an analysis of microdiversity within an area (or family) rather than on a random choice from among its members. Ideally, they may serve as an intermediate stage for a new world-scale typology, an alternative to the sampling method. It would involve comparing the established areal/family patterns between themselves, and would be in a way similar to the multi-level reconstruction of families and macro-families in historical linguistics (cf. Song 2007: 16-17).

To put it simply, it may make more sense to start with a comparison of structurally close languages than to jump to comparing French to Chinese or Navajo to Amele, especially when structures are compared to structures rather than to functionally similar elements across languages: for example, cross-linguistic

comparison of case paradigms on the whole rather than of the functions of datives (see section 4). The obvious problem of this methodological perspective is that not all areas and families are described equally well.

8. Sources of typological data

What are the methods of data collection in typology? Opponents of 'armchair typology'—typology based purely on secondary data—suggest that typological competence not supported by personal fieldwork may not be satisfactory (Dixon 1997: 136; but see Song 2007). Doubtless, fieldwork provides an important basis for typological intuition. One is compelled however to believe that typological insights are not necessarily based on handling primary data. No cross-linguistic research can possibly be based on primary data from a representative sample of languages (with the probable exception of intragenetic typology of small language groups). This is thus a necessary limitation of the method: typology frequently has to deal with languages indirectly. Although not always precise in details, typology is capable of providing a general sketch of variation.

As Song (2007) points out, some of the blame for typologists' mistakes and misinterpretations has to be laid on grammars. The latter vary not only in quality and reliability, but also in grain. Even a reliable and detailed grammar may not provide necessary information simply because an issue of interest might not have been recognized as such at the time when the grammar was written. An example of this is the volumes of the *Handbook of American Indian Languages* (Boas 1911–22). While these are very thorough descriptions, they prove to be of little help in answering many questions typologists started to ask years later.

The best data for non-first-hand analysis are indisputably texts. These are closest to actual language use and as theory-free a type of data as possible (more so for morphology and syntax than for phonetics and phonology). Much effort has been put recently into improving practices of language documentation, including online representation (graphic, acoustic, and later also visual). Some technical and conceptual issues of these practices are discussed in Gippert, Himmelmann, and Mosel (2006); see also Epps, this volume. An important contribution to building standards of typological corpora is *The Leipzig Glossing Rules* (Comrie, Haspelmath, and Bickel 2008), providing practical steps towards the unification of morphological glossing (cf. earlier suggestions in Lehmann 1983). These standards may be (and are) applied to representing textual data from languages of differing structures

which then become much easier to use for typologists (and for other non-specialists in the language, including experts in sister languages) and ultimately contribute to more robust typological generalizations. Needless to say, electronic corpora of glossed texts are clearly a more convenient tool than printed corpora.

Rich electronic online corpora—such as the British National Corpus (www.natcorp.ox.ac.uk), the Russian National Corpus (www.ruscorpora.ru), the Czech National Corpus (ucnk.ff.cuni.cz), and the Eastern Armenian National Corpus (www.eanc.net)—are extensive sources of linguistic information (cf. *STUF* 2007, Plungian 2009). A longer list of the existing linguistic corpora is available at <www.linguistlist.org>. Some practical examples of the use of parallel corpora in typology are collected in *STUF* (2007), including Cysouw and Wälchli (2007), and Dahl (2007) inter alia. Representative corpora have obvious drawbacks for typological research. Most corpora have tools for creating grammatical queries, but large corpora are never glossed, and most do not have any syntactic mark-up. In other words, to work with a corpus the user must have a robust knowledge of the language, which means a shift from the methodological position of conventional typologists to that of language experts.

Glossed corpora, in which every token is assigned a lexical and morphological analysis and broken into a chain of morphemes, are of relatively small size because they involve a mass of non-automatic analysis. The smaller the corpus is, the higher the chances are that less frequent or peripheral phenomenon will not occur in the data, while direct interview with a speaker provides an immediate and easy way to hit upon it. As a result, elicitation guides and questionnaires remain a powerful tool in typological research.

In an attempt to provide a more robust empirical basis, typology has recently started to implement statistical tools. As compared to, for example, sociolinguistics, where statistics have been an important component of the study from the very beginning, statistics in typology have emerged late—notably, in very different domains. Some of the applications and models have already been mentioned: Maslova's (2000) dynamics of language population and reconstructed typological shifts, Bickel's (2006b) comparative density of rare feature values, or methods applied in language sampling to avoid eventual areal and genetic biases (see Bakker, this volume). Statistics may also be applied in research which focuses on a specific category (see Wälchli 2009, who uses statistical methods for part-of-speech classification).

Although these statistical approaches have very different scopes, all of them seem to have a common underlying motivation: the objectivization of typological analyses. This is very clearly articulated in the corpus-based statistical procedure of parts-of-speech identification proposed by Wälchli as a substitute for traditional approaches, or in the typology suggested by Cysouw as a substitute for 'box-style' classifications (see section 5). This tendency may be considered as part of a more general trend to re-evaluate the methodological foundations of linguistic typology,

along with the discussion on what a feature distribution in a representative sample may teach us (see section 7, Maslova 2000, Bickel 2006b, and Lahiri and Plank 2008).

9. CONCLUSION

An amazing fact about human language is how diverse individual languages may be while serving basically the same purpose of human communication. And even more than that: apart from reserves that belong to the domain of sociolinguistics (language shift, code-switching, and other cases of language choice), they all serve this purpose equally well. That suggests that all languages spoken in the world have a common nature. Revealing this common nature might be considered as the highest objective of any study of language.

Linguistic typology is an attempt to achieve this objective through a systematic analysis of language diversity. Not only linguistic diversity itself but also the limits and constraints on cross-linguistic variation are of primary interest to typologists. By looking at what is attested in the world's languages, typology sets out to see what alternatives have (so far) never been attested. There might be a link from what is not attested to some underlying properties of human communication and cognition. This inductive approach is opposite to the deductive approach used in generative grammar, where the assumed underlying properties of human language (innate universal grammar) are projected onto the observed diversity of linguistic facts (however, see Polinsky, this volume, on bringing linguistic typology and formal grammar closer together).

Linguistic typology assumes that structures of different languages may be compared. Although this assumption seems to follow from the fact that the cognitive and social functions covered by various languages are roughly the same, answering specific questions about what is to be compared might be problematic. Typological comparison is based on the fact that linguistic signs (words, constructions, etc.) from different languages can be used in similar or identical situations. However, the position of a category in the system of a language, being at least partly independent of the real world, is an important factor which is—or should be— always kept in mind.

If we wish to come up with generalizations on linguistic possibilities and impossibilities, our data should represent the linguistic diversity of the world as fully as possible. This calls for special methods of language sampling. But even with impeccable sampling methods, some problems persist. Most importantly, we have

access almost exclusively to the actual state of the language population that exists today, and have no generally accepted methods of reconstructing the typological past. To date, this problem remains unsolved.

The more diverse the linguistic structures to be compared, the more problematic the very enterprise of cross-linguistic comparison becomes. Together with the problems of language sampling, this gives rise to typological approaches that are alternative to large-sample typology: typologizing phenomena against a largely common background, that is, in areally and/or genetically close languages.

Linguistic typology often becomes a target of strong criticism because comparing data from multiple languages necessarily relies on data not personally acquired by the author of the research. That calls for responsibility of the researcher in the choice of sources, on the one hand, and relates typology to the methodology and practice of language documentation, such as the creation of corpora of texts, on the other.

Linguistic typology is a relatively young science, (re-)emerging as a separate branch of linguistics as late as the second half of the 20th century. This chapter suggests that its fundamental methods and principles are as yet unsettled. However, for the proponents of linguistic typology, who all share an interest in linguistic diversity, this is not a sign of the infertility of the approach but evidence for the potential of its further development. Unsettled problems are challenges rather than failures, which allow us to look forward to new generations of scholars.

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CHAPTER 4

EXPLAINING LANGUAGE UNIVERSALS

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1. INTRODUCTION

The goal of descriptive linguistics is to establish the range and distribution of grammatical patterns that occur in human languages and to explain these findings. For example, we want to know whether languages do or do not have bilabial fricatives and, if they do, under what conditions they occur.

Statements of language universals have a double role in this endeavour. On the one hand, they serve to explain facts about individual languages. For example, if we know that all languages have stop consonants, it follows that German has them. On the other hand, universals themselves call for explanations: why should all languages have stops? In this chapter, we will explore both of these roles of language universals; but first, a few words on what we will mean by 'language universal' and by 'explanation'.

We will take a language universal to be a grammatical characteristic that can be reasonably hypothesized to be present in all or most human languages. A universal hypothesis is reasonable if it is based on a large, genetically and areally balanced sample; or if it is predicted by an independently motivated principle; or if both are the case. We will use the term 'universal' both for the characteristic itself and for the statement describing it.

Like all generalizations, language universal statements may vary in modality and domain. With respect to modality, some universals are stated as exceptionless, holding for every member of their universe. These are called absolute universals. Others are probabilistic (also called statistical), stated as holding for most but not all languages. With respect to domain, universals may be stated for the entire universe of languages or for a contextually delimited sub-universe of them. The former are called unrestricted universals and the latter, restricted universals (also labelled implicational or typological universals). The four types of universals defined by the two parameters are schematized and exemplified in (1).

(1) (a) **Unrestricted universals**
     (i) Absolute
          Schema: In all languages, Y.
          Example: In all languages, there are stop consonants.
     (ii) Probabilistic
          Schema: In most languages, Y.
          Example: In most languages, there are nasal consonants.
     (b) **Restricted universals**
     (i) Absolute
          Schema: In all languages, if there is X, there is also Y.
          Example: In all languages, if there is /m/, there is also /n/.
     (ii) Probabilistic
          Schema: In most languages, if there is X, there is also Y.
          Example: In most languages, if the basic word order is SOV, manner adverbs precede the verb.

Absolute universals hypothesize that a grammatical property must be present in a language. Probabilistic universals say that a grammatical property is present in languages with some degree of likelihood. There is also a third way of constraining what does and does not occur in languages: by stating what is universally possible, without being necessary or even probable. An example is a list of all the phonetic segment types that occur in human languages. In the literature, universals are generally understood to be either absolute or statistical (see Dryer 1997c); but this third type of universal appears to be adopted by Optimality Theory. In this framework, all constraints on language structures are hypothesized to be universal but violable, in that they may not be evident in every language (cf. section 5.2).

All language universals are merely hypotheses. Although they may hold exceptionless or with a certain degree of probability for a given sample of languages, there is no assurance that additional languages will not turn an absolute universal into a probabilistic feature, or a probabilistic feature into one that is merely possible but not likely. The only kind of cross-linguistic statement that is impervious to refutation is the weakest

kind that simply says that a structural pattern is possible in human languages. This is so because once a pattern has been identified in a language, it must of course be possible.

Let us now turn to the definition of the second concept central to this chapter: explanation. The goal of an explanatory endeavour is to resolve a gap in the observer's mind between what he observes as occurring and what he expects to occur. In some cases, what occurs may seem likely but not necessary. If so, the explanatory task is to provide a reason why the actually occurring fact should be necessary. In other cases, what occurs may seem possible but not necessary and not even likely; if so, a successful explanation must render the observed fact at least probable, if not necessary. In yet other cases, an observed fact may not even seem possible to the observer; if so, the explanation should at the least provide a reason why the observed fact should be possible. These three kinds of explanatory generalizations correspond to the three modality types of language-universal statements identified above.

Explanations differ in their breadth: an explanatory principle may itself be taken as an 'explanandum' (Latin for 'something to be explained'), calling for more general principles that it can be derived from.

Having characterized the focal concepts of this chapter, language universals and explanations, let us turn to the twofold role that language universals play in explaining language structure.

2. UNIVERSALS AS EXPLANATIONS

We will first consider how language universals explain facts about individual languages. Take the fact that adpositions in English are preposed to the noun phrase: the language has prepositions, as in *after class* (unlike the corresponding phrase in Hungarian: *óra után* 'class after', which contains a postposition).

(2) Language-specific explanandum
     In English, adpositions precede their noun phrases.

How could this fact be explained? There are three available avenues of explanation: structural, historical, and functional.

A structural explanation derives a structural pattern from a more general one. If, following Dryer (1992), we classify syntactic constituents as branching and non-branching (i.e. whether they normally consist of more than one word or just a single word), English turns out to exhibit a fairly consistent linear pattern that holds across constituent types: it generally places non-branching constituents before branching ones. For example, verbs precede their objects, and noun heads precede their relative

clauses. Since adpositions are generally one-word—non-branching—constituents as opposed to the noun phrases they go with, the preposed position of English adpositions can be probabilistically derived from

(3) **Language-specific structural generalization**
     In English, most non-branching constituents precede branching ones.

This English pattern is further derivable from a generalization of cross-linguistic scope. Dryer (1992) has noted that most languages exhibit a uniform ordering of syntactic constituents depending on whether they are branching or non-branching. For example, Norwegian and Thai follow the English pattern: VO and prepositions, while Japanese and Turkish show the opposite order: OV and postpositions.

(4) **Universal structural generalization**
     In most languages, either all or most non-branching constituents precede branching ones, or all or most non-branching constituents follow branching ones.

This is an example of how a universal statement (4) provides a structural explanation for a fact about an individual language (2).

However, the explanation given in (4) is not maximally satisfying because it is not causal. What would a causal explanation of English prepositions be like? As Haiman remarks, 'Everything is the way it is because it got that way' (Haiman 2003: 108). This means that searching for a causal explanation amounts to trying to find a temporal process whose input lacks the explanandum and whose output contains it.

If we start with an individual speaker of English and ask why he uses phrases like *around Chicago* and not *Chicago around*, we must conclude that the grammar of English in his head causes him to use prepositions rather than postpositions. This raises the next question: why is the grammar of English that the speaker has in his mind the way it is? The answer is that this is the grammar that he has acquired based on the ambient language (cf. Cristofaro, this volume).

But neither of these two processes—language use and language acquisition—provides a direct cause for how the grammar of English as a communal resource got to be the way it is, because both acquisition and use presuppose the existence of a language to start with. To answer that question, we have to probe into the history of the language. A historical explanation of English prepositions will have to make reference to an earlier stage of the language with no prepositions and derive the present stage from it, such as:

(5) **Language-specific historical generalization**
     Source: In English, all prepositions whose source is traceable within the
             history of the language have arisen either from verbs of verb–object
             phrases or from possessum constituents of possessive phrases.
     Process: Linear order is preserved.

This generalization derives some—although not all—English prepositions from non-prepositions. Examples are *concerning the weather*, where the preposition comes from the verb *to concern*, and *inside (of) the house*, where the source construction was a possessive one ('in the side of the house').

The generalization in (5) has some explanatory force, but it calls for an explanation itself. Why did these changes occur in English, and why did linear order remain invariant? A look at other languages shows that these historical processes are not unique to English: adpositions are generally derived from genitives (e.g. in Basque and Buriat, see Bybee 1988: 354) or from verbs (e.g. in Mandarin Chinese, see Li and Thompson 1974), and the original order is generally preserved. The hedge 'generally' is necessary: Harris and Campbell (1995: 212–15) provide interesting examples where, in the course of the genesis of adpositions, constituent order has changed. The universal tendency is stated in

(6) **Universal historical generalization**
     Source: In most languages, adpositions have historically arisen from verbs of
             a verb-object phrase or from possessum constituents of a possessive
             phrase.
     Process: Linear order is generally preserved.

The generalization in (6) is a language universal which provides a historical explanation for English prepositional order (2).

The occurrence of the changes in English is probabilistically explained by (6). But why should the change from transitive verb constructions and possessive constructions to adpositions be cross-linguistically common, and why should linear order be generally preserved in the process? In her study of historical origins, Bybee remarks: 'Ultimately, we are brought back to the synchronic plane where we must ask what cognitive processes are behind [...] the development of new adpositional phrases from nouns in genitive constructions' (Bybee 1988: 354). In other words, historical change—or the lack of it—must be driven by function: by the goals that humans seek to achieve in using language and the physical and cognitive means available to them in the pursuit of these goals. Given that these goals and means are assumed to be universal within the human species, functional explanations cannot be language-specific: they must be universal. Here is a relevant universal functional principle.

(7) **Universal functional generalization**
     In all languages, the semantic and phonological reduction of frequently occur-
     ring phrases serves ease of production without impairing comprehensibility.
     Changing linear order in the process does not enhance either production or
     comprehension.

Semantic and phonological reduction in the genesis of adpositions is illustratable in the examples of *inside*, *outside*, and *beside*. Semantically, the obligatoriness of

spatial reference has been relaxed (cf. *besides this problem*). Phonologically, the original genitive preposition *of* has been fully lost in the case of *besides* (originally 'by the side of') and is on its way out in *inside (of)* and *outside (of)*.

The discussion in this section illustrated one of the two ways in which language universals figure in linguistic explanations: they explain language-specific facts. The universal generalizations cited above serve to explain prepositional order in English (2) structurally (4), historically (6), and functionally (7). The concept of functional explanations will be further discussed in section 5. We will now turn to the other role of universals: serving as explananda themselves. In the next three sections, we will explore structural, historical, and functional explanations for universals.

3. UNIVERSALS AS EXPLANANDA: STRUCTURAL EXPLANATIONS

As we saw in section 2, a language-specific fact is explained structurally if it can be shown to follow from a more comprehensive structural generalization. In the two case studies below, universals are explained in this manner.

3.1 Subjacency

Transformational generative grammar has analysed English wh-questions as involving a movement rule that displaces wh-words from their underlying position to the beginning of the sentence. For example, the sentence *What did Sue give her husband?* is derived from *Sue gave her husband what?*

However, not all wh-questions derived by this analysis turn out to be grammatical. For example, (8a) and (8b) are well-formed but (8c) is not.

(8)   a. What do you propose___?
      b. What do you propose___was the reason?
      c. *What do you make the proposal that___was the reason?

An obvious guess at why (8c) is ungrammatical is that the underlying position of the wh-element is too far from its 'landing site'—that is, the position into which it moves. Consider the underlying structures of the sentences in (8):

(9)   a. [You propose what]$_S$?
      b. [You propose [what was the reason]$_S$]$_S$?
      c. *[You make [the proposal that [what was the reason]$_S$]$_{NP}$]$_S$?

In (9a), the word *what* moves out of its clause into a clause-external initial position: *[What [you propose ___]$_S$]$_S$?* In the process, it crosses only one major syntactic juncture: the left boundary of its clause. The sentence is grammatical. In (9b), which is also grammatical, wh-movement applies twice: first, the word *what* moves outside its own clause resulting in *[You propose what [___ caused the problem]$_S$]$_S$?*, and then it moves to the front of the entire sentence. In the course of each of the two movements, it crosses only one clause boundary.

In (9c), however, the wh-word's journey to the left is more complicated. As in (9a) and (9b), it first moves out of its clause, resulting in *[You make [the proposal that what [___ caused the problem]$_S$]$_{NP}$]$_S$?* But now, on its way to crossing the left boundary of the entire sentence as it did in (9a) and (9b), it must also cross the left boundary of the noun phrase that its clause is embedded in: *[the proposal that what caused the problem]$_{NP}$*. Based on this extra hurdle, the explanation of why (9c) is ungrammatical might be a constraint against moving a question word across both a noun phrase and a clause boundary. This principle, known as the Complex NP Constraint, was first formulated by John R. Ross in 1967 and hypothesized to be universally valid. We will take it to be an explanandum.

(10)   Universal explanandum
       A question word cannot be moved in a single step across both a noun phrase boundary and a clause boundary.

What more general structural principle might (10) be derived from and thus explained by? There are also other constructions where the syntactic distance between underlying position and landing site seems to be constrained. Consider passives.

(11)   a. The puppy was fed cat food.
       b. The puppy seems to have been fed cat food.
       c. *The puppy seems that it is likely to have been fed cat food.

Here are sketches of the underlying structures.

(12)   a. [Was fed the puppy cat food.]$_S$
       b. [Seems [to have been fed the puppy cat food.]$_S$]$_S$
       c. *[Seems that [it is likely [to have been fed the puppy cat food.]$_S$]$_S$]$_S$

Just as in wh-movement, a leftward movement is involved here. The movement of *the puppy* from (12a) to (11a) involves no crossing of any noun phrase or clause boundary (unlike wh-words, subjects are assumed to be inside the clause). The movement of *the puppy* from (12b) to (11b) involves the crossing of the single boundary of the clause *[to have been fed the puppy cat food]$_S$*. But in (12c), the movement of *the puppy* out of its underlying structure involves the crossing of two clause boundaries: the left boundary of the clause *[to have been fed ...]$_S$* and the left boundary of the clause *[it is likely ...]$_S$*. We might, therefore, offer the following hypothesis.

(13) **Universal explanandum**
A noun phrase cannot be moved in a single step across more than one clause boundary.

A single generalization may now be formulated to encompass the two constraints in (10) and (13) if we create the concept 'major constituent' as a cover term for clause and noun phrase:

(14) **Universal structural generalization**
A constituent cannot be moved in a single step across more than one major constituent boundary.

This principle, known as Subjacency (cf. Chomsky 1986a: 28–31), was tentatively proposed as an absolute language universal. Languages have subsequently turned up that violate it (cf. Hawkins 2004: 193–7), thus it is at best a statistical universal. If so, it provides a probabilistic structural explanation for our initial explanandum in (10).

3.2 Constituent order

In the past 40 or so years, a number of cross-linguistically recurrent correlations have been found among the orderings of different syntactic constituents. Here are some of the property clusters that Dryer (1992) has observed in a sample of 625 languages:

(15) **Universal explanandum**
Languages tend to have either
- Verb & Object,
- Verb & Manner Adverb,
- Noun & Relative Clause, and
- Adposition & Noun Phrase,

or
- Object & Verb,
- Manner Adverb & Verb,
- Relative Clause & Noun, and
- Noun Phrase & Adposition.

Illustrations below come from Rapa Nui (a VO language) and Japanese (an OV language).

(16)

Rapa Nui			Japanese		
Verb & Object			*Object & Verb*		
to'o i	te	moni	okane	o	toru
take ACC	the	money	money	ACC	take
'take the money'					

Verb & Manner Adverb		*Manner Adverb & Verb*	
hapi	riva	yoku	benkyoosuru
learn	well	well	study
'study well'			

Noun & Relative Clause			*Relative Clause & Noun*		
te poki noho oruga o	te	miro	sono booto ni tomatteiru otokonoko		
the boy stay upon GEN	the	boat	the boat on staying boy		
'the boy who stays on the boat'					

Adposition & Noun Phrase			*Noun Phrase & Adposition*	
i	te	money	okane	o
ACC	the	money	money	ACC
'the money (ACC)'				

If the uniformly ordered constituents were as different as their labels show them to be, we would not expect them to be uniformly ordered across languages. If they do exhibit linear likeness, this must be because they are alike in some way. Here are three proposals from the literature, each of which envisages a different way in which the constituents whose order tends to be correlated across languages are reducible to the same type.

(17) **Universal structural generalizations**

(a) Heads and dependents
In any one language, all head constituents tend to be ordered the same way relative to their dependents. (Bartsch and Vennemann 1972: 131–9, Vennemann 1973: 40–47)

(b) Branching and non-branching constituents
In any one language, all branching constituents tend to be ordered the same way relative to their non-branching co-constituents. (Dryer 1992)

(c) Mother-node-constructing and non-mother-node-constructing constituents
In any one language, all mother-node-constructing constituents tend to be ordered the same way relative to their non-mother-node-constructing co-constituents. (Hawkins 1994)

For Vennemann (17a), what defines the classes of uniformly ordered constituents is whether they are heads or dependents. Thus, verbs, adpositions, and nouns are heads, with their co-constituents being dependents. As already mentioned in section 2, for Dryer (17b), the relevant classificatory property is whether a category branches or does not branch. Verbs, adpositions, and nouns do not branch—they are single words—while their co-constituents do. Hawkins's structural principle (17c) is ultimately function-based: it calls for minimizing the number of words that it takes the hearer to identify the immediate constituents of a sentence when proceeding from left to right (see Hawkins, this volume).

The operation of Hawkins's principle (called Early Immediate Constituents) is illustrated in (18) for verb–complement and adposition–noun phrase order for 'walk in parks'.

(18) a. [Verb [Preposition   NounPhrase]$_{PP}$]$_{VP}$
          e.g. *walk*   *in*   *parks*

      b. [[NounPhrase   Postposition]$_{PP}$ Verb]$_{VP}$
          e.g. *parks*   *in*   *walk*

      c. [[Preposition   NounPhrase]$_{PP}$ Verb]$_{VP}$
          e.g. *in*   *parks*   *walk*

      d. [Verb [NounPhrase   Postposition]$_{PP}$]$_{VP}$
          e.g. *walk*   *parks*   *in*

According to Hawkins's theory, the hearer wants to know as soon as possible that the verb phrase consists of a verb and an adpositional phrase. The sequences in (18a) and (18b) are optimal in this respect. In (18a), in the space of the first two words *walk in*, the hearer gets the entire picture. From *walk*, he recognizes one of the immediate constituents of the verb phrase: the verb; and from the preposition *in*, which follows the verb immediately, he constructs the prepositional phrase. In (18b), too, verb and adposition are adjacent. In contrast, in (18c) and (18d), these two mother-node-constructing constituents are separated: the intervening words put processing on hold.

Each of the three principles in (17) explains the particular implicational universals in (15) by subsuming them under more general principles of structure.

4. Universals as explananda: historical explanations

As was discussed in section 2, structural explanations are not causal: they do not provide a process which brings about something. Causal explanations of language structures—as of cultural constructs in general—must be historical. As we also saw in section 2, historical explanations must make reference to sources—earlier stages of the language—and to processes that are responsible for changing the old structure to a new one. Let us see what sources and processes could be found to explain language universals historically.

What are possible historical sources of universals? An unrestricted universal may simply have been inherited from an ancestral language. For instance, the fact that all languages have oral vowels may be due to the fact that the ancestral language(s)

from which all languages derived had oral vowels—a possibly accidental property. (On how grammar might have arisen in the prehistoric evolution of human language, see e.g. Hurford, Studdert-Kennedy, and Knight 1998.)

The source of restricted universals in terms of direct inheritance is more complex. Take first a bidirectional implication: the mutual correlation of two properties, such as that verbs and adpositions tend to be on the same side of their co-constituents, resulting in languages either having VO order and prepositions, or OV and postpositions. This cannot be explained by direct inheritance from a single ancestral language having one of the two patterns, since that would leave the languages having the other pattern without a source. We would have to posit two source languages—or two dialects of a language—each having one of the two patterns.

The explanation of unidirectional implications in terms of direct inheritance requires even richer assumptions about source languages. Regularities according to which 'if a language has X, it also has Y' could not have been directly inherited either from a single original language or from two ancestral languages because they allow for three different language types while excluding one. For example, the universal according to which if a language has an /m/, it also has an /n/ amounts to the claim that there are languages with both /m/ and /n/, languages that have neither, and languages that have /n/ but no /m/ (but no language with an /m/ and no /n/). In order to explain this implication in terms of direct inheritance, three ancestral languages need to be posited: one with both /m/ and /n/, one without either, and one with /n/ but no /m/.

Let us now turn to the second necessary component of historical explanations: processes deriving a new structure from an old one. For universals, what we need to explain is why the inherited patterns have not changed in the course of history in spite of the pervasive transformations that languages undergo in the course of centuries and millennia. Why are universals never sources of historical change? For example, if an ancestral language had alveolar stops, why did they not disappear in at least some languages in the course of centuries and millennia? And if a universal is not absolute but only probabilistic, we have to explain why the original pattern has remained invariant in most languages but has changed in others.

These considerations show the complexities of explaining universals in terms of direct inheritance from ancestral languages (cf. Comrie 2003a). Nonetheless, recent typological research has shown that cross-linguistic clusterings of grammatical properties are often confined to particular language families and to particular geographical areas (Nichols 1992, Bisang 1996, Blake 2001b, Bickel 2005). Thus, the overall prevalence of clustering tendencies may indeed be due to inheritance from languages ancestral to a given language family or to extensive language contact.

So far, we have considered explaining universals in terms of universal sources and universal lack of change. Below, we will see two cases of universals explained by universal sources and universal constraints on change.

4.1 The order of nominal and pronominal objects

Consider the following implicational universal as an explanandum.

(19)   Universal explanandum
       In all languages, if the pronominal object follows the verb, so does the
       nominal object. (Greenberg 1963b: 25)

According to this generalization, there may be languages where both kinds of
objects follow the verb (as in Modern English) and languages where both kinds
precede the verb (as in Turkish); but if one follows the verb and the other precedes
it—as in French—it is always the pronoun that precedes, not the noun. The three
permitted patterns are illustrated in:

(20)   English
a. I saw Bill.
b. I saw you.

(21)   Turkish
a. Billi   gördüm.
   Bill   I:saw
b. Seni   gördüm.
   you$_s$ I:saw

(22)   French
a. J'ai   vu   Bill.
   I:have seen   Bill
b. Je   t'ai   vu.
   I   you$_s$:have   seen

Here is the historical background of (19). French is a daughter language of Latin,
which tended to place both noun and pronoun objects in front of the verb, as
Turkish does today. English is a daughter language of Proto-Germanic, for which
the same order pattern has been reconstructed.

We can thus posit the following three historical stages (O_N stands for noun
object; O_P stands for pronominal object; changes are in bold):

(23)

	Order patterns:		Languages:	
	O_N	O_P	Romance	Germanic
Stage I	$O_N V$	$O_P V$	Latin	Proto-Germanic
Stage II	VO_N	$O_P V$	French	Old English
Stage III	VO_N	VO_P	–	Modern English

(23) shows that the change from preverbal to postverbal order of objects
occurred in both language families, and that in each case, nominal objects were

in the vanguard of change with pronominal objects lagging behind. English has
completed the change by extending it to pronominal objects, while French has not.

Thus, the French and Old English pattern can be explained by the hypothesis that
in historical change, pronouns lag behind nouns. This is supported by independent
evidence. In Old English, both nouns and pronouns had case, gender, and number
inflection. In today's English, nouns still show number, but they have no case
inflection except for the genitive clitic 's, and they lost their gender inflection.
Personal pronouns, however, still retain not only number but also some case and
gender distinctions. The same thing happened in French case marking.

Note that the conservative nature of pronouns explains the universal in (19) only
if we assume that OV-to-VO order is possible but VO-to-OV order is not. This is
because in a VO-to-OV change, pronouns, being more conservative, would still be
postverbal when nouns are already preverbal—a synchronic stage excluded by (19).
The non-occurrence of VO-to-OV is questionable in its unqualified form, however:
Li and Thompson (1974) argued that Mandarin Chinese has undergone just this
change, and Ratcliff (2005) has shown the same for Bukhara Arabic. But the
Mandarin case did not involve a direct reordering of verb and object, and the
change in Bukhara Arabic was induced by language contact. With appropriate
qualifications, (24) summarizes the explanation of (19).

(24)   Universal historical generalization
       Source: In all languages, in spontaneous historical change, the source of the
               direct inversion of verb and object is OV and not VO.
       Process: In all languages, in historical change, pronouns lag behind nouns.

4.2 Definite articles and demonstratives

In most languages that have definite articles, the article's phonological shape is
similar to that of a demonstrative. Examples are English *the* and *that*, German *der*
and *dieser*, and Hungarian *a(z)* and *az*.

(25)   Universal explanandum
       Definite articles tend to be similar in phonological form to one of the
       demonstratives of the language.

The historical explanation is that definite articles most frequently develop from
demonstratives (Diessel 1999: 128, Heine and Kuteva 2002: 109–11).

(26)   Universal historical generalization
       Source: In all languages, the most frequent historical source of definite
               articles is demonstratives.
       Process: In all languages, in the course of history, phonological form
                changes gradually.

The generalization in (26) is further derivable from a broader one. In the course of demonstratives turning into definite articles in certain contexts, two things happen: the demonstrative's phonological form is diminished, and its meaning is generalized from spatial deixis to definiteness. Formal and semantic reduction are symptoms also of other changes where a lexical item turns into a grammatical formative, such as in the development of the English future marker *will* from the lexical verb *will* 'want', or in the development of English prepositions (cf. section 2). The general process is called grammaticalization (cf. Pagliuca 1994, Hopper and Traugott 1993, Givón 2002: 203–22, Newmeyer 1998: ch. 5, and the various articles in Campbell 2001).

Grammaticalization is described in (27).

(27)   **Universal historical generalization**
        Source: In all languages, functional elements tend to derive historically from
                 lexical elements.
        Process: In all languages, this change happens through incremental phono-
                 logical and semantic reduction.

If we classify demonstratives as lexical elements and definite articles as functional ones, and if we further assume that definite articles developed recently enough so that phonological reduction has still kept the skeletal phonetic properties of their source, the universal explanandum in (25) follows from and is thus explained by (26), which in turn is explained by (27).

5. UNIVERSALS AS EXPLANANDA: FUNCTIONAL EXPLANATIONS

Cross-linguistically consistent patterns of historical change can be readily identi-fied, but what causes them? As noted in section 2, trying to explain historical change takes us back to synchrony: communally shared language structures are shaped by the individual-based processes of language acquisition and language use.

Human cognition and physiology cannot be invoked as direct causes of synchronic language structure: the body and mind of an English speaker do not directly cause the grammar of English to be the way it is: the language is given to the speaker and to the language learner. Apart from instances of conscious 'language engineering', the speaker is not like an architect who builds something from scratch and is thus fully in charge of what the structure will come out like; he is more like a person who inherits a house and perhaps remodels it a bit. Thus, the relationship here is only a permissive one: all synchronic language structure must be permitted by human cognition and physiology.

However, human cognition and physiology must be invoked as direct causes of

(i) language use (performance): how the person puts to use the language system
     he has acquired;
(ii) developmental change: how the person acquires the language system he is
      exposed to; and
(iii) historical change: how language is modified in the process of use and acquisition.

Sources of change rooted in individual behaviour are misperceptions, misinter-pretations, and changes in frequency of use (cf. Blevins 2004: 32–3). Although the changes are not brought about by single individuals but are caused by their cumulative effects (cf. Keller 1994), the processes are still rooted in the needs and capabilities of language learners and language users. Explanations of linguistic structures that show how the goals and means of language participate in bringing about historical change through the processes of language acquisition and language use are appropriately called functional explanations.

In the linguistic literature, functional explanations are often pitted against ex-planations in terms of the Innateness Hypothesis. This hypothesis holds that universal properties of languages are wired into the human brain, and they form a separate module apart from other aspects of cognitive capabilities (cf. Hoekstra and Kooji 1988, Penke and Rosenbach 2004, Hauser, Chomsky, and Fitch 2002). Thus, it has often been assumed that a universal grammatical feature is explained either by language function or by it being part of the innate linguistic endowment of humans.

However, explanations of language structure in terms of language function and in terms of innate principles are not at odds. First, by the definition adopted here, explanations in terms of innate knowledge must be viewed as functional since they make crucial reference to cognitive means. Second, the innate properties may be goal-related—necessary or at least conducive to knowing and using language (cf. Kirby 1999: ch. 5, Hawkins 2004: 267).

The compatibility of functional explanations and those appealing to innateness can be shown for the four universals discussed above. The tendency for grammatical structures to observe the principle of subjacency (section 3.1) may be innate, but at the same time, it may be functionally based: relating two positions in the sentence at a great syntactic distance may hamper comprehension (cf. Hawkins 2004: chap. 7). Similarly, the cross-linguistically uniform ordering of certain syntactic constituents (section 3.2) may ease parsing, as claimed by Dryer and Hawkins, but at the same time it may also be an innate preference. The resistance of pronouns to losing inflection and to changing position (section 4.1) can also be functionally explained: due to the frequent use of pronouns, inflection is merged with stem and thus ceases to be a separate morpheme that might get lost. Similarly, the pronoun ceases to be a separate word by getting stuck to the verb as a clitic, and thus cannot easily be repositioned by rules of word order. This explanation is functional, but at the same time it may be linked to innate properties of the mind. Finally, the grammaticalization process that is

responsible for the evolution of demonstratives into definite articles (section 4.2) is an instance of ritualization, a general process manifested in changes that non-linguistic symbols also undergo over time (Haiman 1994, Bybee 2005). This tendency is also a plausible candidate for innateness.

What does remain an issue separating the two approaches is whether the innate devices are 'domain-specific'—that is, applicable to language only (as generally assumed in explanations invoking innateness)—or whether the language-relevant cognitive properties of humans are the same as those operative in non-linguistic cognition (cf. Newmeyer 2003, 2005, Tomasello 2003b, MacWhinney 2004). While this is an empirical question, Occam's razor favours the latter.

Here follow two case studies of functional explanations of universals.

5.1 Resumptive pronouns in relative clauses

One of the ways relative clause constructions differ across languages is the way reference to the head is made in the relative clause. The relative clause may or may not include a pronominal copy of the head. English normally does not use such resumptive pronouns, but Persian does.

(28) a. English
        the man that I gave milk to ____

      b. Persian
        mardi   ke   man   shir-râ   be   u   dadâm
        man   that   I   milk-OBJ   to   him   gave:S1
   'the man that I gave milk to'

Keenan and Comrie (1977) have found that in those languages that use resumptive pronouns in relative clauses, the occurrence of the pronoun is predicted by the constituent type that is 'relativized'; that is, understood as referring to the head of the relative clause. Here is the generalization, which at the same time serves as an explanandum.

(29) **Universal explanandum**
      In all languages, on the scale of relativizable constituents, known as the Accessibility Hierarchy, if a language uses resumptive pronouns for any one type, it also uses them for all types to the right.
      Accessibility Hierarchy
      Subject > Direct Object > Indirect or Oblique Object > Genitive

For example, if a language has constructions like *the book that I have read it*, where the resumptive pronoun *it* represents the direct object, it also has constructions like *the man that I have given the book to him*, where the resumptive pronoun *him* stands for the indirect object.

Hawkins offers a functional explanation for why this should be so. The hearer's task is to identify the referent of the co-referential noun phrase in the relative clause. Not representing the referent by a pronoun in the relative clause is good for the speaker: for him, brevity is at a premium. But the interests of the hearer are different. If there is a pronoun to refer to the head, the expression is closer to diagrammatic iconicity, where each semantic argument is explicit in the syntactic structure (Keenan 1987b) and is thus easier to understand. If there is no pronoun, finding the referent is more difficult, and this difficulty increases with the distance between the head—called the filler—and the gap where the co-referential noun phrase would stand in a main clause. In languages where the order of major constituents is Subject—Direct Object—Indirect Object and the relative clause follows the head, this distance turns out to be small for subject relatives, larger for direct-object relatives, and still larger in indirect-object relativization. This is shown in (30).

(30) N-HEAD [Subject Direct Object Indirect Object]
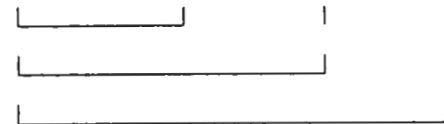
Thus, resumptive pronouns appear to step in to aid comprehension where relative clause structure gets more difficult to process.

Hawkins's (1999, 2004: ch. 7) functional explanation relying on filler-gap distance extends beyond relative clauses. Another filler-gap construction is wh-questions, where, as in English *What did you see?* etc., the wh-word is not in its subcategorized position. As we saw in our discussion of Subjacency (section 3.1), increased distance between filler and gap in wh-questions also results in reduced grammaticality.

Hawkins's overall hypothesis is that grammars in general respond to the complexity of filler-gap constructions: the distribution of gaps relative to their fillers is shaped by processing constraints. If a gap is permitted in a construction, it is also permitted in all simpler constructions of that type. If it is not permitted in a construction, it is also not permitted in the more difficult subtypes of that construction.

The particular universals captured by (29) are thus explained by the following general functional principle.

(31) **Universal functional generalization**
      For all languages, the more difficult a construction is to process, the more likely that the language will use a more explicit expression type.

In other words, '[g]rammatical conventions are "frozen" processing preferences' (Hawkins 1999: 279).

As we noted above, functional principles cannot directly explain synchronic language structure, since the language is given to its user and its learner rather than designed by them from scratch. Functional principles can only explain language change. How does (31) come to guide historical change? The key factor must be frequency (cf. Newmeyer 1998: 127, Haspelmath 1999b, Kirby 1999: 20, Bybee and Hopper 2001, Bybee 2005): preferred structures are used more often and eventually become the only choice.

5.2 The case-marking of objects

Languages differ in how they case-mark direct objects. Hungarian is a language that case-marks all direct objects, shown in (32).

(32) Hungarian
     A   kutya   megharapja   az   ember-t.
     the dog   bites   the   person-ACC
     'Dogs bite people.'

At the other end, Lisu marks no direct objects. Since subjects are not case-marked nor are they differentiated from direct objects in other ways, subject–object ambiguity may arise, as in (33) (simplified from Li and Thompson 1976: 472).

(33) Lisu
     Làthyu   nya   ánà   khùa.
     people   TOP   dog   bite
     'People, dogs bite them.' or
     'People, they bite dogs.'

The picture becomes more complex if we look at Hebrew. Hebrew falls between Hungarian and Lisu, in that it marks some direct objects but not others. In particular, definite direct objects must be case-marked by the prepositional clitic *'et*, but most indefinite ones may not (Aissen 2003: 453).

(34) Hebrew
     a. Ha-sere   her'a   'et-ha-milxama.
        the-movie   showed   ACC-the-war
        'The movie showed the war.'
     b. Ha-sere   her'a   milxama.
        the-movie   showed   war
        'The movie showed a war.'

There is additional variation. Some languages—for example, Catalan and Pitjantjatjara—are more restrictive than Hebrew. They obligatorily case-mark only certain definite direct objects: (strong) personal pronouns (Catalan) and personal pronouns and proper names (Pitjantjatjara). The rule in Turkish, in turn, is more relaxed than the one in Hebrew: Turkish case-marks not only all definite direct objects but also indefinite objects provided they refer to a specific individual.

Here is the summary of the facts about the cross-linguistic distribution of direct-object case-marking:

(35) Universal explanandum
     In all languages, if direct objects of a certain kind are case-marked, so are all other kinds to the left on the following scale.

Personal pronoun	Proper name	Definite common nominal	Indefinite specific nominal	Indefinite non-specific nominal

What explains (35)? Working within the framework of Optimality Theory, Aissen proposes that there are two universal constraints at work here: Iconicity and Economy.

(36) Universal functional generalizations
     (a) The Iconicity Constraint
         For all languages: given a markedness opposition between two nominals, the marked member should be case-marked (where a nominal on the scale in (35) is marked relative to all other nominals to its right).
     (b) The Economy Constraint
         For all languages: no noun phrase should be case-marked.

The two constraints are at cross purposes: Iconicity requires case-marking under certain conditions, while Economy bans case-marking under all conditions. They are both functionally based: Iconicity serves clarity and thus the hearer's interests, while Economy saves effort for the speaker.

How exactly do the two constraints—Iconicity and Economy—account for the cross-linguistic variability of direct-object case-marking? According to Optimality Theory, conflicts between constraints are resolved by ranking. For Lisu, the Economy Constraint reigns supreme: the language complies with it on all levels of the markedness hierarchy, in that it does not case-mark even the most marked types of direct objects on the scale. Thus, it violates all the requirements of Iconicity. Catalan, which case-marks pronominal direct objects only, is less insistent on Economy: it ranks Economy lower than the top requirement of Iconicity that calls for case-marking on the most marked direct objects: personal pronouns. Pitjantjatjara, Hebrew, and Turkish accord less and less of a role to Economy in

favour of Iconicity. Finally, Hungarian discards Economy altogether and marks all objects.

As in the case of resumptive pronouns (section 5.1), the crucial link between function and structure must be frequency: functionally preferred structures are more frequent, and with time, they become conventionalized into grammars.

6. CONCLUSIONS

This chapter has discussed the ways in which language universals play a role in explaining language structure. On the one hand, they serve as explanations of facts of individual languages. On the other hand, they call for explanations themselves. They may be explained structurally, if they are derivable from a more general structural regularity; historically, by appropriate assumptions about initial stages and historical processes; and functionally, if they follow from the goals and means of humans as driving language acquisition and language use.

Our discussion highlighted some of the complexities of explaining universals resulting from conflicting explanatory principles, especially with respect to functional explanations (Newmeyer 1998: 137–53, Frajzyngier and Shay 2003). The last case study above—the explanation of direct-object marking—illustrates conflict between Iconicity and Economy, the former serving the hearer, and the latter favouring the speaker. But not all conflicting desiderata result from the tug of war between speaker and hearer. In Natural Morphology—a framework to which the nature and resolution of conflicting principles is central—languages are held to three types of criteria which may be in conflict: compliance with universals, adherence to features of the type that a language belongs to, and consistency with the language-specific features of a language (cf. Dressler 1997, 2003).

There are also other conflicting functions in language. While economy and ease of parsing may shape the development of novel structures, their propagation is often influenced by social factors which may be diagonal to structural desiderata. People may prefer structures that are used by prestigious speakers even if they are less communicatively effective (cf. Kirby 1999: ch. 3, Nettle 1999a: ch. 7, Croft 2000a).

In addition to the complexity of attempting to explain universals functionally, there are also necessary limits to the task: we cannot expect all grammatical phenomena to be equally determined by language function, even if they are universal (Newmeyer 2003). In thinking about functional explanations of instrumental objects in general, Sanders (1977) takes knives as an example of cultural constructs. He notes that while all structural properties of a knife have to be compatible with its function, not all of them are necessary for it. There are certain

structural properties of knives—such as having a handle that is not made of cotton candy—that are determined by the knife's function. Others are conducive to its function but not necessary, such as a convenient length and the shape of the knife's handle. This means that some functional principles may be tendencies rather than requirements. And, thirdly, a carved geometric pattern on the knife's shaft is merely compatible with but immaterial to its cutting function. Similarly, some grammatical properties may be necessitated by language function; others may be preferred but not necessary; and again others may be merely permitted by function without being indispensable or even advantageous.

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CHAPTER 5

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THE PROBLEM OF CROSS-LINGUISTIC IDENTIFICATION

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LEON STASSEN

1. THE ISSUE

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Typological investigation aims at establishing the range of cross-linguistic variation in the structural encoding of a specific domain. Given this, it is inevitable that at the very start of any typological investigation the researcher will be confronted with the problem of cross-linguistic identification. This problem can be stated in the following question: how can we be sure that the data which we select from the languages in the sample form a coherent body of facts? Languages can differ vastly in the ways they structurally encode a given domain, and this calls for a principled way to identify in each language the structural data which are relevant to the project at hand, and—equally important—those structural data which can be left ignored. The solution to this problem presupposes a language-independent definition of the domain of the enquiry, that is, a demarcation of the relevant body of facts, which can be applied to any language, regardless of its structural characteristics.

Although the problem of cross-linguistic identification is not often addressed explicitly in typological studies, it is clear that a solution to it is vital to any typological enquiry. Failure to provide a precise and explicit language-independent definition of the domain at hand will not only be confusing to the reader. Even

worse, it will also, in all probability, lumber the researcher with a database that is unwieldy and internally contradictory, not to say chaotic. As a result, the researcher will run the serious risk of comparing data that are essentially incomparable, thereby damaging the overall value of his or her conclusions.

2. EXTERNAL CRITERIA

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From the very beginning of modern-day linguistic typology, authors have realized that language-independent definitions of typological domains cannot be formulated in purely formal/structural terms. The general motivation behind this insight is that formal domain definitions are, by their very nature, language-dependent. However, it is not the aim of linguistic typology to single out those languages in which the phenomena in the domain have a specific formal expression; linguistic typology attempts to present a survey of all the different ways in which languages may encode some linguistically relevant property. If one were to define this property in strictly formal/structural terms, one would identify only those encodings which have a specified formal manifestation, while leaving out all those instances of languages in which a different formal way of encoding has been chosen. 'In short, the use of purely formal criteria for the identification of comparable constructions across languages makes this identification unsolvable for all those cases in which it is not trivial' (Stassen 1985: 15).

Stassen (1997: 616–17) points out that non-formal domain definitions are even at the basis of those typological studies which explicitly situate themselves within a 'formalist' theoretical framework. He states (pp. 616–17):

In several respects, the formation of a cross-linguistic database for a typological research project can be compared to the making of a translation. I think it would be pointless to deny that, in making a translation from one language to another, the meaning of the material to be translated plays an all-important role; translations which would only heed formal aspects of a text would certainly be inadequate, if they are possible at all. In the same way, setting up a cross-linguistic database always presupposes the consideration of semantic/functional similarities or differences among the material to be sampled from the various languages. It may be useful to point out that this 'semantic' solution to the problem of cross-linguistic identification is even (though, admittedly, implicitly) adhered to in typological studies which place themselves explicitly in a 'formalist' framework. A case in point is Cheng (1991). In her typological investigation of WH-questions this author does not confront herself explicitly with the problem of how to construct her cross-linguistic database, and hence she does not give us any indication of the criteria she has used in selecting the relevant non-English material for her study. All the same, however, it is clear that this selection has been made on essentially semantic or functional grounds: the non-English sentences which she adduces

are there because they mean the same as, or function similarly to, their English equivalents. Indeed, it would be hard to see why, for example, the characteristics of the Mandarin word *shéi* would be relevant in this study, if it were not for the fact that this word means the same as the English word *who*.

A non-formal approach to cross-linguistic identification was formulated as early as in Greenberg (1966c: 74), who, in his groundbreaking study on word order correlations, made the following methodological remarks:

It is here assumed, among other things, that all languages have subject-predicate constructions, differentiated word classes, and genitive constructions, to mention but a few. I fully realize that in identifying such phenomena in languages of differing structure, *one is basically employing semantic criteria* [...]. The adequacy of a cross-linguistic definition of 'noun' would in any case be tested by reference to its results from the viewpoint of the semantic phenomenon it was designed to explicate. If, for example, a formal definition of 'noun' resulted in equating a class containing such glosses as 'boy', 'nose', and 'house' in one language with a class containing such items as 'eat', 'drink', and 'give' in a second language, such a definition would forthwith be rejected and that on semantic grounds. [Italics added.]

Greenberg's point of view has, explicitly or tacitly, been adopted by all authors of major typological studies in the last three decades, and has been canonized in textbooks such as Croft (2003a: 13–19). Below, I present a small selection of domain definitions which are grounded on non-formal criteria. These definitions stem from typological works that deal with such varied domains as person marking (Cysouw 2003a), comparative constructions (Stassen 1985), clausal negation (Miestamo 2003), relative clause formation (Keenan and Comrie 1977, Comrie 1989), and manner expressions (Loeb-Diehl 2005). Following each definition, I present three example sentences from different languages. These examples are meant to illustrate that these sentences may exhibit considerable morphosyntactic differences, but that they are nonetheless eligible for the database of the typological investigation in question, since they all are licensed by the semantic domain definition at hand.

A construction counts as a comparative construction (and will therefore be taken into account in the typology), if that construction has the semantic function of assigning a graded (i.e. non-identical) position on a predicative scale to two (possibly complex) objects. (Stassen 1985: 15)

(1) Mundari (Austro-Asiatic, Munda) (Hoffmann 1903: 110)
    Sadom-ete   hati   mananga-i
    horse -from   elephant big   -3SG.PRS
    lit. 'From the horse the elephant is big: The elephant is bigger than the horse.'

(2) Duala (Niger-Kordofanian, North-West Bantu) (Ittmann 1939: 187)
    Nin ndabo e kolo buka   nine
    this house it big   exceed that
    lit. 'This house is big (and) exceeds that: This house is bigger than that.'

(3) Amele (Papuan, Madang) (Roberts 1987: 135)
    Jo   i   ben, jo   eu   nag
    house this big, house that small
    lit. 'This house (is) big, that house (is) small: This house is bigger than that house.'

A clausal negation construction is a construction whose function is to modify a clause expressing a proposition *p* in such a way that the modified clause expresses the proposition with the opposite truth value to p, i.e., -*p*, or the proposition used as the closest equivalent to -*p* in case the clause expressing -*p* cannot be formed in the language. (Miestamo 2003: 53)

(4) Polish (Indo-European, Slavonic) (Paloposki 1999: 116)
    Nie   czyta-m
    NEG   read-1SG
    'I do not read.'

(5) Ladakhi (Sino-Tibetan, Tibetan) (Koshal 1979: 238)
    Pəlldənni spečhə   ḍi-yin-met
    P.ERG   book.ABS write-AUX-NEG.AUX
    'Paldan is not writing a book.'

(6) Finnish (Uralic, Finno-Ugric) (Miestamo 2003: 25)
    E-n   juokse
    NEG-1SG run
    'I do not run.'

A relative clause [...] consists necessarily of a head and a restricting clause. The head in itself has a certain potential range of referents, but the restricting clause restricts this set by giving a proposition that must be true of the actual referents of the over-all construction. (Comrie 1989: 143)

(7) Russian (Indo-European, East Slavonic) (Comrie 1989: 149)
    Devuška, kotoraja   prišla
    girl   who.NOM arrived
    'the girl who arrived'

(8) Malagasy (Austronesian, West Indonesian) (Comrie 1989: 156)
    Ny mpianatra izay nahita ny   vehivavy
    the student   that saw   the   woman
    'the student that saw the woman'

(9) Basque (Basque) (Comrie 1989: 141)
    Emakua-ri liburua eman dio-n   gizona
    woman-to book   given has-REL man
    'the man who has given the book to the woman'

The domain of manner predication is characterized by the semantic function of predicating a property of an event under the category of 'manner'. Any linguistic unit, in any language of the sample, which performs this semantic function will be called a *manner expression* and should, in principle, be eligible for inclusion in the database. (Loeb-Diehl 2005: 5–6)

(10) Swedish (Indo-European, North Germanic) (Jan Anward, p.c.)
Hon   sjunger   vacker-t
she   sing.PRS   beautiful-NEUT
'She sings beautifully.'

(11) Even (Altaic, Tungusic) (Benzing 1955: 121)
Paca   kənəli-c   gurgəwein
Paul   bad-INS   works
'Paul works badly.'

(12) Ewe (Niger-Kordofanian, Kwa) (Felix Ameka, p.c.)
Nyonuví   lá   dzi   ha   wò   vívi
girl   the create song it   be.sweet
lit. 'The girl created a song, it (was) sweet: The girl sang sweetly.'

With regard to these definitions, a number of additional remarks can be made. First, it can be seen that in most of these definitions, the 'non-formal' nature of the formulation can be labelled as 'semantic' or 'cognitive'. As pointed out in Croft (2003a: 14), however, it would be too restrictive to claim that domain definitions should always have their foundation in semantics. Cross-linguistic criteria that have their basis in pragmatic or discourse-functional notions are also readily permissible. An example of such a case is the domain definition employed in the typology of person marking developed by Cysouw (2003a: 5):

There are three criteria for linguistic elements to be included in the investigation: they have to be a shifter [i.e., they have to be used in a deictic function], specialized for that function, and used for reference to speech act participants. Henceforth, linguistic elements that adhere to these three criteria are called PERSON MARKERS.

Moreover, it is clear that typological studies that deal with a cross-linguistic comparison of phonological phenomena can never have their grounding in semantics; instead, they will have to be based ultimately on domain definitions that are stated in terms of phonetics. Given this, it seems advisable to follow Croft's suggestion and to speak of 'external' criteria in domain definitions, instead of 'semantic' or 'functional' criteria, as is often done. The term 'external criteria' is meant to be in opposition to 'formal' or 'structural' criteria, which can be viewed as 'internal' to natural language systems.

Secondly, we must note that in some of the above definitions, the 'external' grounding of the domain demarcation is problematic in itself. Thus, for example, in Loeb-Diehl's definition of the domain of manner expressions, the category of 'manner' itself is left undefined: 'it is extremely hard, if not impossible, to

formulate a conclusive definition of the concept' (Loeb-Diehl 2005: 5). Nonetheless, one may agree that the concept of 'manner', unclear and perhaps fuzzy as it may be, has a certain cognitive reality, so that it may be conceived of as an 'a priori' category or a 'semantic prime' in the sense of Wierzbicka (1996). In other words, the lack of a conclusive specification of a semantic or cognitive concept does not automatically bar this concept from figuring in a typological domain definition.

As a third point, it must be stipulated that domain definitions do not always have to be formulated in terms of 'primary' or 'basic' external concepts. In a number of cases, to do so would actually be cumbersome, or even pedantic. As an example, we can cite the domain definition given by Koptjevskaja-Tamm (1993a: 5) in her typological study of action nominals:

[Action nominals are] nouns derived from verbs [...], with the general meaning of an action or a process.

This definition refers to 'primary' cognitive concepts like 'action' and 'process', but in addition it employs notions like 'noun' and 'verb'. For these latter notions, the author apparently assumes that no explication of their semantic/cognitive grounding is needed. I think this assumption can be defended; after all, the cross-linguistic identification of the categories of 'noun' and 'verb' has already been proved to be successful in earlier literature—see, for example, the quotation from Greenberg (1966c) given above. More in general, I take the view that typologists should be allowed to use 'short-cut' terminology in their domain definitions, especially when 'basic' categories such as 'noun', 'verb', 'predicate', or 'subject' are concerned. Definitions in which each and every concept used is reduced to its semantic/cognitive foundation often place an unnecessary burden on the reader.

3. MIXED FUNCTIONAL–FORMAL DEFINITIONS

Typologists generally agree that external criteria form a *necessary* part of cross-linguistic domain definitions. At the same time, however, hardly any author thinks that external criteria are *sufficient* for the definition of a workable cross-linguistic domain. The large majority of recent typological studies demonstrate that external domain definitions are supplemented by one or more criteria of a formal nature, so that the domain definition becomes 'mixed'. The use of such 'mixed' definitions is advocated explicitly in Haspelmath (1997: 9) in his discussion of the domain definition of 'indefinite pronouns':

There is both a functional and a formal component to the definition of the subject-matter of this study. From a functional point of view, the expressions investigated here can be characterized as

INDEFINITE [...], and from a formal point of view they can be characterized as PRONOUNS, i.e., grammatical elements.

This double or hybrid definition is as it should be: the subject-matter of a typological investigation cannot be defined either on an exclusively formal basis or on an exclusively functional basis. Purely formal definitions are impractical because there are extremely few, if any, structural (or formal) properties that can be identified and compared across languages. [...] On the other hand, purely functional definitions have the disadvantage that they tend to pick out quite heterogeneous expressions. For example, a typological study of temporal expressions that is not formally delimited would have to consider such diverse phenomena as verbal tense inflections, tense iconicity in coordinate structures (*I came, I saw, I conquered*), and temporal adverbs and nouns like *tomorrow* and *hour*.

As the last part of this quotation indicates, formal criteria that are included in domain definitions commonly serve the function of keeping the domain manage-able. External criteria alone usually define a domain that is too broad, and the formal criteria are used to weed out 'concomitant' factors, i.e. instances of cross-linguistic variation that are not considered to be essential to the domain under study. As a result, the inclusion of formal criteria in domain definitions commonly leads to a restriction of the actual database of the project, in that it stipulates a subset among the cross-linguistic data that are licensed as relevant by the external criteria.

This limiting function of formal criteria in domain definitions can be illustrated by the following two examples. As we saw above, Stassen (1985: 15) defined his domain of comparative constructions at first by formulating a semantic, or cogni-tive, criterion, repeated here for convenience:

A construction counts as a comparative construction (and will therefore be taken into account in the typology), if that construction has the semantic function of assigning a graded (i.e. non-identical) position on a predicative scale to two (possibly complex) objects.

However, it turns out that the actual domain in this study is limited further by various formal restrictions. For example, Stassen considers only those comparative constructions in which the two compared objects are expressed by noun phrases. As a result, the database of this enquiry contains only expressions along the lines of (13), and not expressions such as (14)–(16), although these latter expressions are not excluded by the semantic criterion.

(13)   John is taller than *Harry*

(14)   John is rather reckless than *brave*

(15)   John would rather live in Cincinnati than *in St. Louis*

(16)   John is smarter than *I thought*

In a similar vein, Lehmann (1984) uses formal criteria to limit his domain of enquiry in his classic study on relative clause formation. This author starts from

the semantic function of such expressions: (restrictive) relative clauses have the function of restricting the set of potential referents of their antecedents (or 'heads'). However, it appears that not just any clause that has this function will do: in addition, the clause should also have the formal feature of being subordinated (Lehmann 1984: 401). Therefore, a language like Nufor, in which the clause at issue has the formal status of a part of a coordination, would fall outside the scope of Lehmann's investigation.

(17)   Nufor (Austronesian, West New Guinea) (van Hasselt 1905: 39, 56–7)

a. Man , ja sin   i, i   sapi maroba
    bird   I   aim   it it fall not
    'The bird I aimed at did not fall.'

b. Ja   mam man   kum   na   bje   kaku
    I   see bird feather they beautiful very
    'I saw a bird whose feathers were very beautiful.'

Lehmann's mixed domain definition demonstrates that in some cases, the inclu-sion of formal criteria in the definition may give rise to what can be called 'partial typologies'. While the 'external' part of the definition specifies criteria that, in all probability, can be matched by any language, the formal part of the definition may effectively limit the database to expressions from only a subset of the languages of the world. Thus, Lehmann's definition has as its consequence that there are languages that do not have relative clauses and are therefore irrelevant to the typological enquiry. Opposed to this, Stassen's mixed definition of the domain of comparative constructions presumably does not have this limiting effect. Despite the formal restrictions, it can be assumed that any language will have at least some expression that encodes sentences like (13), and hence it can be assumed that the typology of comparative constructions that is based on this mixed definition will still remain 'global'. Of course, global and partial typologies are both valuable contributions to the typological enterprise as a whole, and there is no a priori reason why either of these two forms of typologies should be superior to the other, or be considered more interesting.

A final remark on mixed domain definitions concerns the relative scope of the external and formal criteria that are contained in such definitions. Thus far, I have presented examples of mixed definitions in which the external criteria have 'wider' scope and the formal criteria have 'narrower' scope; that is, the formal criteria are employed to create a subset of the phenomena that the external criteria permit. With mixed definitions, however, there is no principled reason why this could not be the other way around. Take, for instance, Haspelmath's mixed definition of the domain of 'indefinite pronouns', which was presented above. If we read this definition with wider scope for the external criterion, the domain definition might read something like (18):

(18)   The domain of the enquiry is the semantic notion of indefiniteness, and the actual enquiry is restricted to pronouns.

Alternatively, one might give wider scope to the formal criterion, in which case the domain definition might receive a formulation along the lines of (19):

(19)   The domain of the enquiry is the encoding of pronouns, and the actual enquiry is limited to those pronouns which exhibit the semantic feature of indefiniteness.

From a logical point of view, the choice between these two alternatives is trivial; after all, the two formulations will select exactly the same set of cross-linguistic data. However, it may very well turn out that in the actual execution of a typological project, one of these two formulations is more useful or fertile than the other. This is especially the case when the definition at issue is meant to specify a sub-domain within a larger domain of enquiry. To illustrate this point, I will adapt here an example given in Croft (2003a: 17). Suppose one wants to provide a cross-linguistically applicable definition of the notion of 'subjunctive clause'. A mixed definition of this domain might read something like (20), with the external criterion formulated in (20a) and the formal criterion formulated in (20b):

(20)   A subjunctive clause is a clause which has:
   a. a non-factual or irrealis meaning, and
   b. a finite predicate, which has inflection that differs from that of predicates in declarative main clauses.

Focus on the external part of this definition, by giving it wider scope over the formal part,

would be more useful in a typological study of modality (e.g. Palmer 1986; [Bybee 1985]), but [focus on the formal part of the definition] has proved more useful in studies of complex sentence structure (e.g. Stassen 1985; Koptjevskaja-Tamm 1993a; Croft 2001: chapter 9; Cristofaro 2003). (Croft 2003a: 17)

The general point is that the formulation of a domain definition, and the relative prominence one attributes to its constituent parts, may be influenced or even determined by the purposes which the typological study is meant to serve.

4. CONCLUSION

The problem of cross-linguistic identification presents itself in any typological enquiry, and therefore it merits serious attention. It should be realized, however, that solving this problem is not a research goal in itself. It is a methodological issue,

and the only reason why it has to be solved is that this solution is a prerequisite for the definition of a cross-linguistic database that is maximally coherent. Given this, any solution which is explicit to such a degree that both the researcher and the reader can apply it cross-linguistically in a largely uncontroversial manner is, in principle, a sufficient answer to the problem. At the current stage of typological practice, it has turned out that a few rules of thumb are beneficial in reaching this goal. In particular, most typologists working today seem to agree that mixed functional–formal domain definitions constitute the best strategy for ensuring cross-linguistic comparability. It is conceivable, however, that in future research this research strategy will be supplemented, or even superseded, by other perspectives and insights on the nature of cross-linguistic variation. In other words, views on the solution of the problem of cross-linguistic identification do not have to be static. Like all other features of the methodology of linguistic typology, these views are developed as a by-product of successful research, which is of course as it should be.

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CHAPTER 6

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LANGUAGE SAMPLING

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DIK BAKKER

1. INTRODUCTION

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Linguists interested in exploring the variation and distribution of linguistic phenomena among the languages of the world face a complex problem of selection. The total number of languages currently spoken in the world is estimated at around 7,000.[1] This number is far too large to be taken into consideration by any research project that aims at anything more than the most superficial types of observations. As in other cases where a population is too large to be studied in full, one has to restrict oneself to a small but representative subset by taking a sample. However, there are a number of complications which prevent a linguist from applying a random selection procedure and stratifying her sample for parameters known to interact with the research variables, as is general practice in many domains of empirical research. The most outstanding problem is that for about two thirds of the existing languages, no grammar or even a grammatical sketch is currently available. Not surprisingly, most of these languages, often spoken in isolated areas of the world and belonging to under-investigated language groups, and which potentially harbour unique features, are on the brink of extinction. It may be expected that up to 85% of these languages will have disappeared before the end

of this century.[2] Because of this bibliographical gap, the representativeness of any sample drawn from the total collection is threatened by the lack of data for a large and rather specific subset of the population from which it is drawn. A major side effect of this, and of the lack of typological data in general, is that we simply do not know enough about the interaction between the host of linguistic variables in order to determine what would be the right stratification parameters in the first place.

A second, somewhat more theoretical point is whether the extant languages are indeed the population that we want to study and describe. Although 7,000 languages is a vast amount, it is only a fraction of the languages that have ever been spoken. The vast majority of these have either become extinct or become another language due to internal diachronic processes and language contact. A very rough estimate of their number may be made as follows. Let us conservatively locate the starting point of modern human language at the Homo sapiens' Great Leap Forward some 40,000 years ago, and follow Nettle (1999a: 100 ff.) in assuming that there was an average of around 6,000 languages spoken from then till the present day—in other words, extinction, divergence, and convergence have kept each other more or less in balance over time. When we stipulate furthermore that a language changes every 1,000 years to the extent that we may conceive of it as a 'new' language, then a rough estimate of 233,000 languages have disappeared into the haze of time.[3] Indeed, of only very few of these do we possess any trace at all. In his classification of the languages of the world, Ruhlen (1991) lists a mere 479 extinct languages, 10% of his list of 5,273. Thus, if we take the around 240,000 extinct and extant languages as the overall population studied by linguistic typology, then the database of linguistics is fundamentally restricted to a sample of under 3% from the outset. And since this sample is diachronically and culturally biased by the fact that more than 90% of these languages are spoken in today's world, this immediately poses the question of how representative the extant languages are of

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[1] The 15th edition of the *Ethnologue* (Gordon 2005) documents 6,912 languages.

[2] This figure is based on Table 5.1 in Nettle (1999a: 114), under the (realistic?) assumption that only languages which currently have at least 100,000 speakers will survive for more than a couple of generations to come. Interestingly, the same author has raised this figure to 90% on the dust jacket of Nettle and Romaine (2000). Obviously, knowledge about the endangered languages might be collected in a massive project undertaking the description of several thousand of them within a period of only a few decades and in a prioritized fashion. Indeed, several initiatives have been taken in this direction over the last few years, notably the Hans Rausing Endangered Languages Project (http://www.hrelp.org) and the DOBES project (http://www.mpi.nl/DOBES/). Given the number of endangered languages and the rate of extinction, however, many will disappear before a proper description will have been made.

[3] The notion Great Leap Forward stems from Dawkins (2004: 36). Estimates of the world's population lie around 6 million up till 10,000 BP (cf. Haub 1995). During this early period, linguistic communities, mainly hunter-gatherers, will hardly have been larger than around 1,000 speakers. After the so-called Neolithic Punctuation, with the introduction of large-scale agriculture, the language communities became much larger and so did population growth. The figure of 1,000 years for a language to become another one should be seen as an average. Languages may change faster due to language contact. Also, the number of speakers may play a role, as will be argued below.

human language in general. This is relevant both to the establishment of language universals and value hierarchies and to research into language variation and constraints thereon.

An answer to the question of representativeness can only be very tentative. For some restricted linguistic areas—i.e. those where writing systems have been available for a considerable amount of time—we can go back a maximum of four or five language generations in order to see whether 5,000 years ago languages were the way they are now. There is no reason to conclude that for these cases anything fundamental has changed. In the face of this, historical linguists often adopt the principle of uniformitarianism (cf. Lass 1997: 24 ff.), which extends this conclusion to the whole era of human language. Under this assumption, our 7,500 sample of known languages may serve as a reasonable representative of the 240,000 or so languages that were ever spoken, and as a basis for inferences about human language in general.

This is not to say that this sample contains all the variety that has ever been present in human language. There are phenomena which are restricted to only one language family or one area in the world. For example, if it were not for the Khoisan languages, no linguist would ever have put clicks in the overall inventory of phonemes. The situation is even worse when we consider the possible combinations of values for linguistic variables. For the around twelve variables discussed in most post-Greenbergian work on basic constituent order in the clause and the noun phrase, the number of possible value combinations is in fact higher than the number of extant languages. And although only a small subset of these patterns has actually been attested so far, leading to some of the well-known word order universals, it seems very speculative to make any prediction about the unknown languages of the remote past, or those of the future. The scope of glottochronology, the historical linguist's most often applied tool, does not take us beyond a couple of thousand years and is of little merit for deeper probings (Trask 1996: 365). In fact, linguistics in many respects has a harder job in reconstructing language evolution than biology has in reconstructing the origin of species. The fossil record goes back only a few thousand years. Random change in languages through imperfect learning and its propagation among the speech community does not take place at a more or less equal pace, the effect of which might be averaged out over time. The success of new varieties is highly influenced by sociological factors, such as in-group processes and language contact. Furthermore, languages are complex systems in which the elements are not independent of each other. Thus, a change in one domain may set in motion a number of other changes (McMahon and McMahon 2000: 70).

For most purposes, we must consider the 7,500 known, extant, or extinct languages as our overall population for typological studies, without the illusion that we will ever have hard data on the invisible 97%. In an even more practical sense, only those languages will qualify for which we have a more or less reliable

description of the relevant research parameters. This may bring the set from which a sample can be drawn down to only several hundred languages or sometimes even fewer. The maximum we might get out of a sample is a fair idea about what is possible in the languages of the world, though not a very reliable idea about what is not possible. And even more care should be taken when extending any conclusions to language in the more abstract sense.

But even if we restrict our attention to the extant languages, our selection problem is far from being solved. Several further issues affect a language sampling procedure. One major point is that there is no such thing as an all-purpose typological sample. Different kinds of research questions call for different sampling strategies and sample sizes. This issue is examined in section 2. Apart from the considerable gap in the data noted earlier, there are other types of bias which threaten the reliability of a sample in the face of specific research questions. In section 3, we will look at the most important of these. Section 4 presents an overview of some of the approaches to sampling that have been proposed to overcome such biases. Finally, in section 5, we will discuss a generalized sampling technique which is meant to determine the size and extension of a language sample for any explorative type of research. Section 6 draws some conclusions.

Once one has decided on the set of languages which will be the sample for a research project, the actual data collecting will start. This chapter ends with a short note on this topic.

2. TYPES OF SAMPLES AND SAMPLE SIZE

Two fundamentally different classes of typological questions may be distinguished, each requiring its specific type of sample. The first class of questions is concerned with the probability that a language is of a specific type. For example, we may want to establish what the chance is of a language being postpositional, prepositional, or neither. In order to find out about the real preferences among these three types, we will want only (and preferably also all) independent cases in our sample. Thus, the fact that both Spanish and French have prepositions rather than postpositions is due to the fact that both inherited the majority of their adpositions from Latin and therefore represent only one instance of prepositionality.[4] In general, in a sample, one would want only one language from a group of languages that shares both the

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[4] The fact that these languages are prepositional without exception makes it rather likely that their substrata were also prepositional, since adposition type is resistant to contact-induced change (cf. Bakker, Gómez Rendón, and Hekking 2008).

relevant feature and a common ancestor, provided that this ancestor also had the feature under consideration and did not itself inherit it from one of its ancestors. In the latter case, the group of languages to be excluded will be even larger. Yet we cannot always be sure that common traits in genetically related languages are indeed cognates and stem from a common ancestor. Croft (1990: 23) mentions the case of the reflexive middle voice in Slavic languages such as Russian and Czech, on the one hand, and in Romance languages such as Spanish and Portuguese, on the other hand. There is good evidence for an independent development of this construction in both subgroups of Indo-European. So, we have to control our sample for genetic relationships at the right historical level. Another cause of sharing may be areal, as in a Sprachbund, where languages as a result of contact and bilingualism all acquired some feature, possibly one absent from any of the original languages. Obviously, the amount of restriction one would like to exert on a sample depends heavily on the relative stability of the linguistic variable in question. For instance, head-dependent marking (Nichols 1992) appears to be a rather conservative parameter of language in the sense that it is highly resistant to internal change as well as contact-induced change. Constituent order, in comparison, is less stable, as witnessed by the variation in basic and alternative orders among the Indo-European languages of Europe (cf. Siewierska, Rijkhoff, and Bakker 1998). In general terms, a sample for this type of research, called a *probability sample* in Rijkhoff, Bakker, Hengeveld, and Kahrel (1993), will be relatively small in size, typically between 50 and 200 languages, and will vary, depending on what is known beforehand about the range of values for the relevant linguistic variables and their stability.[5] This is the preferred type of sample if one wants to apply conclusions drawn from the sample directly to the population in terms of the distribution of the phenomena observed. The sampling strategies proposed by Bell (1978), Perkins (1980, 1989), and Dryer (1989) all seem to strive for optimal independence of the languages that are selected. They will be discussed in section 4.

A fundamentally different situation arises when linguistic variables are explored about which not much is known in advance. In such cases, it is precisely the variation among the values for the respective variables that we want to know. For such explorative research, we need a *variety sample* rather than a probability sample. In this type of sample, the likelihood is optimized that different values for the research variable will be attested. Typically, such a sample is built up in several stages. In the absence of any clue as to what factors determine the variation in the relevant variables, an initial sample is established which maximizes the genetic or typological diversity of the languages in the sample. Languages are

assigned by experts to different language families or types precisely on the basis of their differentiation on certain parameters. Therefore, there is a reasonable chance that they will also exhibit some degree of variation on the research variable. In case the diversity in an initial sample turns out to be large, with many unique cases, one might extend that sample under the same constraints of genetic or typological distance, in order to find relatively rare, as yet undetected values. The extension procedure may stop when no new values are found. Whereas probability samples tend to be relatively small and can in fact even be too large for their purpose, variety samples tend to be large and typically contain many hundreds of languages. In fact, they can never be too large, provided that they are not used to answer research questions belonging to the probability class. To give an example, the majority of the samples on which the 142 maps in the *WALS* atlas (Haspelmath, Dryer, Gil, and Comrie 2005) are based are of the variety type. The average size of all these samples, which overall draw on a remarkably large subset of 2,558 of the world's languages, is 417, while 39 samples consist of over 500 languages. The Diversity Value (DV) sampling technique to be discussed in section 5 generates samples of the variety type of any user-determined size above a certain minimum.

Thus, both size and selection criteria will be different for the two types of samples. There is an independent factor which should be taken into consideration when determining the number of languages to be selected, especially in the case of variety samples. It is the number of values to be expected for the research variables and their relative distributions. For example, for binary valued variables such as 'presence or absence of a passive construction', a relatively small, well-chosen sample of, say, 50 to 75 languages may be good enough for a reliable impression. However, the situation is different for a variable such as 'gender distinctions on independent personal pronouns'. This variable has six different values in Siewierska (2005), some of which are relatively rare, as shown in Table 6.1.

Table 6.1. Distribution of alignment of verbal person markers

Alignment type	No. of languages	Percentage
No distinctions	254	67.2
Only 3SG	61	16.1
Only 3	42	11.1
3+2 and/or 1	18	4.8
1+2, not 3	2	0.5
Only 3PL	1	0.3
TOTAL	378	

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[5] For extremely stable parameters, we would end up with the original mother languages spoken 40,000 years ago. In practice, however we will not be able to look anywhere beyond a 5,000-year horizon. This seems to be enough time for most linguistic variables to change anyway.

Two languages have gender distinction on first and second person but not on third. Both are from the genus Southern Cushitic. And there is only one language in 378, Dagare from West Africa, which has gender distinction on third person plural. In order to find a representative of such rare cases, a sample of several hundred languages is needed. And the size should even increase if more than one variable is involved and we are interested in the possible combinations of the values.

There is a limited set of typological questions for which a purely *random sample* suffices, provided that it is big enough in the light of the general requirements of representativeness for such samples. Obviously, this is the case for all research which are not (directly) related to genetic affiliation or to areal considerations, and for variables which are highly unstable and show a high level of variation. Apart from that, we may simply be interested in the distribution of linguistic phenomena in their own right and consider each language as a case on its own. For example, in order to find out about the relative stability of certain parameters, a first impression may be gained precisely from a sample in which the respective genetic groups are represented proportionally, which will be the case in a relatively large random sample.

It goes without saying that in all cases the construction of a sample should follow the precise formulation of the research questions one would like to answer on the basis of it. Still, as we will see in the next section, there may be practical circumstances which force a researcher to just grab the data which happen to be available and sufficiently reliable. Such samples are generally called *convenience samples*. It may well be the case that many of the samples used so far in typological research are in fact of this type.

3. Types of Bias in a Language Sample

Even if we have selected the right kind of sample for the type of research questions we want to answer, there are several ways in which our sample may be biased. Probably the most severe cause of bias is what is commonly known as *bibliographic bias*. As has already been observed above, over two thirds of the known languages have not been described at any level of linguistic sophistication. This subset is the opposite of a random selection: it is heavily biased away from the under-explored areas and families. Many of these languages may in fact turn out to be (relative or absolute) isolates or otherwise unique specimens. And even if there is some descriptive material available, this is often sketchy in comparison to the extensive and manifold grammars available for more widely spoken languages, and hard to come by. This state of affairs is very likely to be reflected by the library material available to the individual

researcher.[6] Another complication in this area typically arises in the case of grammars older than, say, 50 years, when descriptive practice was mainly geared towards phonology and morphology. Such grammars may simply contain no information on many topics which are of great interest to today's typologists, such as constituent order rules and semantic and pragmatic conditions on their application, the distinction between syntactic and semantic roles, the different uses of pronouns, and complex syntactic phenomena such as raising and control. Yet another complication occurs when grammars have been written strictly from the perspective of some theory, most notably Tagmemics or one of the several instantiations of Generative Grammar. For most linguists working in the typological tradition, and even for many linguists working on more up-to-date versions of the theories mentioned, such material is close to inaccessible since the original raw language data are interpreted in terms of theoretical notions such as transformations. So, even if descriptive material is present, it is not always of much use for typological investigations. As a result, the corresponding languages will have to be absent from most samples.

A second cause of unbalanced samples is *genetic bias*. Mainly as a result of bibliographic bias and the availability of native speakers or other experts, many samples have an overrepresentation of languages from the better-known language families, such as Indo-European and Bantu, and an underrepresentation of the languages from Australia, New Guinea, and South America. The 30-language sample used by Greenberg for his seminal (1966c) article contains six Indo-European languages, while Papua-New Guinea, Eskimo-Aleut, and Caucasian are not represented at all.[7] Genetic bias, though not uncommon in samples used in the literature and almost inevitable for large samples, is fatal for probability samples but also a threat for variety samples, since it has a negative influence on the potential variation.

Thirdly, a sample may suffer from *areal bias*. In that case, it contains languages which are part of the same linguistic area, or Sprachbund, and which may have influenced each other through language contact. This phenomenon can be witnessed on all continents. Well-known examples of linguistic areas are the Balkans, South Asia, and Central America. For instance, according to Campbell, Kaufman, and Smith-Stark (1986), a number of features may be found among the languages which form part of the Central American Sprachbund, but they are not found in the surrounding areas, not even in genetically related languages. Campbell et al. (1986: 545 ff.) mention nominal possessive constructions, the occurrence of relational nouns, the use of a vigesimal numeral system, typical VSO basic constituent order, and the derivation of locatives from body parts which keep their nominal characteristics. Some areal features may be hidden in the sense that they do not

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[6] The availability problem will be solved to a large extent once all existing language documentation becomes accessible to the linguistic community in an online fashion, a not too unrealistic dream.

[7] It is intriguing to see that quite a few of the universals and tendencies observed in that article still hold.

stem directly from one of the languages involved but developed more or less autonomously as a result of intensive contact and bilingualism between a number of neighbouring languages. Obviously, areal phenomena contaminate probability samples since they are not independent. Nonetheless, they provide some insight into the process of linguistic borrowing and may be a measure for the (in)stability of linguistic parameters.

A fourth kind of distortion of a sample is caused by *typological bias*. This occurs when a sample contains a disproportionate representation of languages, the type of which has a direct or indirect bearing on the values of the research parameter. The clearest example is the pairs of types found in established implicational universals of the kind 'If a language has X, then it (almost) always has Y'.[8] If this implication holds and Y is a research parameter, a sample should be controlled for the right distribution of type X languages. More complex cases of relationships between linguistic variables are chains, as in Hawkins' (1983: 75) Prepositional Noun Modifier Hierarchy in (1) below:

(1) PrNMH

   Prep → ((NDem OR NNum → NA) AND (NA → NG) AND (NG → NRel))

Thus, if the order between noun and relative clause is under investigation, the sample should be controlled for adpositional type and possibly for the other order parameters found in (1). It goes without saying that such relationships are often not clear from the outset, which makes typological bias not very easy to control.

The last type to be discussed here is *cultural bias*. In the case of this bias, there is a skewing in a sample as far as the representation of the world's cultures is concerned. Ignored mainly by theoretical approaches to grammar, the problem of linguistic relativity—that is, to what extent differences between cultures are reflected in language—has been raised by both typologists and their precursors, the students of 'exotic' languages. In an early and rather extreme version of linguistic relativity (Sapir 1949b, Whorf 1956), it is assumed that a language is an integral part of a culture and that it affects the way speakers experience reality. In more recent work in linguistic anthropology, this radical, almost axiomatic version is replaced by a more moderate hypothesis. In this view, language and thought are separated and seen as autonomous domains, the relationships between which are open to empirical testing. However, research done in this area confirms that there may indeed be a relation between certain aspects of the grammar of a language on the one hand and the beliefs and practices of its speakers on the other hand. Number appears to be such a culturally determined parameter. Lucy (1992) found that speakers of languages with a sharp distinction between count and mass nouns, and obligatory

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[8] The universals archive (http://ling.uni-konstanz.de/pages/proj/sprachbau) currently documents over 2,000 of these.

number marking on the former, react differently to non-linguistic tasks than speakers of languages with a numeral classifier system and with restricted number marking or none at all. This implies that while creating a language sample, we should control for culture, although it is not very clear how to classify cultures. As we will see below, Perkins (1989) has made an attempt at this.

If we consider population size to be a cultural parameter of a speech community, then there is another interesting observation to be made here. It has been observed that small communities experience a higher amount of random genetic drift since there is a higher chance that 'unlikely' gene combinations are successful (see Kimura 1983). Although the mechanisms for linguistic innovation differ quite substantially from those of genetic innovation, it may well be the case that the same principle applies to random linguistic drift. As a result, the chance that one might find relatively 'exotic' phenomena in languages with only a few hundred or a few thousand speakers is assumed to be greater than in those with tens or hundreds of thousands of speakers, especially when we look at the standard (written) dialect of the latter languages. An example given by Nettle (1999b: 133 ff.) is that of the very uncommon Object first basic orders (OSV and OVS), which are almost without exception attested in languages with under 3,000 speakers. If this population size factor may indeed turn out to be fundamental, then a sample, and especially a variety sample, should consistently contain a relative overrepresentation of the smallest languages.

We have seen above that language contact affects the 'purity' of a language and may be a threat to the reliability of probability samples. However, we have to accept that language contact is a very regular phenomenon and that there may be very few 'pure' languages indeed. And of course, a language with many contact-related phenomena is as natural as a language without those. Since certain aspects of languages may come about mainly or only through contact rather than develop 'spontaneously', this may be a reason to see to it that there are a fair amount of languages with an interesting contact history in our sample, especially when we are interested in variety.

The last brief point made here, not necessarily leading to a form of bias, is the role of extinct languages in a sample. Although we actually possess more information about some of these languages than many extant languages—Latin is a clear case in point—an obvious but principled problem is that we could never elicit a native speaker's opinion on any question. This is crucial in cases where we seek negative evidence. Only for those linguistic variables where we could more or less rely on grammatical descriptions rather than speakers' intuitions is it safe, then, to mix extant and extinct languages in a sample.

Obviously, the types of bias discussed above are not independent of each other. Genetically related languages are often spoken in the same area. And there is a rather high chance that they will belong to the same linguistic type, especially when the parameter in question is relatively stable. Society form and population sizes are more or less related to areal factors, and so is the availability and accessibility of language data. The general solution to bias is to see to it that a sample is stratified

according to the dimensions along which bias may be introduced. In the next section, we will discuss some proposals from the typological literature which are designed precisely to cater for this problem.

4. SAMPLING IN THE TYPOLOGICAL LITERATURE

The growing awareness of the importance of sampling in typological research is reflected by the increase in attention given to this topic in the respective introductions to typology. Comrie (1989: 9–12), although mentioning the major problems and biases, devotes only a short paragraph to sampling. Croft (1990: 18–26) provides a more in-depth discussion of these issues, illustrating the usual points with several concrete examples. Whaley (1997: 36–43) critically assesses several samples from the typological literature, running from the 30-language sample in Greenberg (1966c) via Tomlin's (1986) 402 sample to Dryer's (1992) 625 sample, all mainly used for research on constituent order. Finally, Song (2001a: 17–38) gives an extensive and critical discussion of the problems with language sampling and the proposals which have been made to counter them, and pays separate attention to the issue of sample size. In the rest of this section, we will present a brief survey of the most important contributions to the discussion.

Pride of place should be given to Bell (1978), whose eponymous chapter in Greenberg, Ferguson, and Moravcsik (1978) is possibly the first contribution dedicated solely to language sampling. Bell is the first to mention the three important sources of bias discussed above: genetic, areal, and typological. His sampling method concentrates on avoiding genetic bias, for him the most obvious source of sample distortion. In order to counter it, Bell takes as a point of departure 478 genetic groups which have developed more or less independently over a time depth of several thousand years. They are his measure of linguistic diversity within language families.[9] In a sample, each family contributes a number of languages proportional to the number of genetic groups it contains. For example, Indo-European, with twelve groups, should contribute 12/478 of the languages in a sample, one from each genetic group. In a sample of 250, the contribution of Indo-European would be six languages. The method does not suggest an optimal sample size. If we were to assume that, despite a time depth of several thousand

[9] I will follow general practice and use the word 'family' for what is supposed to be the highest type of node in language classifications. In biological classifications, families are somewhere in the middle, with genera and species under, and classes and phyla above, them (cf. Dawkins 2004: 24). Since, as we have seen, language classification is utterly incomplete in the deep historical sense, this seems to be the right position. Nichols (1992) coined the notion 'stock' for the highest groupings.

years, genetic groups related to the same language family will still have more in common than any two groups related to different families, this method guarantees some degree of independence between the sampled languages. However, since there is no requirement that all families must be represented by at least one group, strict application of the criterion means that for small sample sizes certain families will no longer be represented. Furthermore, the method is unspecified for the selection of groups in the case of samples under 478. That said, areal and typological bias may be precisely kept under control when selecting actual groups and languages.

Perkins (1980) adds cultural independence to Bell's genetic independence. Based on the classification of the world's languages in Voegelin and Voegelin (1966) and the classification of the cultures of the world established in Murdock (1967), he proposes a sample of 50 languages with optimal genetic and cultural distance. This may well be a good size for a probability sample.[10] However, for a variety sample, it seems to be short measure.

Tomlin (1986) also seeks to improve and further formalize Bell's method. Parallel to a version of Bell's genetic groupings, he establishes 26 linguistic areas. On the basis of these two classifications, he statistically determines an optimal sample of 402 languages with maximum areal and genetic distance. Tomlin's method will provide a high degree of variety among the languages. However, an inherently fixed number of languages is not a very desirable feature of a sampling method. It is almost certainly too large to guarantee a reasonable level of independence and to serve as a probability sample. Also, for many other designs, a sample of around 400 languages may be unrealistically high. Finally, it is not very likely that Tomlin's many linguistic areas have a high degree of independence.

A further improvement on Bell's proposal comes from Dryer (1989). Analogous to Bell, he establishes a number of language groups, 322 in his case. Each of these genera stands for the common ancestor of the modern languages that form part of them. They have a time depth of around 3,500–4,000 years. Variable values are not measured for individual languages, but established per genus. This is done under the assumption that values are typically the same for most languages in a genus for many linguistic variables. In the case of Dryer's research, they mainly stem from the domain of constituent order. This generalization obviously reduces the amount of double measuring. Furthermore, Dryer puts his genetic groups on an areal grid, more or less like Tomlin does. However, in the case of Dryer, the (five) macro-areas that he employs are really independent beyond much doubt: Africa, Eurasia, Australia-New Guinea, North America, and South America.[11] A phenomenon counts as a universal preference only if in all areas the majority of the genera

[10] Dryer (1989: 263) suggests that ten might be the maximum number of fully independent cases, and that any sample larger than that number would have some amount of double counting. This figure seems to be on the low side, especially for the less stable parameters.

[11] In later work, Dryer splits off South-East Asia and Oceania from Eurasia.

have it. For example, basic constituent order SOV is preferred to SVO, according to Dryer, because of the distributions in Table 6.2 (1989: 270). Thus, SOV is universally preferred to SVO since in all areas it is the basic order of the majority of the genera.

Dryer's method seems to be good for the application it has been designed for, i.e. testing universal preferences for variables which are relatively stable within and across genera over the time depth taken into consideration. In general, selection on the basis of genetic groups of some time depth seems to be a good way of controlling for genetic bias. However, it is not completely clear how the method could provide us with an all-purpose sample, where languages rather than genera are the unit of observation. Furthermore, since the method focuses on a fixed time depth for all sampling units, it works well only for those linguistic variables which are relatively stable over a long period. For variables which are prone to change, be it for language-internal or external reasons, the method seems to break down.

In a recent paper, Bickel (2008b) criticizes precisely this aspect of Dryer's method and provides a refinement. Bickel abandons the pre-established genera. Instead, he sketches an algorithm which, in a top-down fashion, determines the nodes in a hierarchical genetic classification for which the variance of values for the linguistic variable under study is below a certain statistically acceptable maximum. As long as a node has too much variance, the search is continued recursively for its daughter nodes, until a 'stable' node is found, i.e. one with little or no variance. From this node, one language may be selected for the sample as being representative for the languages under that node. When the variance on a node cannot be explained on the basis of lower genetic splits and is perpetuated among the daughter nodes, all languages belonging to that node will be taken into consideration for the sample. Obviously, in order for this method to work, variable values for a large number of languages should be available beforehand.

The methods discussed so far are mainly concerned with the 'purity' of the sample in terms of genetic and areal independence. Interestingly, only a few authors have discussed language sampling from the perspective of the statistical techniques which have been developed for sampling in general. This is not surprising against a backdrop of incomplete synchronic and diachronic data; uncertain genetic, areal, and typological classifications; and a host of other factors, such as language contact, the workings of which are not yet well understood. In that sense, the application of finely tuned

Table 6.2. Numbers of genera with basic constituent order per macro-area

	Africa	Eurasia	Aus-NG	N. America	S. America
SOV	22	26	29	26	18
SVO	21	19	6	6	5

quantitative methods, including checks on reliability and representativeness, seems to be premature at best. Preferably, one concentrates on controlling for the major sources of bias. This makes many researchers prefer a genetically and/or areally controlled convenience sample. However, Perkins (1989) is an exception. He restricts his domain to the set of 1,063 languages in Tomlin's (1986) database. Now having reliable (constituent order) data for all languages in the population, he is in a position to measure the association between these dependent variables and some independent variables, such as genetic and areal affiliation. As a result, he may be able to determine the maximum size of a sample for which the cases are more or less guaranteed to be independent. For constituent order variables, that would be between 50 and 100 languages (Perkins 1989: 301 ff.). Although this is an interesting exercise, the problem is that the population from which Perkins selects his languages is itself a sample, with arguably quite reliable values for the relevant variables and accurate classifications. But it is necessarily biased, at least in the bibliographic sense. And we typically do not have reliable values for the relevant variables if we include all extant languages in our population. In that case, the genetic and typological classifications will be uncertain for many languages.

As pointed out in Janssen, Bickel, and Zúñiga (2006), samples like the one proposed by Dryer have an inherent statistical problem. Since they attempt to provide a complete representation of the population from the outset, in Dryer's case by including all genera, standard tests and analyses, such as Anova, do not apply. One could of course refrain from testing and assume that the observations made on the basis of the sample have a built-in reliability because of the presence of a language from all genera. However, as we have seen above, this shifts the problem to the selection of the individual languages, which may or may not be representative for the genus in question. In order to test the significance of the observed distribution of values over areal or genetic groupings for such samples, and indeed for any type of sample, Janssen et al. suggest that randomization be applied. This is done by calculating a large number—say, 10,000—of randomly determined distributions of the same variable values as in the original distribution, while keeping the marginal totals of the observed distribution constant. On this basis, it may be calculated how far the observed distribution of the values differs from one purely determined by chance, and therefore whether there is any areal or genetic effect in the data. The authors show that their approach may be implemented for different types of linguistic variables.[12]

To round off this section, let us look at the samples that have been used for three authoritative, relatively recent typological studies.

Nichols (1992), in her groundbreaking study of head versus dependent marking in the languages of the world, explicitly aims to find areal patterns in marking

[12] See the appendix for more on data types in linguistics. These so-called Monte Carlo techniques are popular whenever non-parametric tests are called for. Special fast algorithms are developed that take care of the enormous amount of computation necessary for their execution.

systems. Her sampling strategy is much like Dryer's approach. Like him, she distinguishes a number of genetic groups, but since she goes a bit further back in time, the number of groups is smaller. Also, she maximizes the contribution per family at six languages.[13] This genetically balanced sample is stratified for area, of which Nichols distinguishes ten. In contrast to Dryer, Nichols uses this grid to select actual languages. In choosing a language for some group, Nichols typically selected the one for which the best description was available. Also, she avoided languages judged by specialists to be atypical of the family (1992: 37). This led to a sample of 174 languages, which does not contain a language from the Eskimo-Aleut family. Furthermore, Amerindian might be overrepresented with 66 languages (38% of the overall sample), while Sino-Tibetan (two languages) seems to be slightly under-represented in relation to the total number of languages and the genetic complexity of this family. Nichols's sample may be characterized as a probability sample stratified for genetic and areal affiliation, with aspects of a convenience sample.

Bybee, Perkins, and Pagliuca (1994), in their study of Tense-Aspect-Mood (TAM) systems in the languages of the world, initially envisaged a sample of 94 languages, being an expanded version of the original sample of Perkins (1980) discussed above. In order to increase diversity in their sample, the authors stratified it genetically according to the classification of Voegelin and Voegelin (1977), which contains 80 families. These families were divided into two groups: 56 minimal ones (including unclassified languages and isolates; each less than seven languages) and 24 large ones (over 20 languages). From the first group, only two languages were chosen. From the larger groups, a number of languages were chosen roughly in proportion to their total number of languages, under the assumption that diversity in a family is proportional to its size (Bybee et al. 1994: 29). At a later stage, eighteen of these languages were rejected, since the documentation turned out to be insufficient, leaving a sample of 76 languages. As a result, some isolates are absent as well as the (small) families, that is, Chukchee-Kamchatkan, Yukaghir, and several genetic groupings from the Americas. Bybee et al. (1994: 27) characterize their sample as a (stratified) probability sample. Its relative small size seems to suggest this. However, the emphasis given to maximum genetic distance between the sample languages makes it rather a variety sample, albeit a small one. This throws some doubt upon the amount of variety detected for such a complex morphosyntactic domain. However, bibliographic complications obviously got in the way. It might have been recommendable, then, to expand the sample, in combination with better descriptions, for those families which showed a greater than average variety of TAM phenomena.

[13] Nichols (1992: 24) classifies languages genetically in terms of families and stocks. Families have a time depth of 2,500–4,000 years, not unlike Dryer's genera. Stocks are older, typically between 6,000–8,000 years. They are considered to be the highest level we can reconstruct using the usual comparative methodology.

The last sample we will consider is the one used by Stassen in his study on intransitive predication (Stassen 1997). This rather large sample of 410 languages (8% of the languages in Ruhlen's 1991 classification) is explicitly meant to be representative for the diversity of the phenomenon. All major families are present. However, there is a clear overrepresentation of especially Uralic (no fewer than 54% of the languages of this family are in the sample) and Caucasian (34%), while Indo-Pacific (3%) is underrepresented. The sample contains a basic genetically stratified subsample of around 300 languages, which are distributed more or less proportionally to the total number of languages in the respective families. The extension of this basic sample is clearly in the direction of the families which display most variety. It may therefore be characterized as a variety sample with a bias towards the phenomenon under study.

5. THE DIVERSITY VALUE TECHNIQUE

In this section, we will discuss a language sampling technique called Diversity Value (DV), introduced by Rijkhoff, Bakker, Hengeveld, and Kahrel (1993) and extended and refined by Rijkhoff and Bakker (1998). It gets separate treatment here because it appears to be the only fully formalized general sampling technique proposed in the typological literature to date. It comes with a computer program which generates samples of any predetermined size. The DV method was developed mainly to create variety samples. The starting point for a DV sample is a language classification to be selected by the user. Typically, this is a genetic classification, such as the *Ethnologue* (Gordon 2005), Ruhlen (1991), or Voegelin and Voegelin (1977). But it may in fact be applied to any classification—for example, areal or typological—provided that it has the traditional shape of a tree, with maximum groupings for the top nodes and languages for its terminal nodes. Figure 6.1 is an example of (part of) a genetic tree. Group names start with a capital letter; language names are in lower case. Note that empty mother nodes have been inserted (x) to balance the trees and provide equal time depth for all languages within a family.

The central assumption for the DV method is that trees such as in Figure 6.1 are compiled on the basis of expert knowledge of the genetic groupings or areas, and that languages are assigned to the respective families or genera according to the relative amount of features they have in common. Because of the lack of extensive grammatical information on most of the world's languages, a state of the art classification might well be the best key to the variation among them. Therefore, the smallest variety sample is one which contains precisely one language from each of the major groups. In the case of Figure 6.1, this will be one language from Eskimo-Aleut, one from Chukchi-Kamchatkan, and so on. Depending on the
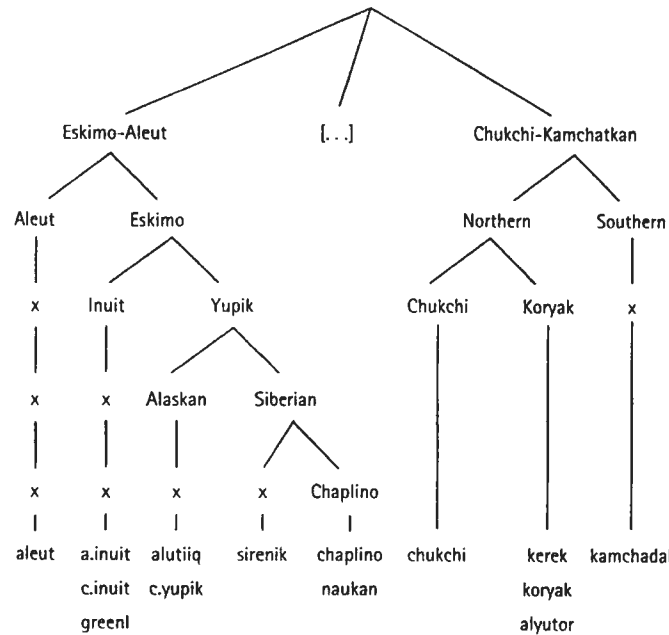
Figure 6.1. Partial genetic tree (based on Ruhlen 1991)

genetic classification chosen, this will lead to minimum samples of size 27 (Ruhlen), 50 (Voegelin and Voegelin), and 120 (*Ethnologue*). By definition, isolates like Basque and Ket form part of any sample. For each of the larger groupings, a language must be chosen by the linguist on the basis of availability of material or some stratifying parameter (see below). This being the basic sample, it may be expanded by any number of languages. This is done by applying a recursive weighing procedure which assigns a diversity value (DV) to all nodes in the tree down to the preterminal nodes right above the actual languages. This DV expresses the complexity of the tree under a node in terms of the number of daughter nodes under it and the way they are embedded. Under the assumption that higher splits in a tree represent older stages of diversification, such nodes will contribute more to the weight of the mother node than younger splits, thus determining the total number of languages to be selected per family in the case of sample sizes larger than the minimum. The formula in (2) calculates the contribution C_k of level k under a node to the DV value of that node.

(2) $C_k = C_{k-1} + (N_k - N_{k-1}) * (MAX - (k-1)) / MAX$

In (2), C_{k-1} is the contribution of one level upwards. N_k and N_{k-1} are the number of nodes at levels k and k–1 respectively, including the empty ones (x). Finally, MAX is the maximum depth anywhere in the overall tree. The contribution of the family level, Co, and the number of nodes at this level are established at o. Per lower level, the number of extra nodes ($N_k - N_{k-1}$) is added to the value of the previous level. This number is multiplied by a factor (MAX – (k–1)) / MAX which decreases going down the tree. So, the contribution of the lower levels is less than that of the higher ones. This is meant to express the assumption that the difference between, say, Sirenik (Siberian) and Alutiiq (Alaskan) is less than that between Sirenik (Eskimo) and Aleut (Aleut). The DV for any node in the tree is the mean of the contributions of all levels under it. Thus assigned to each node in the tree, the DV gives the proportion of languages to be drawn from under that node in relation to its sister nodes given a certain sample size. The first step in the sampling process is to calculate the proportion of languages to be selected for each of the major nodes (families), given the DVs of the top nodes. Since there is no a priori reason why one family would be more interesting than another, the minimum is one language per family, including all isolates. For the Ruhlen classification and a sample size of 250, we would get the results shown in Table 6.3. From this table, it is clear that the number of languages to be selected per family only very indirectly reflects its total number of languages. Amerind, with about half the number of languages of Niger-Kordofanian, is assigned twice as many languages in the sample, thanks to its much more complex internal structure, resulting in a relatively high DV.

This initial number of languages having been calculated, the assignment process continues recursively on the basis of the DVs of the lower nodes. In the case of Amerind, with 51 languages to be selected, the values for the first branch are as shown in Table 6.4. Per node, this process goes on until a level is reached where the number of languages to be distributed is lower than the number of daughter nodes. This is the case for Andean in Table 6.4; Andean has six daughter nodes but only three languages to distribute over them. Thus, apart from cases where there is only one language under a selected node, as for isolates, the method selects genetic groups, not individual languages. Then the linguist has to take over and select the best grammars, preferably for languages from different subgroups, to the extent that these are available.[14]

As suggested above, the method may be applied not only to genetic classifications but also to areal or typological ones, provided that they are shaped in the form of a tree. This could be done for areal classifications as in Figure 6.2.

Also, typological trees may be constructed by subjecting a maximum collection of languages to a statistical cluster analysis on the basis of a set of variables which

[14] On request, the program may suggest choices, applying a weighted random selection or following a stratification scheme.

Table 6.3. Partial distribution in a 250-language sample based on Ruhlen (1991)

Family	Total languages	DV value	Languages in sample size 250
Amerind	583 (11.1%)	178.4	51 (20.4%)
Niger-Kordofanian	1064 (20.2%)	90.4	26 (10.4%)
Indo-European	144 (2.7%)	39.7	11 (4.4%)
Caucasian	38 (0.7%)	8.5	3 (1.2%)
Basque	1 (0.02%)	1.0	1 (0.4%)
[...]	[...]	[...]	[...]
TOTAL	5,273	853.2	250 (4.7%)

Table 6.4. Dividing languages at the lower levels of Amerind (Ruhlen 1991)

Amerind branch	Total languages	DV value	No. of languages in sample of size 250
Central	60	19.1	6
Ge-Pano Carib	193	29.3	9
Northern	232	45.5	14
Equatorial-Tucanoan	268	45.0	14
Chibchan-Paezan	71	16.9	5
Andean	30	9.9	3
TOTAL	854	165.2	51

are assumed to be typologically central. The results of the cluster analysis, which may be run by any standard statistical package such as SPSS (SPSS 1988 and later versions), may be expressed in the form of a dendrogram. This tree-shaped constellation can then be used as the basis for a DV sample designed to explore other linguistic variables. The DV method as implemented in the computer program also allows for stratification. For example, a genetically based primary sample may be stratified for areal or for typological distribution, provided, of course, that the corresponding information is available for all (relevant) languages in the classification used.

The standard assumption is that all branches in (genetic) trees are equivalent in that they represent the same time depth. The DV method allows for adding weights to the branches, assigning more or less depth to each of them, thus increasing or diminishing the DVs of their mother nodes.
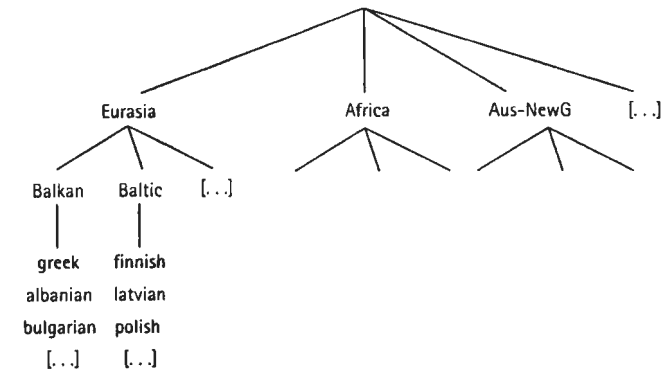
Figure 6.2 Partial areal tree

The DV method has some clear restrictions. It provides variety samples rather than probability samples. It relies heavily on the quality and internal consistency of the classification used. And it only takes classifications in the shape of a tree. Yet it is fully explicit, formalized, and completely independent of the domain under investigation. This makes samples produced by it for different research projects reproducible and comparable. The stratification option may help to minimize the amount of bias on the other dimensions.[15]

6. CONCLUSION: THE FUTURE
OF LINGUISTIC SAMPLING

In general terms, samples are created for two reasons. Either it is impossible to study the whole population under investigation because it is too large or partially inaccessible, or it is not necessary to do so because a representative sample will give reliable results at much lower cost. In both cases, we would take a random sample which is large enough in relation to the complexity of the phenomena under investigation and which is stratified for the parameters which we know may affect the results.

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[15] In their assessment of ten samples and sampling strategies, Widmann and Bakker (2006) observe that the DV method fares among the best in capturing the variety on the parameter used for their test.

Unfortunately, the population of the known languages does not allow us to take such an approach. It is very large indeed, at least from the perspective of a typical linguistic project, in which only one or a few people are involved, and for a restricted amount of time. However, the problem is that there is a large knowledge gap in terms both of individual languages and of the crucial parameters by which to stratify the sample in different cases, apart from genetic and areal factors. Until these gaps are sufficiently filled—the first by a massive effort in the description of mainly the endangered languages and the latter by ongoing typological research—typologists will most probably continue using somewhat opportunistic strategies when compiling language samples, mainly by gearing them towards the domain of interest while avoiding the well-known types of bias within the limits of the bibliographic search space. None-theless, some points should be taken into consideration.

The method followed should be explicit and formalized, and preferably imple-mented in a computer program. Only then can it be assessed and repeated by others, and results of different research projects be compared. Moreover, samples may then be optimized using statistical techniques in search of the most representative, least biased selection of languages according to the criteria thought to be relevant.

Second, the nature of a sample produced by some method should be clear and fit to answer the original research question. More concretely, one should select a probability sample for questions involving independent cases and relatively well-known parameters, and construct a variety sample for more explorative questions concerning lesser known linguistic domains.

Rather than an unstructured list of languages, a sampling method will often employ some type of classification. The method should, however, not be based on a specific type. The researcher should be free to select her preferred classification, be it genetic, areal, typological, or other. Neither should the method be geared towards specific linguistic domains or variables. Following the example of phylogenetic trees in biology, linguistic classifications typically take the shape of a tree with one root ('human language'), with all the major language families directly under it. However, languages have only a restricted similarity to species in biology, and only in a restricted number of cases do two (let alone more than two) languages result from a clear-cut geographical split in one monolithic speech community. Increas-ingly over the millennia, new languages are the result of complex interactions within and between existing linguistic groups, with all kinds of substratum and superstratum effects, creoles, and other mixed and contact languages being extreme cases. It is important, therefore, that sampling methods be developed based on other kinds of representations of genetic and areal relationships between languages and within language groups. These may be unrooted trees, as used in research in lexicostatistics (Lohr 2000: 215 ff.), or so-called 'neighbour networks', as proposed in Huson and Bryant (2006). A mixed representation of trees and networks may also be considered, one which implements a punctuated equilibrium model, as

discussed by Gould and Eldredge (1993) for biological evolution and by Dixon (1997) for the history and development of languages.

Lacking more comprehensive models of language classification, special attention should be given to the representation of extreme cases. For instance, creole lan-guages are often grouped under one heading, as if they were a language family, with the lexifier languages as a second-level division and no indication whatsoever of the substrate languages. The same treatment is often given to other mixed languages such as Media Lengua (Muysken 1994). Studies in language contact, notably Tho-mason (2001a), have shown that languages which originate from intensive contact between two or more other languages may exhibit phenomena, such as combina-tions of features, which are uncommon in languages which do not have a strong multilingual basis. Therefore, a representative number of them should find their way into any sample which seeks to explore the notion of 'possible human language' in a more or less direct sense. The same argument holds for language isolates, especially the absolute ones, like Basque and Burushaski, which are relatively well studied and have so far resisted allocation to any of the known genetic groupings. Furthermore, if the observation made above that small communities are relatively rich in 'marked' behavioural patterns extends to language, then these should also get extra weight with respect to their representation in samples.

As a final requirement mentioned here, sampling methods should not have built-in constraints on sample sizes. Either the choice of size is left to the individual researcher in the face of the amount of variety that she expects, or the method provides an algorithm for determining the optimal sample size when the variety that may be expected for the research variables and their distributions can be reliably predicted.

Arguably, with most of these requirements unfulfilled and a considerable gap in the linguistic database, the best sampling strategy for explorative typological research may be the following. First, estimate, on the basis of the availability of descriptions of the phenomenon under investigation, how large a variety sample may be that is genetically and/or areally representative in terms of the most up-to-date classifications available. For this, the DV method may be used, with a genetic classification as its basis and an areal classification as a stratifying dimension. To the extent that there is a choice between languages, check the sample for typologi-cal bias on the basis of known relationships between linguistic variables. This constitutes the basic sample, probably anywhere between 100 and 200 languages. This sample may be used for answering questions which require a relatively high degree of independence of the languages in the sample, and could be seen as a pseudo-probability sample. After a first inventory of the data, expand the sample for those areas or genetic groupings where most variety was found. This expanded sample, with a size upwards from 250 languages, may be used to answer questions related to the variation among the research parameters. These sizes are mere approximations and of a general nature. For some simpler variables, the sample

sizes may in fact be much lower. Also, time or means may be too short to collect the ideal amount of data, or one hits the bibliographic ceiling at a much earlier stage.

APPENDIX. A SHORT NOTE ON DATA COLLECTION AND REPRESENTATION IN LINGUISTIC TYPOLOGY

The real information about languages is found in utterances of speakers as part of a complete stretch of discourse. They are the primary data of any linguistic enterprise. However, linguistic typology abstracts from this information analytical data i.e. values assigned to a set of linguistic variables. One could argue that it is the sheer nature of linguistic typology—and theoretical linguistics in general—to abstract away from primary data and discuss language phenomena in terms of variables and their values. These variables are typically determined on the basis of the research questions pertaining to some typological project, or they may be generally accepted ones, such as basic constituent order, or morphological or adpositional type. Together, these variables code the usually very restricted domain in which the answers to the research questions will be sought. For each language in a sample, a value will be established for each variable, provided that it is relevant to the language in question. Since typological studies usually cover several hundred languages from all over the world, having native speakers of, and real primary data available on, all relevant languages is illusory. The typical sources are of a secondary nature, that is, reference grammars and grammatical sketches. As discussed above, to date these are only available for between 10% and 20% of the world's languages. Apart from that, tertiary sources may be consulted, such as journal articles and monographs, including typological studies on related research areas. Another instrument which is frequently employed is questionnaires. These contain questions and example sentences, usually in English, which have to be translated into one of the sample languages. Questionnaires are sent out to specialists on the respective languages, possibly but not necessarily native speakers themselves, and preferably to more than one specialist per language for the sake of cross-informant reliability. The issues addressed in typological questionnaires are typically interpretable by linguists only. Finally, the internet and the respective lists which are functioning on it are of great help to typologists, since they bring the whole typological community to the individual researcher's desktop.[16] However, all this

[16] The most important one is the Linguist List (http://www.linguistlist.org/). The Association for Linguistic Typology's website (http://www.lancs.ac.uk/fss/organisations/alt/) lists several hundred experts of individual languages.

implies that native speakers will only infrequently be directly involved in typological data collecting, and mainly for those languages for which grammars are available anyway. As a result, one does not always get the full range of possibilities and more subtle distinctions for part of the sample languages, or only part of one's questions may be answered, which leads to missing observations and an unbalanced data collection.

Apart from the reliability of the data sources one has available, there is the problem of the interpretation of the information. Generally speaking, grammars are written in order to document languages and not in the first place with their future typological use in mind.[17] Often, descriptive categories such as subject, pronoun, and topic, and notions such as 'unmarked' are drawn from the generally available linguistic jargon. In other words, they are not very clearly defined or derived from a well-established theoretical framework. The same can be said of the glossing apparatus, if available at all. This means that the typologist often has to reformulate the grammatical statements and the examples given into her own terminology. It is therefore advisable to employ as many sources as possible on a language, to the extent that there is more than one source available in the first place. Another strategy, successfully applied in Bybee et al. (1994: 32 ff.), is to seek cooperation and let two or more typologists collect and interpret the same data according to a shared set of definitions.

Once the data are collected and interpreted, one proceeds to the next step: the actual coding of the data for linguistic analysis. This is done on the basis of a code book, which is usually compiled before the actual data collecting starts. The code book is in fact a list of all variables, their definitions, and the values one expects to observe. It will direct data collecting, and is especially important when more than one researcher is involved in the process. Obviously, it is a dynamic instrument in the sense that values, and even variables, may be added and changed in the course of the process.

Coding means a considerable reduction of the linguistic facts. It is important, therefore, to start out with a relatively rich set of values per variable, even if it is not clear whether one needs all that information. It is very easy to reduce values to a smaller, more coarse-grained set. It is much harder to diversify at a later stage, since one has to go back to the original data sources for that purpose.

Technically speaking, variables fall into three categories according to the type of value one may assign to them. The type of variable most frequently occurring in typological studies is *nominal*. About the values of this type of variable, the only thing that can be said is that they are different. The vast majority of the 142 variables found in the *WALS* atlas are of this (lowest) category. An example is basic constituent order, found in the left-hand column of Table 6.5 (from Dryer 2005e). Less

[17] A favourable exception is the grammars in the Descriptive Grammar Series; these grammars are based upon an organizational structure proposed in the early 1970s by Bernard Comrie and Norval Smith.

Table 6.5. Types of linguistic variables

VARIABLE	Basic constituent order	Tone system	No. of basic colours
TYPE	Nominal	Ordinal	Interval
VALUES	SOV	No tones	3
	SVO	Simple system	4
	VSO	Complex system	5
	VOS		6
	OVS		7
	OSV		[...]
	None		11

common are variables of the *ordinal* type; their values may be ordered on a scale, say, from few to many or small to big. An example is tone system, as defined by Maddieson (2005b). In this case, one can say that a 'simple system' is more complex than 'no tones' and that a 'complex system' is more complex than a simple system. How much more complex is, however, unclear. Finally, *interval* variables not only have ordered values but the distance between the values is equal. This is the case for a number of basic colours, as defined by Kay and Maffi (2005). Thus, a language which has six basic colours has twice as many of these as a language with three basic colours.[18]

It is important that one is aware of the types of one's variables at the data collecting and coding stage, since this has important methodological implications. In very general terms, the lower the type of a variable on the Nominal to Interval scale, the more restricted are the methods of (statistical) analysis one may apply to it.[19]

The complete set of variable values for all languages in the sample is often presented as a data matrix, with the languages ('cases') on the rows and the variables on the columns. This is depicted in Table 6.6, taken from the agreement database discussed in Siewierska and Bakker (1996).[20] The columns contain the variables which code the

[18] Sometimes a fourth type is added, i.e. ratio variables. These are interval variables with a natural zero point. An example would be a variable which contains the number of times a certain word or linguistic phenomenon has been attested in a corpus.

[19] I will not discuss statistics for linguistics here at all. A classical, basic introduction is Butler (1985), now out of print but available on the internet (http://www.uwe.ac.uk/hlss/llas/ces/iclru/pgstudent.shtml/). More advanced techniques are discussed in Rietveld and van Hout (1993).

[20] Many databases described in the typological literature are probably not databases in the technical sense. That is, they do not consist of a number of matrices, like the one in Table 6.6, which are linked via key variables, but single ones, constructed via a spreadsheet program. I will follow the custom here and use the term 'linguistic database' throughout.

Table 6.6. Data matrix

LG_NAME	S_AGR_PRS	S_AGR_NUM	S_AGR_GND	S_AGR_INEX
Abipon	123	sgpl	NO	Unified We
Abkhaz	123	sgpl	23sg	Unified We
Abun	IRR	IRR	IRR	IRR
Acehnese	123	Nonum	NO	InEx
Achumawi	123	sgdupl	NO	InExDP
Acoma	123	Nonum	NO	IRR
Adzera	IRR	IRR	IRR	IRR
Aghem	3	sgpl	3sg3pl	InExP
Ainu	123	sgpl	NO	InExP
Akkadian	123	sgpl	23sg23pl	Unified We
[...]				

way the subject is marked on the verb. Note that more or less mnemonic names have been chosen, rather than abbreviations like VAR1 and VAR2. Subject agreement is represented in terms of person, number, gender, and in/exclusivity, respectively. The code book will contain full definitions for them. Using meaningful labels not only makes data and the analyses based on them more readable, but it also helps prevent mistakes. The same goes for the values. Thus, Abkhaz has subject agreement for all three persons, in the singular and the plural; has gender agreement for second and third person singular; and has no inclusive or exclusive distinction in the first person plural. For Abun and Adzera, the values are IRR(elevant), since these languages do not mark their subjects on the verb at all. Note that a distinction is made between this value and the value NO, which codes the absence of a marking which could potentially be there, as for gender agreement in Abipon. Yet another label is used to code the absence of a value when it is unknown (UNK). The data matrix is precisely the format used by computer programs for data management, such as Excel and Access, and analysis programs, such as SPSS and SAS. It is, therefore, easy to digitalize and process.

This one-value-per-variable representation is found in most linguistic databases that have been discussed in the typological literature (e.g. the studies discussed in section 5). However, this may be too much of a simplification of the actual linguistic situation. Thus, most languages have more than one order for the Subject, Object, and Verb in the main clause. In fact, all six logical combinations may occur in one language (cf. Siewierska 1998c). For Polish, this would lead to a representation such as the one in (3).

(3)   SOV/SVO/VSO/VOS/OVS/OSV

Of course, these values are not equivalent, in the sense that some are used by speakers more often than others. This difference may be coded by adding a value on a markedness scale to each of the values, indicating B(asic) or M(arked), as in (4).

(4)   SOV(M=M)/SVO(M=B) /VSO(M=M) /VOS(M=M) /OVS(M=M) /OSV (M=M)

But even such scales are simplifications. In fact, real variation is rare in languages in the sense that, more often than not, variation is subject to syntagmatic conditions. This is the case for the choice between alignment types accusative and tripartite in the Bolivian language Chacobo. The former alignment type appears when the subject is second or third person plural; the latter, in the other cases (Prost 1967). This could be represented as in (5).

(5)   ACC(SUBJ=23PL) /TRI(SUBJ=123SG1PL)

Unfortunately, none of the generally available software for data analysis supports such complex values in the sense that it 'looks into them'. A way out of this is to distribute the information over several single-value variables, which are linked via meaningful labels. This is shown in Table 6.7 for the data in (5).

In the course of the data analysis process, in which computational tools will usually be involved, all kinds of recodings of variable values may take place. These are typically generalizations to 'broader' values, which will reduce the number of distinctions made. For example, the six main clause orders of (3) may be generalized to the two values 'OV' and 'VO'. Also, new variables may be derived from old ones. These are often of a higher type than the original variables. A clear example is Nichols's Head-Dependent Marking parameter, which is a summation of the individual head and dependent marking constructions a language has and which are coded by a number of yes/no variables. The H/D variable takes values between −8 (maximum head marking) and +9 (maximum dependent marking) (Nichols 1992: 292 ff.).

Traditionally, linguistic databases are built up and maintained by individual researchers. Sometimes, parts of them make it to the appendix of book publications, as in the case of Nichols (1992), or to a CD-ROM, as in the case of the *WALS* atlas. This means that well-defined analytical data becomes available for extension

Table 6.7. Distributing complex values

LG_NAME	ALIGN_1	ALIGN_1_COND	ALIGN_2	ALIGN_2_COND
Chacobo	ACC	23PL	TRI	123SG1PL
[...]				

and further research, even if the original author is no longer working on it. Moreover, information from different projects may be combined, which may lead to further insight into the interaction between linguistic parameters from different linguistic domains. This philosophy of the recycling, extension, and combination of typological data has led to the Language Typology Resource Center (LTRC) project. It maintains a website which provides online access to over ten major typological databases, all fully documented in terms of variables and their values.[21] In this way, typological data is available in a quality and on a scale which no individual typologist or local group has ever had at their disposal.

FURTHER READING

1. SAMPLING

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2. LINGUISTIC DATA COLLECTION AND STATISTICAL ANALYSIS

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[21] The LTRC is a combined initiative of a number of typological research centres in Europe. The databases are available via an interface at <http://www.lotschool.nl/Research/ltrc/>.

THEORETICAL DIMENSIONS OF LINGUISTIC TYPOLOGY

MARKEDNESS: ICONICITY, ECONOMY, AND FREQUENCY

JOAN BYBEE

1. INTRODUCTION

Markedness is a very important concept in linguistic theory and in cross-linguistic study. Its origins are in the theory of language developed in the Prague School and continued principally by Roman Jakobson. Building on ideas of Nikolai Trubetzkoy, Jakobson used the concept of markedness as the theoretical foundation both for a set of distinctive features for the languages of the world and for a theory of morphology based on the meaning relations within categories. The most important prediction resulting from this theory for morphology is that only the unmarked member of a category may have zero expression. In subsequent developments, many of the details of Jakobson's theory have been dropped, and we now all too often find linguists using the terms 'marked' and 'unmarked' to mean little more than unusual or not expected vs. usual or expected, both within a language and across languages.

When terms become so highly generalized, they lose their value for scientific purposes. Yet the phenomena identified by those studying markedness, in

particular Roman Jakobson and Joseph Greenberg, are real and deserve an explanation. In this chapter we examine these phenomena, which happen to differ somewhat depending upon whether they reside in the phonological, morphosyntactic, or semantic domain. Our goal is to evaluate the proposed explanations for markedness correlations, which include references to diagrammatic iconicity, economy, and frequency of use.

2. THE ORIGINS OF MARKEDNESS THEORY

The concept of markedness was introduced by Trubetzkoy in the context of a large cross-linguistic study of phonological oppositions published originally in 1939. Oppositions in which one member is characterized by the presence of a certain feature and the other by its absence are called 'privative oppositions' (Trubetzkoy 1939: 75). In a privative opposition, the member characterized by the presence of a 'mark' (such as nasality) is called the 'marked' member, and the member characterized by its absence is considered 'unmarked'. Examples of privative oppositions are 'voice/voiceless', 'nasal/non-nasal', and 'round/unround'. The notion of markedness originally did not apply to gradual oppositions, in which features are present to varying degrees (e.g. vowel height), nor to equipollent oppositions, in which both members are logically equivalent (e.g. place of articulation).

Trubetzkoy observed in the languages of his corpus that when an opposition was neutralized in a certain context, it was the unmarked member that appeared. Thus, when a voicing opposition in final position is neutralized in German, it is the voiceless or unmarked member of the opposition that appears. Markedness relations for Trubetzkoy are not necessarily universal: language-specific factors, such as the types of neutralizations and the interception of oppositions, determine markedness. Yet Trubetzkoy argues that markedness has a phonetic basis: the unmarked member is the one whose production requires the least deviation from normal breathing. Trubetzkoy was also interested in phoneme frequency and predicted—based on Zipf (1935)—that the unmarked member of an opposition would be more frequent in continuous speech than the marked member, and that this would be true even if one controls for the fact that neutralization makes the unmarked member more frequent. This prediction is related to the phonetic character of the unmarked member.

Roman Jakobson developed a set of distinctive features based on Trubetzkoy's notion of a privative opposition (Jakobson, Fant, and Halle 1952, Jakobson and Halle 1956). Jakobson reduced all oppositions to privative (binary) oppositions, and maintained the idea that each feature had a marked and unmarked value,

though the unmarked value could be represented either by a plus or a minus sign and could be different in different contexts (Jakobson and Waugh 1979). Binary relations with the asymmetry represented by the difference between the unmarked and the marked member in Jakobson's view pervade the structure of language and culture. In particular, Jakobson further developed his theory of markedness in the analysis of morphological systems. In some morphological categories, the unmarked member, which lacks the semantic feature, has a dual function. Battistella paraphrases the statements in Jakobson (1971b[1939], 1971c[1957]), explaining the function of the unmarked member as follows (1990: 2):

> The unmarked element thus has two interpretations: it has a general interpretation in which the nonsignalization of the marked feature indicates the irrelevance of the poles of the opposition; and it has a specific interpretation in which the nonsignalization of the marked feature indicates the signalization of the opposite.

In terms of phonology, for the voiceless/voiced contrast in obstruents, this means that in a context of neutralization (e.g. in syllable final position in German), the occurrence of the voiceless obstruent means that voicing is irrelevant. In other contexts, it means that voiceless is truly signalled and contrasts with voicing.

In terms of morphology—for example, for the category of number—the singular form can signal that the number contrast is irrelevant, as in the generic use *The cow is a domestic animal*. This can be referred to as the 'neutral value interpretation' (Croft 2003a). In other contexts, the singular form actually points to a single entity. What is particularly striking is that the category member that is used in such contexts is also the one that is most likely to be marked by a meaningful zero; that is, it goes literally unmarked (Jakobson 1971b[1939]). Jakobson built a morphological theory around this form/meaning correlation. Continuing to use binary features, he analysed inflectional distinctions by decomposing them into sets of marked and unmarked features.

For example, in Jakobson's (1971c[1957]) analysis of the Russian verb, first, second, and third person are represented by two binary features. The first distinction is between 'personal' and 'impersonal', separating the first and second person as participants in the speech event from the third person which is a non-participant. 'Personal' is marked, and the absence of this value is unmarked, reflecting the tendency for languages to use zero expression in third person. The first and second person are distinguished by 'addresser' vs. all other participants, making first person the marked member and second the unmarked one. The analysis continues by designating the past as marked compared to the present, the perfective marked with respect to the unmarked imperfective, and so on.

Jakobson's theory is an excellent example of what is meant by a structural theory: the same structural relations are hypothesized to hold throughout the various domains of language despite differences in the substance (e.g. phonetic, morphological, or semantic).

3. SUCCESSES AND FAILURES OF MARKEDNESS
AS A STRUCTURAL THEORY

Markedness theory can be considered successful to the extent that it can be shown that a number of properties correlate with the distinction between unmarked and marked. In its application to morphology, Jakobson cited the semantic correlate: the unmarked member is used to indicate the absence of a feature as well as in cases where the feature is not relevant. In addition, he pointed out that this feature correlates with zero expression. A third property identified by Jakobson is the greater syncretization in the marked member of the category. That is, the marked member of a category may express fewer further morphological distinctions. Thus, in English pronouns, the unmarked singular distinguishes masculine, feminine, and neuter: *he, she,* and *it.* In the marked plural, no gender distinctions are expressed; instead, the only pronoun available is *they.*

Two other important properties of the unmarked member of a category have been discussed by Greenberg (1966a). Greenberg points to the lesser degree of morphological irregularity in the marked members of categories. It may seem counterintuitive that unmarked members have more irregularity, but it should be borne in mind that the unmarked forms have greater frequency, which allows them to maintain their irregularity while the marked members are more likely to undergo analogical regularization. As an example, consider the tense/aspect system of Spanish. In terms of tense, the present is unmarked, in opposition to the two pasts—preterite and imperfective. In terms of aspect in the past tense, the preterite is unmarked. The irregularity of paradigms in terms of vowel and consonant alternations in the stem resides almost exclusively in the present and preterite, while the imperfective is regular. Thus, in the present, a large number of verbs have vowel alternations, illustrated by *cuento* 'tell (PRS.1SG)' vs. *contamos* 'tell (PRS.1PL)'; a dozen or so have consonant alternations, exemplified by *tengo* 'have (PRS.1SG)' vs. *tenemos* 'have (PRS.1PL)'. In the preterite, there are more than a dozen verbs whose stem is radically different from the present or infinitive form: *poner* 'to put' vs. *puse* 'put (PRET.1SG)'; *tener* 'to have' vs. *tuve* 'have (PRET.1SG)'. In contrast, the imperfective stem is completely regular, with the possible exception of the verb *ser* 'to be', whose imperfective stem is *er-*. There are no changes to the stem within the imperfective and, with the exception just mentioned, there is no change from the infinitive stem.

The second property that Greenberg notes and explores in detail is the higher token or text frequency of the unmarked member of a category. Greenberg counts texts in Sanskrit, Latin, Russian, and French and finds that in nouns the singular is more frequent than the plural (at about a 3:1 ratio) and the dual (in Sanskrit) is much less frequent than the plural. He also finds singular pronouns more frequent than plurals

and first person more frequent than other forms. He finds direct cases of nouns more frequent than oblique cases, the positive form of the adjective more frequent than the comparative or superlative, cardinal numbers more frequent than ordinal numbers, the active form of the verb more frequent than the passive, the indicative more frequent than other moods, and the present more frequent than other tenses.

To the list of markedness criteria as composed by Greenberg, we can add the strong tendency for children to acquire the unmarked member of a category and use it for both members until the marked member is acquired (Dressler, Mayerthaler, Pangl, and Wurzel 1987). Thus, English-speaking children use singular nouns before plurals and present tense verbs before past tense.

In addition, it should be noted that when alternations in inflectional forms are levelled, it is the unmarked member whose form survives and replaces the form of the marked member. Thus, levelling of *cow, kine* to *cow, cows* favours the singular, and levelling of *weep, wept* to *weep, weeped* favours the present (Mańczak 1980, Bybee 1985).

The correlation of these properties (i.e. neutral value, zero expression, syncretization, irregularity, frequency of use, order of acquisition, and direction of analogical levelling)—if confirmed empirically and shown to be universal—presents an impressive set of relations that should be accounted for and explained in any linguistic theory. However, some problems do arise with the application of these properties to categories beyond those that constitute the best examples.

First, there are general problems with binarity itself (see the discussion of phonology in section 5), which does not seem to apply equally well to all categories. The attempt to apply binary features to categories with more than two members— such as first, second, and third person as discussed above—seems artificial. Second person is not the absence of first and third person. Nor is first person more marked because it is more specific. Indeed, considering its frequency and the fact that it has zero marking in some languages and serves as the basis for analogy in some cases, the indicators for first person seem to be mixed (Bybee and Brewer 1980).

The use of binary features for the meanings of grammatical categories depends upon being able to find a single abstract meaning for each morpheme. Current functional approaches to linguistic analysis are less likely to set the goal of arriving at one abstract meaning for a morpheme, and also less likely to view meaning as resulting only from oppositions in which one member has what the other lacks. Rather, recent work in grammaticalization emphasizes the polysemy of grammatical morphemes as well as their inherent content, which comes from their earlier lexical sources (Bybee, Perkins, and Pagliuca 1994). For instance, the binary analysis that Comrie (1976a) proposes for aspect characterizes the progressive as lacking in perfectivity and also lacking in habituality. This suggests that the progressive is a sort of default, but nothing could be further from the truth: progressives in English, Spanish, and many other languages express rather specific meaning of an agentive actively engaged in activity, in some cases in a specific location (Bybee et al. 1994).

In addition, there are many exceptions to the way the properties apply to individual categories. The semantic criterion works nicely for gender—a *poet* can be male or female, but a *poetess* must be female—and for number, but it is less clear how this criterion applies to aspect or mood. In a language with inflectional aspect, are there cases in which aspect is neutralized and one or the other is used? In a language with a subjunctive mood, the distinction between moods is neutralized in certain subordinate clauses, but it is the marked subjunctive that appears, not the indicative. This type of situation has led some linguists to propose 'markedness assimilation', in which a marked value occurs in a marked context. However, such stipulations weaken the general theory (Shapiro 1972, Battistella 1990).

Other counterexamples include the Spanish imperfective, which syncretizes the distinction between first and third person in the singular, but not in the plural. In Dutch, the first person of verbs rather than the third has zero expression. In addition, in categories—such as aspect—which interact strongly with the meanings of verbs, zeros signal different meanings according to the type of verb: in some languages, an unmarked stative verb signals present/imperfective, while an unmarked dynamic verb signals perfective (Bybee 1994: 251). Thus, it seems that the structural relations among members of categories are affected by the substance of the categories and are not all the same.

As Haiman (1985) points out, familiarity (or frequency) in some cases works against the semantic criterion. Frequency of the first person singular explains why it is often zero marked, first acquired, and the basis of analogy for other forms. Particular lexical items also show the effect of frequency of use. Tiersma (1982) shows that in Frisian the levelling of alternations in the stem of singular and plural nouns favours the singular for items that are more individuated in experience, but favours the plural in items that tend to occur in pairs or groups—horns, stairs, tears, geese, and so on.

These problems suggest that there is no one overarching explanation for all asymmetries within categories, but rather, a combination of considerations—frequency of use, diachronic source, semantics—produces the tendencies identified under markedness theory in morphology. We return in section 8 to a discussion of possible explanations for these tendencies.

4. EXPANSIONS OF MARKEDNESS

Jakobson's theory has subsequently been expanded in a number of ways. While markedness relations were originally proposed to hold only among members of the same categories whose distinctions were expressed only in binary relations, later we find the following developments.

First, markedness relations are stated in degrees; for example, singular is less marked than plural and plural is less marked than dual (Greenberg 1966a, Croft 1990). In Naturalness Theory, Preference Laws give relative markedness values to linguistic structures (Vennemann 1988), and hierarchies—such as the Animacy Hierarchy—are recast in markedness terms (Mayerthaler 1987).

Second, Greenberg (1966c) formulates certain relations among categories as implicational universals—such as the fact that in agreement systems, gender is more marked than number. Croft (1990: 92–3) interprets this as a markedness relation. In addition, Croft (1990) interprets word order co-occurrences as marked or unmarked.

Third, markedness has been applied to the contexts in which feature values occur; as in 'markedness assimilation', mentioned above, or in phonology, where, for instance, one could view the syllable coda as a marked position for obstruents.

Fourth, markedness has been applied to relations among non-opposing forms of expression, as in Wurzel's (1998) proposed relations among affixing, stem-modifying, and subtractive morphology.

With this expanded set of functions for the notion of markedness, it is easy to see how the term 'unmarked' has come to mean very little more than 'natural', 'normal', 'frequent', or 'expected'. In fact, Haspelmath (2006) suggests that the terms 'marked' and 'unmarked' should and can be avoided altogether, with one of the terms above being used instead to explain what is truly meant. In contrast, with changes in linguistic theory, those who find a role for markedness view it as a means of evaluating grammatical structures (Battistella 1990) with regard to their deviation from the innate 'core' (Chomsky 1981, Hyams 1986) or in terms of how much stress they put on linguistic processing capabilities (Wurzel 1998). Observe that both Trubetzkoy and Jakobson saw markedness relations as inherent to language structure and not outside of it.

5. MARKEDNESS IN PHONOLOGY

As the concept of markedness has evolved in phonology, it is closely tied to the notion of naturalness and most often considered to have a phonetic explanation. Thus, in current practice, there is no expectation of a correspondence between markedness in phonology and markedness in morphology or syntax.

It was mentioned above that Jakobson came to see all the features of language as binary and exhibiting markedness relations. Binary distinctive features are also proposed in Chomsky and Halle (1968), but in the theory developed in that book, which became the basis of decades of work in generative phonology, markedness or naturalness considerations were not built directly into the theory. The authors

recognized this lacuna and paid homage to markedness by appending a chapter containing rules that stated markedness relations. However, it is not made clear upon what basis these markedness conventions are proposed, since the empirical evidence for them is not cited. Chomsky and Halle (1968: 411) do say, however, that systems made simpler by the application of universal marking conventions 'will be more generally found among the languages of the world, will be more likely to develop through historical change, etc.'

A general problem that arises when markedness relations are considered in sequential context is that some distributions that are patently 'natural', such as the voicing of intervocalic obstruents, produce marked segments. There are various proposals for two types of constraints: one which affects segments or oppositions in the phonemic inventory, in which context is irrelevant, and another which predicts outcomes in specific phonetic environments (Greenberg 1966a: 64, Bailey 1973, Stampe 1973). The first type is the classical markedness relation, since it deals with oppositions and is sometimes considered to have acoustic/perceptual motivation, as Jakobson proposed. The second type deals with natural processes, such as assimilation and lenition, and usually refers to articulation for its explanation. One could legitimately view these as competing trends.

Many marking and naturalness relations have been worked out by the proponents of Naturalness theories: Stampe (1973), Bailey (1973), Dressler et al. (1987), and Vennemann (1988). In these theories, naturalness in different domains can produce different results. Besides markedness relations among segments, various proposals about the naturalness of syllables have been worked out. For instance, Vennemann proposes several Preference Laws for syllable structure which are graded relations, such as the Coda Law:

A syllable coda is the more preferred: (a) the smaller the number of speech sounds in the coda, (b) the less the Consonantal Strength of its offset, and (c) the more sharply the Consonantal Strength drops from the offset toward the Consonantal Strength of the preceding syllable nucleus. (Vennemann 1988: 21)

Vennemann is able to show that a number of diachronic changes conspire to produce the patterns described by the Law. In Natural Phonology, it is proposed that diachronic change is always towards a more natural or less marked state. Marked structures arise because some 'Preference Laws' may be in conflict with one another (Bailey 1973, Vennemann 1993).

Unfortunately, this approach is methodologically circular: if a change produces a more marked syllable, then it is said not to be a syllable-structure change, but rather it is said to have some other motivation. In addition, this theory of change involves an undesirable teleology by proposing that languages are trying to become more natural or less marked (Dressler 1990).

Optimality Theory is quite similar to Naturalness Theory, though the proponents of OT rarely credit these earlier proposals for violable, interacting constraints

and have proposed no theory of linguistic change. In OT, the evaluative function of markedness, which is ordinarily applied at the level of the language, to phoneme inventories, rules, etc., is applied at the level of the individual form, evaluating each possible form for its relative markedness. Markedness constraints in OT are violable, and violations are handled through the language-specific rankings of constraints. The goal of this theory appears to be the specification of a universal set of constraints and their usual rankings across languages. The constraints are universal, though they can be violated, and considered to be an innate part of the language mechanisms by some practitioners (Prince and Smolensky 1997) while at the same time having phonetic motivation (Hayes 1999).

Blevins (2004: 241–4) points out a number of problems with Optimality Theory, one of which is that this theory cannot explain why, for instance, 'constraints, like that prohibiting (syllable) coda voicing, are typically resolved by constraint rankings which result in devoicing or voice assimilation, but not by rankings which involve vowel epenthesis or metathesis' (p. 241). Her point is that a phonological theory needs not just a theory of markedness, but also a theory of how unmarked structures arise diachronically (see below).

Another approach, based firmly on cross-linguistic evidence and phonetics, postulates that segments in a phoneme inventory can be classified as basic, elaborated, or complex. Whereas Jakobson and Chomsky and Halle would find markedness relations among even the most basic of consonants and vowels, this approach designates a set of basic segments that are commonly found in the languages of the world, and notably in languages with very small inventories, and shows that the more phonemes included in the inventory, the more elaborated and complex segments it will contain. The basic consonant inventory contains voiceless and voiced stops at three points of articulation ([p t k b d g]), voiceless fricatives ([f s h]), one voiceless affricate ([tʃ], glottal stop, three nasals ([m n ŋ]), [r], [l], [w], and [j] (Lindblom and Maddieson 1988, Lindblom, MacNeilage, and Studdert-Kennedy 1984). The basic vowel system contains the five vowels ([a i e o u]). No finer distinctions of markedness are made within these inventories, but if languages contain additional consonants or vowels, these will further fractionate the phonetic space (e.g., by adding points of articulation) or be produced with secondary features, such as palatalization, rounding, glottalization, aspiration, etc. The largest inventories contain segments that combine such secondary features, yielding highly complex segments, such as a glottalized, lateralized [t]. Lindblom and Maddieson (1988) as well as Lindblom et al. (1984) argue that both perceptual and articulatory factors interact to produce the basic inventory: distribution in maximal perceptual space is modulated by articulatory effort. Willerman (1994) further explicates the articulatory parameters.

Greenberg uses Implicational Universals to state markedness relations. For instance, the statement that the presence of nasal vowel phonemes in a language implies the presence of oral vowels would mean that nasal vowels are marked and oral vowels

unmarked. In Greenberg (1978a), he argues that the explanation for this relation is diachronic in nature, since nasal vowels derive from oral vowels in nasal contexts. He generalizes that the marked features arise as contextual variants of unmarked features, which accounts both for their restricted distribution and lesser frequency and for the fact that the unmarked feature is also always present in the language.

Even in cases where the marked segment type does not conform to these generalizations, it is the diachronic processes that provide the explanation. Thus, he cites the example of long vowels which are marked vis-à-vis short vowels. There are often more long vowel phonemes than short vowel phonemes, but the reason for this is that some long vowels are formed by the contraction of diphthongs or vowel combinations. Greenberg (1978a: 87) concludes,

We see from this and similar examples that it is the nature of the process that gives rise to them that is decisive in producing marked and unmarked status rather than the inherent nature of the features as such.

Bybee (2001) and Blevins (2004), who also take this point of view, argue in addition that the underlying explanation for the sound changes that create markedness relations is phonetic in nature.

6. MARKEDNESS IN MORPHOLOGY AND SYNTAX

We have already discussed how Jakobson developed a theory of morphological markedness. This theory can be applied rather directly to some syntactic phenomena. For instance, it appears to be universal that the positive version of a clause is unmarked while the negative is marked. No languages exist in which the negative has zero expression and the positive requires a marker. It also appears to be universal that the active voice is unmarked while the passive is marked. As Croft (1990: 81) points out, the passive uses more complex expression and also has a more restricted distribution, being used only with certain transitive verbs.

Greenberg's (1966c: appendix III) empirical work has turned up numerous generalizations that can be expressed as implicational universals. Croft (1990: 92–3) interprets these to mean that the marked member implies the presence of the unmarked member. Some of the statements found in this work involve more than two members of categories (e.g. singular, dual, trial, and plural), while others are implications across categories—for example, the statement that in inflected words, the presence of gender implies the presence of number. Implications across categories should probably not be taken to be markedness relations. Implicational universals, useful as they are, cover a wide range of relations between the elements in the statement and are descriptive only. The statements themselves say nothing about the nature of the relations among the elements, nor are they explanatory in themselves (see Moravcsik, this volume).

Croft (1990: 84) argues that certain cross-linguistic patterns of word order give evidence for markedness. Because the order demonstrative–noun occurs in languages with both relative clause–noun and noun–relative clause, Croft argues that demonstrative–noun is the unmarked order for that constituent. As this is a very different interpretation of markedness, one which denotes 'more common cross-linguistically' and not one that contrasts elements within a language, it is not subject to the same types of criteria and explanations as the within-category relations usually discussed under markedness.

That does not mean, however, that markedness cannot apply to word orders, but it seems only appropriate within a single language. For instance, the English word order in which the auxiliary precedes the subject is a marked word order: it is used only in certain special constructions, i.e. questions, negatives, and emphatic statements. The other order, subject–auxiliary, is clearly the unmarked one.

Another extension of markedness in syntax concerns the various hierarchies, such as the Animacy Hierarchy, which have been uncovered in recent research. Casting these hierarchies in terms of markedness requires once again the recognition of degrees of markedness, since such hierarchies order multiple elements (Mayerthaler 1987, Croft 1990).

7. SEMANTIC OR COGNITIVE MARKEDNESS

Theories of morphological or syntactic markedness often refer to iconicity with semantic or cognitive markedness, which is also sometimes equated with semantic complexity (Clark and Clark 1978, Haiman 1985, Mayerthaler 1987; cf. Haiman, this volume). A useful point of view, though one that takes us a great distance from Jakobson's original notions, establishes the human cognitive and physical make-up as the reference point for the unmarked. Thus, Croft (1990: 111–15) discusses the Animacy Hierarchy in terms of markedness. This hierarchy, motivated by many grammatical processes, ranks the following (from least marked to most marked):

first, second-person pronouns < third person pronoun < proper names < human common noun < nonhuman animate common noun < inanimate common noun

Several different interpretations of this hierarchy have been proposed. As the name implies, one interpretation is that it represents a semantic cline of animacy (Croft 1990). Mayerthaler (1987: 41) proposes that the more accessible an entity is to the speaker and the more it resembles non-biological properties of the speaker, the less marked it is.

Clark and Clark (1978) discuss a number of markedness relations in terms of human perception and cognition (cf. van der Auwera and Gast, this volume). Basic colour terms, which refer to parts of the colour spectrum favoured by the visual cortex, are named by words that are unmarked or monomorphemic, such as *red* and *blue*. Colours residing in other parts of the spectrum have more complex expression: *dark red*, *sky blue* (Berlin and Kay 1969, Kay and McDaniel 1978). Also in the lexicon, objects can be referred to in many different ways: *an apple* might be *a fruit*, *an object*, *Corinne's lunch*, and so on, but the most useful term for it is *apple* because it is neither too general (as *fruit*) nor too specific (*Golden Delicious apple*). The nouns for this basic level of categorization tend to be morphologically simple, while more specific levels of categorization have more complex expression.

One of the most interesting markedness relations discussed by Greenberg (1966a) is the relation between spatial terms that refer to having dimension or lacking it. In pairs such as *high/low*, *long/short*, *wide/narrow*, *deep/shallow*, *thick/thin*, *far/near*, the term that designates having extent is unmarked, while the term signalling lacking extent is marked. The evidence for this is the fact that if the nominalization for these dimensions uses the stem of one of the terms, it will be the one meaning 'having extent', for example, *height*, *width*, *depth*, *thickness*. Also in neutral questions involving these dimensions, we ask, *How long is it?*, not *How short is it?* Clark and Clark (1978) explain this phenomenon, which is consistent across languages, by saying—for example, for length—that a line remains a line as it gets longer, but as it gets shorter, it will eventually disappear. Thus, the term meaning 'having extent' is more basic or unmarked. Clark and Clark also discuss basic shape terms and kinship terms (following Greenberg 1966a).

For relations that are more grammatical than lexical, Clark and Clark (1978) have a similar explanation. Referring to Greenberg's finding that if a language has expressions that differ in complexity for state, change of state, and cause of change of state, they differ in complexity in that order, Clark and Clark argue that constant states are basic and that a change of state involves added conceptual complexity, and causing a change of state adds a further complexity. They argue that language reflects these cognitive facts.

8. FREQUENCY, ECONOMY, ICONICITY

The explanations for markedness in morphology and syntax become more varied as the notion is extended into more and more domains. Let us here consider explanations for the classical properties associated with markedness. We have already noted that a strong version of structural theory cannot be applied blindly

to every category; it follows that even within the classical properties, explanations might differ according to the categories involved.

First, consider zero expression. The fact in need of explanation is that within each category, there is a certain member that tends to have zero expression across languages, as mentioned above (Greenberg 1966a, Bybee 1985). Jakobson (1971g [1966]) notes the iconicity of the relation between the marked and unmarked form. In this case, it would be an instance of diagrammatic iconicity: relational properties of the form reflect the relational properties of the meaning. He cites the positive, comparative, and superlative of adjectives in Indo-European languages—for example, English *high*, *higher*, *highest* and Latin *altus*, *altior*, *altissimus*—as showing a gradual increase in the number of phonemes to 'reflect the gradation gamut of the signata' (Jakobson 1971g[1966]: 414). Singulars and plurals are another example: Jakobson says, 'the *signans* of the plural tends to echo the meaning of a numeral increment by an increased length of the form' (p. 414).

Others have generalized over categories by saying that the added morphological complexity of the marked form reflects its added semantic complexity (Vennemann 1972a, Clark and Clark 1978, Mayerthaler 1987). However, there still remain questions about what makes certain category members less complex. Why is it that a noun in the singular is less complex than a noun in the plural, and why would this relation be reversed for nouns that occur more often in the plural? It might be that for most nouns, singular is an inherent part of the meaning: for nouns that stand for entities that are easily individuated and that are frequently referred to as individuals (e.g. *a man*, *a woman*, *a table*, *a dog*), their singular designation is part of the meaning. In order to override the singular interpretation, an extra morpheme must be added. Similarly, for verbal aspect, individual verbs have inherent aspect of various sorts, and to override this aspect, additional markers must be present. Because there are many types of lexical aspect and several types of inflectional aspect, markedness relations among aspects are not as consistent cross-linguistically. As mentioned above, in some languages, the zero-marked verb signals past if the verb is dynamic and present if it is stative. However, considering the unmarked meaning to be inherent to the lexical item will not apply to deictic categories such as tense or person.

As we mentioned earlier, frequency of use correlates well with unmarked status, and frequency can certainly be invoked as explanatory. For instance, most nouns are more often used in the singular because when we talk about entities in our experience, we tend to individuate them, referring to them in the singular. Thus, it could be that the frequency with which forms are used influences their markedness relations. Conceptual bundling of singularity with individuated entities provides for economy of expression. Some would indeed argue that languages choose the most economic expression for high-frequency concepts.

Consider the important point made by Haiman (1985): while it is often the case that semantic markedness and semantic complexity are the same, as in compounds

where *room*, *bedroom*, and *master bedroom* are increasingly complex notions and increasingly marked, semantic complexity also interacts with familiarity or frequency. Haiman points out that *mare* and *female hippo* are equally complex, but they are not equally marked; the explanation being the greater familiarity of the first referent over the second. This point also relates to local markedness, as discussed above, wherein nouns that designate entities that tend to occur in pairs or groups may be unmarked—as, for instance, in the English nouns for herding animals, *deer*, *sheep*, *fish*, which are unmarked in both singular and plural. Thus, it appears that frequency or familiarity may be the underlying criterion, since it overrides semantic complexity as the correlate of unmarked status. Hay (2001) finds experimental support for the proposition that multimorphemic forms that are more frequent than their bases are viewed as less complex than those that are less frequent than their bases. (See also Witkowski and Brown 1983 for evidence from markedness reversals.)

But before becoming satisfied with a particular explanation, we need to consider how zeros develop. An explanation for a linguistic phenomenon is only valid if the factor referenced can be shown to have operated in the creation of the phenomenon diachronically (Bybee 1988). Zeros develop diachronically in two ways. Most zeros develop when the opposing member of the category undergoes grammaticization. If a language has no number marking for nouns, a zero-marked singular develops only when the overtly marked plural develops and becomes obligatory; if the overt plural is always used when plural is intended, then by inference, the unmarked noun comes to be interpreted only as singular (García and van Putte 1989). Why is it, then, more common for the overt mark to arise on the plural rather than on both members? The reason is perhaps that, as mentioned above, for most nouns, singular is inherent to the meaning and plural is something that must be specified explicitly. The repeated use of a plural morpheme will lead it to grammaticize and perhaps attain affixal status, while the singular noun continues without explicit number marking. To take another example, in English, the present form of the verb formerly signified present habitual, present progressive, and future. With the development of the future from the modal *will* and the progressive from *be + ing*, the unmarked form of the English verb signals present habitual (Bybee 1994).

A second way that zeros develop occurs less often but provides stronger evidence for the cognitive validity of markedness. In cases documented by Watkins (1962) and Bybee and Brewer (1980), a third person singular verb form with an affix is reinterpreted as zero-marked, leading to the restructuring of a sub-paradigm. For instance, in some dialects of Provençal, the third person singular preterite suffix *-t* (as in *cantét* '3s sang') is taken to represent all the preterite rather than just the third singular, giving rise to a third plural form *cantéten* '3p sang' replacing *cantéren*.

Turning now to explanations for syncretization or neutralization, we find that a simple frequency explanation is sufficient, even if we distinguish between cases

where certain distinctions never developed and those in which a prior distinction is lost. For example, in the marked subjunctive mood, Spanish and French do not distinguish the present from the future, though such a distinction is made in the indicative. When the synthetic future developed in these languages, no subjunctive form grammaticized. In the marked and less frequent members of categories, further distinctions will not be of very high frequency and thus may not develop. Similarly, the distinction made in Latin between the Perfect and the Imperfective in the Subjunctive is not made in Spanish; this would be a case where a distinction in a marked member was lost due to its low frequency.

The preservation of irregularity in unmarked forms is very likely due to their frequency of use. It is well attested that high-frequency paradigms maintain their irregularity more than low frequency ones (Hooper 1976, Mańczak 1980); there is no need to search for a different explanation for the unmarked parts of paradigms resisting regularization. Due to high availability in the linguistic environment, the mental representation of unmarked forms can be very strong and accessible, making them unlikely to change. The same explanation applies to the tendency for the unmarked members to serve as the basis of analogical levelling when it does occur. Their higher frequency and greater accessibility in mental representation allows them to be chosen for the basis of new formations. While it is true that regularization or analogical levelling restores the diagrammatic iconicity by which the form reflects its semantic complexity, the actual mechanism by which such a diagram is restored has to do with the higher frequency of the unmarked form.

Are frequency and economy the same thing? Most discussions of economy or economic motivation begin with references to Zipf's Law, which states that 'high frequency is the cause of small magnitude' (Zipf 1935: 29, Haiman 1985, Croft 1990). Zipf's study of vocabulary in a number of languages revealed that high-frequency words are shorter than low-frequency words. This creates a kind of economy in that the words that are used more often take less effort to produce. DuBois's (1985) slogan 'Grammars code best what speakers do most' is more general but subsumes Zipf's Law. What is missing from these statements is explicit mention of how this pattern in language systems arises. Zipf cites clipping, as when *lab* is formed from *laboratory*, as the major mechanism. Some interpretations of economy treat it as an inherent principle that guides change in language systems (Mańczak 1978a). Such interpretations invoke an unfortunate teleology that makes change seem goal-directed.

In contrast, invocations of frequency of use are not goal-directed. Rather, it is claimed that frequency of use has certain effects on cognitive representation which lead to economy in retrieval and production of linguistic units. High-frequency items are stronger in mental representation and thus easier to access, making them more available to either resist change or serve as its basis (Bybee 1985, 1995). In production, repetition leads to the automatization of neuromotor routines; further

repetition leads to the reduction and overlapping of articulatory gestures which shorten the duration of the sequence of gestures that make up a high-frequency word (Browman and Goldstein 1992, Mowrey and Pagliuca 1995). Thus, the increase in efficiency in high-frequency words results from the way the general neuromotor system operates, and is neither restricted to language nor a conscious goal-directed process.

9. CONCLUSION: STRUCTURAL VS. EMERGENTIST VIEW OF LANGUAGE

Markedness was originally proposed in a purely structuralist context, as a generalization over numerous relationships between members of categories. Given the importance of structure, the attempt to analyse all such relationships as governed by one structural principle was an admirable goal. In structural theories, issues of language use are not considered important. Usually, issues of meaning are also left aside (Chomsky 1957), but in the case of Jakobson's theory of markedness, meaning was viewed as structured in the same way as form.

Linguistic theory and practice, especially in typological studies, is no longer so cleanly structuralist. It is recognized that not all linguistic categories have the same structure. Rather, it is not controversial to attend to the substance of the category in trying to understand its structure: thus, it is recognized that some phonological features may not be truly binary, many categories contain scalar relations, and so on. In addition, due to the work of Greenberg, the way language structure is created and changed in diachrony has become an important factor in explaining synchronic structure. Also because of Greenberg's contributions, the role of language use is now considered in formulating explanations for linguistic phenomena. Current theories of language are more emergentist: certain mechanisms of change are postulated; the substance of language (including the phonetic, morphological, and semantic) is subjected to repeated applications of these mechanisms as speakers and hearers use language; and as a result, what we think of as structure emerges in the linguistic material. Both iconicity and economy arise in this way, as do the structural phenomena associated with markedness.

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CHAPTER 8

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COMPETING
MOTIVATIONS

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JOHN HAIMAN

1. INTRODUCTION

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The recognition of competing motivations is very old in linguistics. Unlike Hugo Schuchardt (1885: 23), however, who saw 'a colourful interplay of innumerable drives' in shaping grammatical patterns in language, it seems that functionalists, for the most part, recognize only two. Analogy and sound change, inherited from the 19th-century Neogrammarians, constitute the full roster of the usual suspects. Their opposition is revised, refined, and continued under different names in different functionally oriented theories. We see analogy motivated by the 'drive for clarity' (*Deutlichkeitstrieb*), versus sound change, which is substantially an outcome of the 'drive for comfort' (*Bequemlichkeitstrieb*) of Gabelentz (1891: 251); we re-encounter analogy as one aspect of 'iconicity' and sound change as a part of 'economy' in functional theories of the late 20th century (Anttila 1989, Langacker 1977, Haiman 1985); the recognition of the two underlies all recent studies in the theory of grammaticalization (see Heine, Claudi, and Hünnemeyer 1991: ch. 1 for a survey); most recently, we re-encounter them in the opposition of 'faith' versus 'unmarkedness' in the post-generative theory of optimality (McCarthy 2002: 13–14), and in the work of Grice and his successors in pragmatics (cf. Levinson 2000a: 6).

However they are named, all of these oppositions boil down to the recognition of the same pair of opposing forces that seem to affect grammatical structures. On the one hand, there is something like the speaker's need to communicate information clearly and in an orderly fashion (the 'drive for clarity' is also known as '(semantic) transparency' (Slobin 1975: 27, Langacker 1977: 110), 'perceptibility' (Kiparsky 1974: 263), 'material integrity' (Hagège 1993: 69), or 'faith' in Optimality Theory). In any theory that incorporates an idea of derivations, 'clarity' is whatever keeps the output of the derivation as near as possible to the input. On the other hand, there is the same speaker's urge to cut corners as much as possible in communicating (Zipf's 1935 'principle of least effort' has been frequently renamed and rediscovered).

'Non-functionalists' (meaning here, specifically, all those who think that language is essentially 'hard-wired') may not agree with external motivations of any sort. But the overwhelming majority of sound changes, for example, as Bloomfield explicitly remarked (1933: 370), seem to be 'natural' in that they result in structures that are unmarked, which is to say most frequently occurring. They are most frequent, in turn, because they are produced with less effort—open, typically CV syllables, and the local assimilation of segments to each other. When Bloomfield (1933: 385) and others nevertheless famously proclaimed that 'the causes of sound change are unknown', their reason was that it is impossible to predict where and how these tendencies will become channelled and conventionalized in any language. For example, the lenition of consonants in intervocalic position is a universal natural process of assimilation, but it was only in the history of one language, Spanish, that it led specifically to the total loss of voiced alveolars and only these (*radice* > *raiz* 'root'; *credere* > *creer* 'believe'), and so on.

Conversely, the operation of analogy tends to be compatible with a communicative ideal of maximum clarity, since it aims at signalling every individual meaning with one single invariable form. Such a one-to-one or 'isomorphic' correspondence between meaning and form entails the elimination of purposeless and confusing variation (Bréal 1897: 26, Saussure 1974[1916]: 224, Anttila 1989: 89, Bolinger 1977: x). In the case of a pidgin, the same drive towards isomorphism entails the elimination of *all* inflectional morphology, a particularly troublesome source of allomorphy. It also frequently results in a consistent invariable word order, which can be labelled as the elimination of 'allotaxy' (Haiman 1985: 162)—different word orders for different transformations of underlying sentence types.

The reality of both sound change and analogy is presumably not in question. The extent to which the reciprocal demarcations and extensions of these opposing processes *are* language-specific (and thus not universally predictable) is the extent to which the grammar of such a language can be deemed 'autonomous'. And to the extent that the grammars of languages must be described independently of these motivations, to that extent the explanatory power of external motivations, like the principle of clarity or that of least effort, can be dismissed as Panglossian. For example, the palatalization of /k/ to /č/ before front vowels is a natural assimilation process, and recurs in the diachrony and the synchronic morphophonological alternations of dozens of unrelated languages. It is encountered in Italian in words

like /amiči/ 'friends' (singular /amiko/). However, there are many Italian cases where such a palatalization fails to occur in exactly the same contexts: the plural of /banko/ 'bank' is /banki/. The result of this failure is that the singular and plural stems for words like 'bank' are the same: the resulting paradigm coherence can be seen as the working of analogy (in traditional grammar; cf. Saussure 1974[1916]) or of 'faith' (in Optimality Theory), but it is impossible to predict the ranking of sound change versus analogy, or their notional equivalents, in Italian. One might say that the autonomy of this infinitesimal fragment of Italian grammar resides precisely in the fact that the forms cannot be predicted. Both sound change and analogy can be thought of as hostile states which rule within their own domains, but the often complex 'frontiers' of these hostile states need to be specified in ways which are peculiar to Italian, rather than on the basis of general principles.

This brings us, however, to a number of languages which have been described by some of the people who knew them best as 'having no (autonomous) grammar' at all, or at least very little. Such a claim has been commonly made of isolating languages like Chinese (cf. Humboldt 2005[1826], Newnham 1971: 99), of American Sign Language (cf. Tervoort 1968), and of most pidgins. Political correctness aside, it seems eminently reasonable to claim that pidgins have no grammar—after all, if they did not have an absolute minimum of grammar, why would they be worth learning and using at all? In fact, 'defenders' of even the autonomy of Chinese grammar quietly concede the point when they say that the order of words and phrases in the production and interpretation of a structure is largely determined by 'semantics and pragmatics' rather than by any fixed and independent rules of grammar (Li and Thompson 1981: 19 thus repeat almost verbatim Humboldt's words of 2005[1826]: 47, 52). Perhaps such languages can offer unmediated evidence for the reality of competing motivations.

Cambodian (Khmer) is an isolating language like Chinese with perhaps even less in the way of a conventionalized grammar. Its sparse derivational morphology is largely infixing or prefixing; syntactically, heads (generally) precede modifiers, operators (verbs and relational words) precede operands; and in measure/extent phrases, numerals and other quantifiers precede the units which are quantified (e.g. *pi: maong* 'two hour' means '(for) two hours', as opposed to *maong pi:* '(at the) hour (of) two'). Beyond this, there is very little autonomous grammar to describe. There is not even much evidence for the reality of larger syntactic units like a Noun Phrase consisting of Noun + Adjectives + Measure Phrase, let alone more dubious entities such as VP and S. We might predict that such a language will provide ample direct evidence both for the principle of least effort and for the drive for clarity. And we find that this prediction is largely true.

To begin with the principle of least effort. Cambodian is an 'everything-drop' language. Consider the four representative samples below:

(1)   Cambodian

   a. wisseh   rau:k   kmian   tee:
      special   seek   not-exist   not
      '(You) (are) special(;) (I /one) seek (but) there is not (anyone like you).'

   b. knyom   do:c   cia   prawhael   _____   muk!
      I   like   be   about   face
      'I was just about sure (I) (recognized) (your) face.'

   c. lngiac   trawlawp mau:k   _____ bawbaw: ruam
      evening   return   come   porridge together
      '(In the) evening (we) come back and (eat) porridge together.'

   d. juvaucaun li:w   sot tae_____sbaek ceu:ng kawng la:n
      youth   unmarried only   skin   foot   tyre   car
      'A young single man only (wearing) shoes made from rubber tyres.'

There is no purely structural or grammatical characterization in Khmer of what constitutes a 'recoverable' deletion. In (1a), it is mainly nouns and pronouns that are left unexpressed, but in (1b), it is also the main verb 'recognize'; in (1c), it is the main verb 'eat'; and in (1d), it is the main verb 'wear', which are mentioned nowhere in the purely textual context. The massive amount of ellipsis in normal prose of nouns (including classifier nouns), verbs, prepositions, and conjunctions messes up even the rudimentary quantifier placement rule which I mentioned above. In what looks like a typical NP, consisting of head noun, quantifier, and classifier, in that order:

(2)   Cambodian
     cru:k   pi: kba:l
     pig   two head

the quantifier *pi:* 'two' precedes the unit of quantification, the classifier *kba:l* 'head'. But since post-numeral unit classifiers are largely optional (or subject to deletion), expressions like *cru:k pi:* 'two pigs' also abound. These are noun phrases in which the quantifier seems to follow rather than precede the only visible unit that is quantified. Heads are also free to drop, so that it is perfectly acceptable to say:

(3)   Cambodian
     pi: kba:l
     two head

All this potential for massive confusion is the price that Cambodian speakers can apparently pay for adhering to a principle of least effort.

Conversely, there is no strictly structural criterion for obligatory deletion either. Cambodian is an 'anything goes' language, whose prose sometimes seems to approximate a Jackson Pollock canvas, with massive semantically unnecessary redundancy.

Extra words and phrases are slapped onto a frequently invisible (often, but not always) SVO 'skeleton' structure. They seem to be motivated not by any autonomous principles of grammatical structure but by other drives. Consider these fragments:

(4) Cambodian

    a. pum deung cuaj cro:ng craeng p'o:n ja:ng mec tee:
       not know help support support younger brother kind how not
       '(You) can't help younger brother.'

    b. meut daw smawh trawng mneak   dael poh   vian kmian bawt
       friend very honest honest one-person who stomach twist not-be fold
       cawntiah koat nijiaj sdej avej   ta:m trawng awh   pi:
       spring-coil he speak greet anything follow honest exhaust from
       poh   pi: paw:ng
       stomach   from animal-stomach
       'a totally honest comrade, a straight shooter who spoke from the gut.'

    c. daoj jau:k ksae ko: teang cawngwa:j mau:k caw:ng
       by bring rope cow all tied-up-around come bind
       trawng sawnlak daj tbaeng reut awh tumheung
       direct joint hand tight tight use up tightness
       'they got a cow tether and bound my wrists up tight.'

In (4a), the notion 'not' is expressed twice, by the words *pum* and *tee*. The notion of 'helping' or 'support' is expressed three times, by *cuaj*, *craeng*, and *cro:ng*. In (4b), the notion of 'honesty' is expressed no less than five times: three times by the words *smawh*, *trawng*, and *ta:m trawng*; and twice more by the doubled metaphors *poh vian kmian bawt cawntiah* 'having a gut without twists, without springlike coils' and *pi: poh pi: paw:ng* 'from the gut, from the (animal's) gut'. In (4c), 'tying up' is repeated twice, as *cawngwa:j* and *caw:ng*, while 'tight' is repeated three times, as *tbaeng*, *reut*, and *tumheung*.

The only 'available' explanation for such gratuitous padding in common currency is some version of the principle of clarity. (Note also, and in particular, that examples of seeming prolixity such as these could be blamed on the idiosyncratic *style* of individual speakers/writers and hence, properly speaking, are not part of *grammar* at all. We will return to this issue in the conclusion.)

Finally, whether a given word is acting as a noun, verb, measure unit, or preposition in Cambodian is determined not by any inherent grammatical categorization prescribed by the grammar of the language, but by the immediate communicative needs of the speaker at the time. All verbs can act as nouns or nominalizations; most prepositions are also verbs; and so forth. The production and interpretation of any utterance in Cambodian would thus seem to be regulated by the direct interplay of drives that are largely unconventionalized.

Nevertheless, it is in this language, more than many others, that there is direct evidence not only for the familiar principles of clarity and least effort, but also for a

third drive distinct from these two. Not all the padding that we observe can be explained by a need for clarity or for a related desire for emphasis. Rather, the more one examines Cambodian, the more it seems to be a language which, in effect, encourages speakers to say things 'in pairs' (Fox 1988) or twice in a row: it is common to find hundreds of symmetrical compounds not only of phrases (e.g. *pi: poh pi: paw:ng* 'from gut from animal's gut' in (4b) above) but also of individual nouns and verbs (e.g. *smawh trawng* 'honest' also in (4b)). These are roughly comparable to English examples like 'law and order', 'cease and desist', 'heart and soul', and 'last and final', but while in English and related languages such binomials are apparently limited to a small number of noun, verb, and adjective formulas, in Cambodian, we encounter items acting as conjunctions, prepositions, adverbs, and aspect markers that are similarly paired as well. Thus, both *baeu* and *prawseun* mean 'if'. They may be used interchangeably but also in tandem, in either order. Similarly, *ruac* 'escape' and *haeuj* 'finish' may both be used as completive aspect markers, and also may occur in tandem. We will begin our survey of evidence for this third 'aesthetic' drive by considering the drive for non-referential symmetry in Cambodian and comparable decorative frills in other languages.

2. DECORATIVE MORPHOLOGY

That the Cambodian predilection for symmetrical compounding goes beyond any need for clarity is attested by the fact that there are not only synonym compounds but also hundreds of 'twin words' and phrases of the 'razzle dazzle', 'jibber jabber', or 'flim flam' type, wherein one of the elements in the (most often alliterating) symmetrical compound is quite meaningless. Such meaningless alliterations or rhyming words are called *bo'ri'va: sap* 'servant words' in Cambodian, and they are encountered everywhere. Ourn and Haiman (2000) catalogue several hundred, but this is a very preliminary interim finding, based on a handful of texts. Speakers will recognize and accept utterances without servant words, since they add nothing to the meaning. But it is impossible to sound like a good speaker of Khmer without using them occasionally (cf. Nacaskul 1976: 874–6, Roffe 1975: 285 on the purely aesthetic basis of such doublets not only in Khmer but also in other languages of the Southeast Asian linguistic alliance, among them Thai, Malay, Burmese, and Lao). And *really* good speakers seem to be able to make them up as they go. It can be shown that the motive for the production of this feature is aesthetic rather than (like the principle of least effort and the drive for clarity) a cognitive utilitarian one.

There are two schools of thought about the origins of such meaningless decorative words. The first, a version of the familiar functionalist 'decay' theory, is that they (like

English *kith and kin*) must have originated as alliterating synonyms, like the pair *klee:c kli:* 'knead massage'. There are very many such alliterating synonym pairs in Cambodian (cf. Ourn and Haiman 2000: 502–3). The decay theory suggests that in the course of events, one word (or possibly both) may have ceased to appear independently and thus come to seem to be a meaningless form. This position is so sensible that it is rarely articulated for such 'twin forms', and it is more or less tacitly assumed by scholars like Hock and Joseph (1996: 169), Ourn and Haiman (2000: 483), and Wälchli (2005: 126–7). The other 'whole cloth' school, however, maintains that servant words are made up for euphony by speakers on the spot and thus have no etymology (Maspéro 1915: 226, Gorgoniev 1966: 73). A current example of such a nonce made-up form seems to be *wu:m wiak* '? + surprise'. Later in their careers, according to the 'whole cloth' theory, these made-up forms may come to seem to be alliterating synonyms and acquire an independent cognitive dimension, like a statue coming to life or an Escher drawing emerging into a third dimension.

Which of these is the likelier correct theory? Note that the existence of a large number of indeterminate borderline examples, such as *pkoap pkun* 'satisfy' (where it is unclear whether the two words are actual synonyms or one of them, in this case the first, is purely decorative), is compatible with either theory. Note also that it is notoriously hard to find reliable etymologies for such doublets even in familiar, well-studied languages (cf. Malkiel 1970: 353).

Surprisingly, the evidence within Cambodian favours the 'whole cloth' theory. There are three reasons to believe that speakers of Cambodian constructing such compounds are or were originally motivated by a purely formal quest for a good alliteration rather than by any cognitive search for a good synonym.

Consider first the widespread existence of alliterating pairs whose de facto 'junior' or 'servant' member has a meaning totally unrelated to that of the 'senior' word and the resulting compound. Examples include:

(5) Cambodian

    a. bawnlae   bawngka:
       vegetable   protect
       'vegetables'

    b. bawnlae   bawnlawm
       vegetable   confuse
       'confuse'

    c. bawnlae   bawnlawp
       vegetable   turn (tr.)
       'entertain, distract'

The same word (in each of these examples, *bawnlae*) may play the referential role in one compound (thus (5a)) and a purely decorative 'servant word' role in others (thus (5b) and (5c)). It is clear that the junior word in such pairs has been

conscripted to be a servant word on the basis of its sound rather than its sense. Other words of this quite common type include:

(6) Cambodian

    a. ponma:n   pontae
       how much   but
       'but'

    b. kawmlang   kawmhaeng
       strength   shout to scare away
       'force, strength'

    c. lveu:ng   lvej
       vast   slow
       'vast'

Consider second the (apparently much smaller) group of symmetrical compound words where the junior member includes a root that is synonymous with the senior word, but where this root has been tricked out with a meaningless prefix or infix to make it alliterate with the senior word, much as in the English expression *kit, cat, and caboodle*. Examples include:

(7) Cambodian

    a. mho:p m-ha:
       food (< *aha:* 'food', but the prefix *m-* is meaningless here)
       'food'

    b. praw-hak prawhael
       like, about (< *hak* 'like', but *praw-* has no meaning here)
       'like'

    c. d-awm-kom dawmkaeung
       raise (< *tkom* 'gather', via the insertion of a meaningless infix *-awm-*)
       'carry upwards'

    d. kawndaoc kawnd-aeng
       lonely (< *aeng* 'self', via the insertion of the meaningless prefix *kawnd-*)
       'lonely'

    e. dawng-ho: dawnghae
       procession (< *ho:* 'flow' (?), but *dawng-* is meaningless)
       'parade, procession'

    f. srawngo:t s-raw-gnat
       sad (< *sngat* 'quiet', via the insertion of the meaningless infix *-raw-*)
       'sad'

The motive for such non-referential affixation is clearly aesthetic—or at the very least, the drive for parallelism is something other than cognitive, and definitely not economic.

Finally, consider the fact that some of these compounds (like *wu:m wiak* 'surprise') are recognized even by 'conservative' speakers as neologisms or nonce formations. (Conservative speakers are those, like Noeurng Ourn (p.c.), who maintain that servant words are a fixed and learned part of the vocabulary. 'Liberals' are those who, like Maspéro and Gorgoniev, believe that they may be made up ad hoc.)

In addition to these three varieties of direct evidence, we should add the weaker indirect evidence of so-called *wiseh kun niam* 'intensive modifying' words, which function approximately like English *pitch, brand,* and *hopping* in expressions like *pitch black, brand new,* and *hopping mad*. Like all Cambodian modifiers, they follow the word they modify. They all mean something like 'very'. Cambodian has a surprisingly large number of these: the modifier occurring only after the unique word that it modifies. Representative examples include:

(8)   Cambodian

    a. kra:h   kleuk
       calloused   INTS

    b. kheung   crawlee:t
       angry   INTS

    c. huj   tko:l
       smoky   INTS

    d. ngawngeut clawp
       dark   INTS

    e. reak   kawmphael
       shallow   INTS

    f. kdav   caeh
       black   INTS

    g. haeum   prawmawl
       swell   INTS

    h. lveung   s'o:k
       yellow   INTS

This list (which could be considerably extended) is suspicious: why should there be so many different words, all meaning 'very', all with such limited distribution? A possible answer to this question is that there are not. Each of these words, presently labelled as intensive modifiers, may have originated as a (near-) synonym of the word it now is perceived to modify. What they all have in common is the fact that they fail to rhyme, alliterate, or otherwise echo the word they are bound to. If they did, they might more likely be classified as 'servant words'. That is, it may be that formal symmetry is the all-but-exceptionless prerequisite for servant words (cf. Ourn and Haiman 2000: 504–8), and the absence of this symmetry leads speakers/ linguists to assign other now meaningless words some other asymmetrical

function—in this case, that of acting as modifiers. The grammatical label is thus brought into congruity with the formal phonological fact. By 'congruity', the formal (phonological) symmetry of conjuncts entails that they will be interpreted as examples of syntactic coordination (a symmetrical A+A relation). Formal phonological asymmetry, by congruity, entails the syntactic asymmetry of head + modifier (A+B). (We will return to the possibly aesthetic basis of 'congruity' between different levels of linguistic structure in section 4.) This conjecture entails the hypothesis that (unlike 'servant words') 'intensive modifiers' do have etymologies—even if these are presently unknown.

The monolingual Khmer *Dictionnaire Cambodgien* of 1938 (reprinted in Phnom Penh in 1967 and, most recently, in Tokyo in 1989) echoes Mr. Ourn in identifying many of these 'intensive modifiers' as 'words used to heighten [...]' or simply 'words used together with [...]' the words they follow. But in a handful of cases, they are identified as having a meaning of their own. Thus, *kawmphael,* which occurs after *reak* 'shallow', is also glossed as 'shallow' (p. 61); *l'o:t,* which occurs after *leung* 'yellow', is identified as the name of a kind of (red?!) bird (p. 1146); *kawkok,* which appears after *kda* 'hot', is identified as 'still hot' (p. 122). (The dictionary, however, cannot be recognized as the final authority. In a number of cases, it includes no entries for modifying words which occurred in modern texts, and which Mr. Ourn recognized and provided glosses for.)

Being virtually forced to recognize at least the consequences of a purely esthetic drive for formal symmetry in Cambodian, it is interesting for us to see whether other languages allow us to witness any comparable 'decorative morphology' in action under more familiar guises. It is immediately apparent that many other languages of the Southeast Asian linguistic area—including Chinese, Vietnamese, Hmong, and Thai—manifest the same predilection as does Cambodian for non-referentially symmetrical expressions at the word level and higher (for Chinese, compare Newnham 1971: 101–7, Li and Thompson 1981: 68–70; for Vietnamese, Nguyen 1965; for Thai, Vongvipanand 1992; for Hmong, Ratliff 1992; for a pioneering survey of such constructions around the globe, mainly in Indo-European languages, see Pott 1862). Now the mere existence in English of twin pairs such as *razzle dazzle* may be dismissed as a marginal and above all purely lexical fact of that language. It is indicative that Marchand (1960), the authoritative compilation of the types of word formation in English, should devote only the briefest of chapters to a description of such 'twin forms'. But there are cases where this same tendency of repetition for the sake of symmetry is more deeply embedded in the morphological nuts and bolts of the grammar.

It has been suggested that the grammatical agreement which is so widespread in inflectional languages may be an outcome of the same once purely decorative drive:

It might be worth exploring the possibility that agreement persists and even spreads in response to the same kind of factors at work in the conventionalization and persistence of

rhymed word-pairs, prose rhythms, patterned repetitions, and the like. (Barlow and Ferguson 1988: 17)

It is not so much the agreement of verbs with subjects and objects which is in question here: personal verbal desinences can often be identified as eroded pronouns (as scholars from Horne Took, through Bopp 1985[1816] and Paul 1995[1880: 310–11], to Givón (1979) have proposed). But the agreement of modifiers with their heads is a pattern for which no such etymological history can be motivated. It may be that such agreement originated as the result of a purely phonological drive to make adjacent units rhyme or alliterate (cf. Paul 1995[1880]: 187, Zuraw 2002: 395). As a homely consequence of this drive, a borrowing into English like the original *smorgasbord* becomes *smorgasborg*, while a borrowing in German like *Ramadan* becomes *remmidemmi*.

Note that for all the attempts to motivate agreement functionally, it is clearly cognitively redundant—as witness most strikingly the number of languages in which it is totally absent (cf. Paul 1995[1880]: 304)—or, even worse, wildly counterintuitive (Hagège 1993: 78–85). There are, for example, languages where every constituent in a clause agrees in number and gender with the subject or the first NP; others in which verbs agree not only with their own subjects but with the subject of the following clause; and so forth. As one of our foremost authorities on the subject of agreement has written, 'If we ask [. . .] why [agreement] occurs at all, then we find that our understanding is limited' (Corbett 1983: 1). Perhaps we can ask ourselves why grammatical agreement exists by observing where it comes from. There are few instances where we can observe head–modifier agreement *in statu nascendi*, but a very suggestive one occurs in varieties of New World Spanish.

Given the status of final /-s/ as a sociolinguistic variable in these varieties, it is possible for each of the final consonants in a noun phrase such as *la-s chica-s bonita-s* 'the pretty girls' to be lost. The principle of least effort would tend to favour the loss of all three. The principle of maximum clarity would tend to favour retention of all three. A 'compromise' between the two would favour retaining only one. What Poplack (1980, 1981) discovered instead was an overwhelming tendency to preserve 'concord at the string level', also (and better) known as the rhyme: if the final -s was retained in the first word in such a NP, there was a tendency to retain it in all three words (with massive redundancy, incompatible with the principle of least effort); if the final -s was lost in the first word, there was a tendency to lose it in all three (with the attendant irrecoverable loss of meaning, totally incompatible with the principle of clarity). The least common result was the sensible compromise between the countervailing tendencies of laziness and clarity (retention of -s in only one word). As Labov (1994: 559) correctly observed, Poplack's results argued against 'functionalism'; however, this is true only insofar as functionalism is synonymous with 'utilitarianism' and recognizes nothing but the two opposing principles of Gabelentz. If 'functionalism' means the opposite of 'hard-wiring', insofar as it

accepts external motivations for linguistic forms, then a drive to decorate can also be viewed as an external and hence 'functional' motivation.

Nor are the conventional inflectional categories of number, gender, and case the only material which is exuberantly copied onto sites where it has no strictly cognitive business. The same is notoriously true of discourse articles like Russian *-to* (Haiman 1999), American teenspeak *like* (Underhill 1986 and Romaine and Lange 1991 are two attempts to characterize the distribution of the particle semantically, but it is obvious that its uses have overflowed these borders), and affectionate diminutives in Spanish and possibly other languages (Gooch 1970). In the course of being so copied, particles may well end up with an entirely characterizable new grammatical function. But the radical (not really 'analogical') extensions which led to their present distribution are no more cognitively motivated than the reproduction of agreement categories in familiar languages like Russian.

3. PATTERNS FOR THEIR OWN SAKE

The drive to conventionalize may itself be viewed as an outcome of a purely aesthetic tendency. For many students of grammaticalization since Meillet (1912), conventionalization or grammaticalization is no more than an aspect of the familiar drive to erode: words become affixes by the same tendency as morphemes are ground down to phonemes. But this model will not do nearly so well in accounting for the presumably related process whereby pragmatically motivated structures are syntacticized (Givón 1979: ch. 5). Nor, indeed, will it account for at least some of the phenomena of grammaticalization. There is more going on than mere erosion. As students of the phenomenon have noted, grammaticalization frequently entails obligatorification (Jakobson 1971d[1958], C. Lehmann 1982, 1995). A pattern which was one of several, and optional, becomes the only pattern, and obligatory. An often-cited example is the evolution of the distribution of the auxiliary verb *do* in English from the apparent randomness of Shakespearean English to the crystalline structure of the modern language.

This is, of course, what analogy is all about in traditional discussions. But in these discussions, it has always been stated that the final motive for analogical extension or levelling is the drive to make one meaning correspond to one form— and hence, the drive is ultimately a cognitive one for transparency. (Recall Saussure's classic example of the nominative Latin *honos* 'honour' becoming *honor* to conform with all the oblique cases where intervocalic /s/ had become rhotacized.) There are, however, many cases where paradigm coherence or uniformity is imposed at a cognitive cost: semantic distinctions and clarity are lost for the sake

of a pattern that is 'tidy', but has no basis other than tidiness for existing, and which is frequently confusing.

A notorious example of non-referential tidiness is provided by the verbal paradigms of Athabaskan languages. On the face of it, these are languages in which it seems that sound changes have completely trumped material integrity, faith, or paradigm coherence. Verbs occur with a bewildering series of prefixes which spell out verb class, aspect, mood, transitivity, voice, and both subject and object person and number. Both root and prefixes are subject to complex phonological rules, so that a 'regular' verbal paradigm with a consistently identifiable stem is extremely hard to find. But precisely in these languages, verbs which have no syllabic etymological prefix (typically, present tense, 3SG intransitive assertives) are essentially provided with a meaningless syllabic prosthetic 'peg' to make them conform with the otherwise prevailing type (cf. Cook 2004: 14 for Dene *he-* ; Faltz 1998: 524 and passim for Navajo *yi-*; Rice 1989: 133, 149 and passim for Slave *(h)e-*). Thus, in Dene, *Ne-jɛn* '2SG-cry' consists of just the subject person-number prefix and the root, but in the first and third person singulars (prefixes 1SG *s-*, 3SG *φ-*), the word lacks a syllabic prefix, and so the meaningless peg *he-* comes to the rescue:

(9)   Dene
    1SG   *s-jɛn*   becomes   *he-s-jɛn*   'I am crying.'
    3SG   *φ-jɛn*   becomes   *he-φ-jɛn*   'She is crying.'

In the same way that *he-* is a placeholder prefix in Dene, so *do* is a placeholder auxiliary in English, a meaningless default quasi-verb that is supplied in marked finite clauses when no 'real' (i.e. meaningful) auxiliary is present (Chomsky 1957). And so too is *it* a meaningless placeholder quasi-noun phrase in sentences with extraposed sentential subjects, inserted to 'conform with the prevailing pattern', (e.g. *It is shocking that Massachusetts voted Republican*), as students since Jespersen have recognized.

A curious parallel to this fleshing-out process occurs in modern colloquial English, possibly motivated by a similar kind of aversion to the isolated unmarked form. It is common to repeat a bare unmodified noun with the meaning 'unmodified, typical, standard', as in *Maybe you should get a job job*, meaning, of course, a real job (cf. Ghomeshi, Jackendoff, Rosen, and Russell 2004) as opposed to a·*part-time job*, or a *fake job*, and so on. The result is that the meaning 'zero' is spelled out by some morphological material in modifier position. No information is lost here, but neither is there a correspondence between a zero meaning and a zero form (which, as Benveniste 1946 and others have pointed out, is the frequent outcome of a presumably universal iconically motivated drive to represent the non-person [3SG] by the non-desinence zero).

A much more restricted phenomenon of the same avoidance of motivated zero occurs in Vallader Romantsch, and was discussed in detail in Haiman (1971). In the inverted (i.e. interrogative) Verb–Subject order, the second person plural verbal

desinence etymologically should be something like *-ais < -atis*, as it is in other Romance (and Romantsch) dialects. In Vallader, however, it is *-aivat* (first conjugation) or *-ivat* (other conjugations). In the fourth conjugation, the result is that the present ending is identical with the imperfect: perhaps it was 'borrowed', with the result that *finivat* 'do you finish/were you finishing?' is ambiguous; *chantaivat* 'are you all singing?' is distinct from *chantevat* 'were you all singing?' in the first conjugation, but the question still arises as to where the extra syllable came from. Minimally confusing though it is, paradigmatic borrowing satisfies an otherwise general pattern in this dialect; that in the inverted word order, all verbs have penultimate stress. This would seem to be a quite typical case of analogical extension but for the fact that it results not in a cognitively satisfying 'one meaning—one form' correspondence, but in an etymologically unmotivated ambiguity.

In his well-known discussion of linguistic drift, Sapir proposed a similar motivation for the loss of the oblique form of the English interrogative/relative pronoun *who(m)*.

There is something unaesthetic about the word [*whom*]. It suggests a form pattern which is not filled out by its fellows [*which, what, that*]. The only way to remedy the irregularity of form distribution is to abandon the *whom* altogether [...]. Once this is done, *who* rejoins its flock, and our unconscious desire for form symmetry is satisfied. (Sapir 1949a[1921]: 156–7)

Again, this is not quite a classic case of analogical extension, because it is one which is presumably not motivated by any cognitive drive: information is lost in the process. Tidiness (the elimination of an isolated form which inflects for case) comes at a referential cost.

Bally (1926: 39, 51) proposed that a similar quest for tidiness may have played a role in the replacement in colloquial French of the 1PL suffix *-ons* by the pronoun *on*. With the loss of all desinential endings but the 1PL and the 2PL, spoken French has gone a long way towards becoming a prefixing, rather than a suffixing, language: all-but-totally obligatory subject clitics now act effectively as prefixed subject person/number markers on verbs. Bally (1926: 77) noted, in the same way, that the category of number in nouns is audibly marked on (pronominal) articles rather than in the orthographically present but inaudible suffix *-s*. Perhaps there was 'something unaesthetic' about these two increasingly isolated verbal suffixes. Aided by the semantic plausibility of expressing 1PL by the pronoun morpheme which expresses the generic person, and by the phonetic identity of these two, a restructuring occurred. Essentially,

(10)   Verb + suffix   >   prefix + Verb
       1   2   2   1

Triumphant confirmation of Bally's conjecture would be provided by the loss of the 2PL desinence *-ez* or its replacement by a prefix.

4. CONGRUITY BETWEEN PATTERNS

A striking property of the symmetrical Khmer compounds of section 2 is that they alliterate much more often than they rhyme. From a typological and comparative point of view, this is quite unusual. English is in this respect a typical language: there are a number of pairs that rhyme (like *razzle dazzle*) or are assonant (like *flim flam*), but hardly any that are exclusively alliterating (like *kit, cat, and caboodle*) (cf. Pott 1862, Marchand 1960). It may be that the Khmer penchant for alliteration is a purely areal phenomenon: Hmong, Vietnamese, and Thai also are characterized by alliterating twin forms, to the virtual exclusion of other types. But there may also be a structural basis for this peculiarity. Ourn and Haiman (2000) noted that the Southeast Asian languages with alliteration tended to be either prefixing languages (like Khmer and Thai) or perhaps on the point of becoming prefixing languages (like Hmong; cf. Ratliff 1992). The connection between these two structural facts is a kind of congruity between phonological and morphological structure. In predominantly suffixing languages, contrasting material will tend to occur at the beginning of the word (since suffixes, as members of closed paradigms, will tend to be recurrent and ergo non-contrastive): this will lead to rhyming structures. Conversely, in predominantly prefixing languages, contrasting material will tend to occur after the beginning of the word for the same reason: this will lead to alliterating structures.

Other examples of congruity are easily found. Consider the observation (Chomsky 1965: 12–14) that intonation does not correspond to the syntactic or semantic bracketing of repeated right-branching relative clauses, as in:

(11) This is the dog [that chased the cat [that ate the rat [that stole the cheese]]]

Indeed, it does not. But it corresponds perfectly to the segmental texture of the sentence:

(12) This is the dog . . .
          that chased the cat
          that ate the rat
          that stole the cheese

The congruity between intonation and the repeated segmental rhythm of the chunk {that+V+NP} overrides the possibility of congruity between intonation and semantics.

'Iconic motivation' is another example of congruity, in this case between a linguistic and a conceptual structure (cf. Haiman 1985). In spite of some brave claims that iconic structures are easier to store and manipulate than symbolic ones, and hence cognitively motivated (cf. Givón 1985: 189), the little evidence available seems to indicate that this is not the case (Bellugi and Klima 1976 show that in

American Sign Language, where iconicity is much more widespread than in spoken languages like English, words are stored in memory not in terms of their iconic properties, but rather in terms of their purely formal features). Moreover, even in nonce communication systems that originate as iconic charades, motivation is abandoned, often within less than an hour (Bellugi and Klima 1976, Bloom 1979). If so, why do languages persistently favour iconic means for the representation of concepts such as symmetry or repetition? Perhaps such humble devices as reduplication are used iconically not because there is anything which makes *orang orang, raja raja* ('men' and 'kings', respectively, in Indonesian) cognitively superior to *men* or *kings*, and most certainly not because Indonesian is somehow a more primitive language which reflects a proto-human state of language when charades were the only communicative medium available. Rather, iconicity may exist simply because ordinary people take some aesthetic pleasure in painting the thing as they see it.

5. CONCLUSION

The preceding fragmentary discussion has dealt with both syntagmatic and paradigmatic cases of non-referential symmetry. That is, there seems to exist a drive for such symmetry which is independent of and sometimes directly opposed to both the familiar drives for clarity and economy. Given the role of symmetry in art, such a drive may be characterized as aesthetic. But the parallel between language and art goes deeper. The very drive to represent is, of course, the source of many kinds of art, but it is also the characteristic function of language. Perhaps all kinds of representation, made possible by our unique capacity for imitation, have a basis that also could be characterized as aesthetic. Our mimetic productions are subject to erosion and analogy, but what drives us to engage in them in the first place?

Whether or not we believe ourselves to be biologically unique in having language, any version of the uniformitarian hypothesis suggests that the miracle of language genesis is taking place as much under our noses now as at any time in the past. The conventional understanding of the engines of language change, however, has identified only two recurrent drives: sound change, which (very broadly speaking) wears language down, and analogy, which (again, very broadly speaking) tidies language up. Both of these drives are well attested, to be sure. But both of them have to take language (and ergo protolanguage) as a given. To go no further, then, to venture no hypotheses on original creations, requires that we adopt a kind of creationist stance about the origin of language. We have a relatively good

understanding of the forces in language that could be compared to geological erosion. But somewhere in language, there have to be forces analogous to vulcanism and tectonic plate shift (cf. Hopper 1990). In identifying a playful decorative impulse, albeit perhaps a less than totally regular one, we may take a step towards identifying some of the latter forces.

What seems to separate a playful drive for reproduction, decoration, or symmetry from the traditionally recognized drives is not only the fact that it does not seem to be motivated by a kind of 'bare bones' communicative utilitarianism, but also the fact that it seems that play is always conscious, while the traditional post-Saussurean understanding of langue is that it is a largely unconscious creation. This is how we contrast grammar, a cultural fact, with individual style. But perhaps this contrast is an untenable one. Even in the realm of phonology, the diffusionist model of sound change is explicitly based on the idea of imitation. (A change spreads from a source via the people who copy that source, further and further away from this source, fading in intensity as it goes until it 'dies out'—possibly because the prestigious originator of the change is too far away to be recognized and worth copying.) And imitation of any model at any level is always to some extent the result of a conscious decision.

In syntax and the lexicon, it may be said that style is *l'homme même*, a completely individual matter, but on the issue of where to draw the line between grammar and style, there has been and continues to be a great deal of debate. While in Chomskyan and post-Chomskyan linguistics all sentence-level syntax is emphatically a grammatical matter, it will be recalled that for Saussure almost all of it belonged to parole, where 'the individual is master' (Saussure 1974[1916]: 30). There is a sense in which modern fieldworkers are edging closer to the view of Saussure. Among them, there is a feeling that unconscious grammar is that portion of the language for which elicitation provides reliable results (Heath 1980: 4–5, Payne 1997), and much of what we call syntax falls outside that area. In his approving review of Payne (1997), a guide for fieldworkers, Bakker (1999: 273) puts it thus:

Elicited data are unreliable for word order, intonation, clause combining, sentence-level particles, among others, whereas elicitation is most useful for phonology, morphophonemics, and inventories of inflection, pronouns, and the lexicon.

If we take it that 'reliably elicited data' refers to what all speakers can be counted on to share, then we can identify it with langue. Saussure would probably have agreed entirely with Payne and Bakker. When we ascend to higher levels of structure than these, conscious individual manipulation—and with it, a playful or aesthetic impulse—is a reality. In many cases, such playful creations may become congealed as grammar, as the present sketch has tried to indicate.

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CHAPTER 9

....

CATEGORIES AND PROTOTYPES

....

JOHAN VAN DER AUWERA

VOLKER GAST

1. WHAT IS A 'CATEGORY'?
....

The term 'category' can be defined loosely as the label for a set of entities that share one or more properties and that are, thus, to some extent similar. These properties can be said to 'partition' some larger set of entities. Consider the set of linguistic entities (words) in (1):

(1)   {barks, barked, believes, believed, croit, croyait}

Several partitionings of this set are possible:

(2)   a.   {barks, barked, believes, believed} {croit, croyait}
      b.   {barks, barked} {believes, believed, croit, croyait}
      c.   {barks, believes, croit} {barked, believed, croyait}

In (2a), there are two criterial properties characterizing each of the subsets: in the first subset, the words are all English and they start with a *b*; in the second subset, the words are French and they start with a *c*. Bark, for instance, is thus 'categorized' as being English and as starting with a *b*. These criteria can be called 'formal'. In (2b), the criterion is semantic or 'notional': the words *barks* and *barked* relate to the concept of 'barking', and the other ones, to the concept of 'believing'. In (2c),

finally, the criterion is the distinction between present and past tense. This can be considered a semantic criterion as well, though some linguists may call the criterion 'formal' or perhaps partially formal and partially semantic, because present and past tense forms can also be used to refer to non-present and non-past time spheres. Note also that the partitioning in (2c) cuts across languages, even though it is not obvious to what extent the French present or past tense is the same as the English present or past tense, independently of whether one takes 'present' and 'past' to be formal or semantic categories. All that matters for now is that there is at least a certain degree of similarity.

In principle, all of the subset labels used so far—'English', 'French', 'starting with *b*', 'starting with *c*', 'present' and 'past', 'relating to barking' and 'relating to believing'—could be called 'linguistic categories'. In practice, however, they are not. There are two reasons. Either there is a more specific label, or the category is uninteresting. Thus, we do not normally call 'English' and 'French' 'categories', because we feel happy with calling them something else, viz. 'languages'. 'Starting with a *b*' and 'starting with a *c*' are not normally regarded as categories either, because the partition is usually not very interesting, except perhaps in lexicography. The same goes for 'relating to barking': we are not aware of any property of language for which the identification of a word as relating to the concept of barking would be useful. This is different for 'relating to believing' or, in another parlance, 'propositional attitude concepts'. This is a category found useful in semantics, and in relation to verbs, it is comparable to the traditional class of *verba sentiendi*. 'Present' and 'past', finally, are also bona fide categories. What the above examples thus show is that the inventory of categories used in linguistics basically depends on how useful these categories are for the description and analysis of language.

So far, the listings in (1) and (2) illustrate three categories. Implicitly, however, the listings illustrate several more. The entities in (1) and (2) are all verbs rather than nouns or adjectives, and they are finites rather than infinitives or participles. Let us call categories that directly partition relatively concrete linguistic objects 'basic categories'. Parts of speech are thus basic categories, but also specific form classes like 'present tense' and 'past tense' or 'singular' and 'plural'. Accordingly, basic categories correspond to properties of concrete linguistic objects. For instance, we can say 'the word *bark* is a verb', 'the verb *barked* is in the past tense', or 'the pronoun *they* is in the plural'.

Basic categories always stand in opposition to at least one other category which relates to the same aspect of meaning or form (e.g. 'present' vs. 'past' or 'singular' vs. 'plural'). Taken together, such contrasting basic categories form systems of oppositions, namely, a 'tense system' in the first case and a 'number system' in the second case. Now, 'tense' and 'number' are also often called '(grammatical) categories'; but if both 'number' and 'singular' are 'categories', there is bound to be confusion (cf. Dahl 1985: 21). This is the reason why we have used the attribute

'basic' for categories such as 'past (tense)' and 'singular', which allows us to distinguish them from 'higher' categories, such as 'tense' and 'number'.

There are, of course, other ways of establishing such a differentiation. For instance, we could simply find a different label for one of the two types of categories. This is done by Corbett (2000), among others, who regards 'number' as a category (2000: 1) and subsumes notions like 'singular', 'plural', 'dual', etc. under the term '(number) values'. However, one also finds linguists calling Corbett's 'values' 'categories', but 'number' a 'dimension' (see e.g. Haspelmath 2002: 61). The latter usage seems more typical of modern linguistics, but as will be shown in section 2, in philosophy the term 'category' is usually applied to 'higher' categories. What both types of categories have in common is that they refer to sets that consist of similar elements and that have resulted from the partitioning of some larger set. In the case of basic categories, the elements are linguistic objects (e.g. {barked, believed, . . . } for 'past'); higher categories, by contrast, can be regarded as sets of 'basic categories' (e.g. {present, past, future} for 'tense').

2. SOME HISTORICAL REMARKS ON THE NOTION OF 'CATEGORY'

2.1 Categories in philosophy

The term 'category' (Gr. κατηγορία 'accusation', but also 'predicate' or 'mode of predication') was coined by Aristotle in his treatise on *Categories* (cf. Barnes 1984: 3–24). Aristotle distinguishes between two types of judgements: 'thetic' and 'categorical' ones. Thetic judgements merely state a fact, whereas in categorical statements, some property is attributed to an individual or object. Simplifying somewhat, thetic statements have the form *A* (*is*) (e.g. *It rains*), while categorical statements always have the form *A is B* (*Socrates is short*). Among the categorical judgements, Aristotle distinguishes further between ten 'categories' (the examples in parentheses are Aristotle's): (i) *substance* (e.g. 'man', 'horse'), (ii) *quantity* ('four-foot', 'five-foot'), (iii) *quality* ('white', 'grammatical'), (iv) *relation* ('double', 'half', 'larger'), (v) *place* ('in the Lyceum', 'in the marketplace'), (vi) *time* ('yesterday', 'last year'), (vii) *position* ('is lying', 'is sitting'), (viii) *having* ('has shoes on', 'has armour on'), (ix) *doing* ('cutting', 'burning'), and (x) *being affected* ('being cut', 'being burned').

In the course of the centuries, several modifications of Aristotle's theory of categories have been proposed. Even though this is not the place to discuss these revisions, mention should be made of one prominent philosopher, Immanuel Kant. In *The Critique of Pure Reason* (see Kant 1927), he established a system of four interrelated

categories which was intended to represent the most simple and elementary concepts of human thinking. Kant's categories—made use of also by Grice (1975) in his theory of conversational implicatures—comprise: (i) 'quantity' (unity, plurality, totality), (ii) 'quality' (reality, negation, limitation), (iii) 'relation' (substance, causality, community), and (iv) 'modality' (possibility, existence, necessity). Just like the categories of Aristotle, those of Kant are 'higher categories'. Moreover, these categories are notional ones. The use of the word 'category' for formal and/or basic sets is a relatively recent phenomenon that is often lamented in philosophy as being inflationary and even downright wrong.[1] This seems worth mentioning, for in linguistics there is the opposite tendency: to use 'category' only for basic sets and to find new labels for higher categories (such as 'dimension'; see above).

2.2 Categories in linguistics

Even though Aristotle's theory of categories was largely based on linguistic observations (insofar as it described possible modes of predication and was closely related to the use of the Greek copula: 'What kind of predication can be expressed by saying x *is* y?'), the term 'category' was not widely used in linguistics until the 20th century. What is called 'grammatical category' today was known as *modus significandi* in the medieval (scholastic) grammar tradition (e.g. Thomas of Erfurt). With a few exceptions, 19th-century linguistics did not make use of the term 'category' at all. Comparative or descriptive linguists simply spoke of 'declensions' or 'conjugations' when referring to what we call 'inflectional categories' today, or used it only in a notional sense (e.g. Wilhelm von Humboldt). One of the first linguists who used the notion of 'category' for formal categories was probably Gabelentz (1901[1891]).[2] The word was established as a technical term in linguistics in the early 20th century and was used, for instance, by Jespersen (1924: 45–57) and Bloomfield (1933: 270), who provides the following definition:

Large form-classes which completely subdivide either the whole lexicon or some important form-class into form-classes of approximately equal size, are called *categories*. Thus, the English parts of speech (substantive, verb, adjective, and so on) are categories of our language. So are singular and plural substantives, since these two form-classes, of approximately equal size, completely subdivide the form-class of substantives. In general,

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[1] This is also witnessed by early mentions of the term 'category' in the *OED*, where its use as standing for 'class' is called a 'specimen of bad English': 'The following specimens of bad English [. . .] have been taken from despatches recently received at the Foreign Office [. . .] "category" for class'. *OED*, s.v. *category*, 1883.

[2] Since 'category' was still reserved for the notional use of the term at the beginning of the 20th century, Gabelentz uses the compound *Formkategorien* ('formal categories'): 'Von unerquicklichen Wortstreitereien ist auch unsere Wissenschaft nicht verschont geblieben. Jede Sprache hat ihre eigenen Formkategorien. Wie soll man die benennen?' (Gabelentz 1901[1891]: 63).

inflectional forms, what with the parallel occurrence in every paradigm, represent cate-
gories—for instance, the various forms of the verb-paradigm, including the congruence-
forms of finite verbs (*am* : *is* : *are* or *was* : *were*) and, crossing these, the tenses and modes of
finite verbs (*he is* : *he was* : *he were*). [emphasis original]

3. FROM NECESSARY AND SUFFICIENT CONDITIONS TO PROTOTYPES

So far we have taken the existence of categories for granted, for instance by saying
that *barks* and *croit* are both elements of the category 'verb' (in different languages).
But how and why do we know that these elements are verbs or present tense verbs?
How does 'categorization' work? This issue is, of course, a very general one and by
no means restricted to linguistics or even science (see Murphy 2002 for a state of
the art discussion of the nature of categorization).

In the *bark/croit* example, we have implicitly embraced the so-called 'classical'
model of categorization: sets of linguistic objects are neatly partitioned on the basis
of similarities. And indeed, parts of speech are sometimes defined in this way, with
respect to morphology and/or syntax. Consider the category of adjectives in the
Mayan language Tzotzil. Words can be classified as adjectives if they have the
following three properties: first, they can be used in a predicative or attributive
function (cf. (3)); second, they do not inflect for aspect (cf. (4)); third, they may
not project a (non-elliptical) noun phrase (cf. (5); see also Aissen 1987: 5).

(3) Tzotzil
     k'išin   vah
     warm   tortilla
     'warm tortilla'

(4) Tzotzil
     *ta   x-k'išin
     IND   ICP-warm

(5) Tzotzil
     *li   k'išin-e
     DET   warm-CL

Since these 'properties' or 'conditions' serve to define a (basic) category and
because they serve as criteria, they may be called 'definitional' and 'criterial'. Each
of these conditions is, furthermore, necessary, and they are jointly sufficient. This
'classical' way of categorization is often called the 'Aristotelian' model, or simply

the model of 'necessary and sufficient conditions'. According to this model, if a
given element does not meet one of the criterial conditions, it is necessarily
excluded, and if it meets all three conditions, it is necessarily included. Category
membership can thus be determined by 'checking' the relevant attributes, and for
each item, this will lead to either inclusion in or exclusion from the category in
question.

The 'classical' model of categorization will have its use in some domains, but it is
often at best only an idealization. With the advent of what we may broadly call the
'cognitive sciences' in the second half of the 20th century, this model of categori-
zation was challenged radically, i.e. more than by merely pointing out that it is an
idealization. Human categorization, it was claimed, should be regarded not as an
abstract logical process of 'feature checking' (a view sometimes referred to as
'objectivism'), but as involving perceptual and physical activity on the part of the
human subject. This new paradigm is sometimes called 'experiential realism' or
'experientialism' (cf. Lakoff 1987: xv). In experiential realism, human cognition is
intimately related to bodily experience associated with a broad range of connota-
tions. For instance, when we think of a bed, we do not primarily think of a set of
features that a bed necessarily exhibits; rather, we associate with that notion specific
perceptual experiences, like comfort and rest.

The idea of categorization being intimately related to perceptual experience had
an obvious impact on the question of how categorization works. One of the most
important consequences was a rethinking of the relationship between categories
and their elements as well as the attributes characterizing categories. While in the
classical model, categories or the (abstract) criterial attributes characterizing them,
on the one hand, and the entities to be categorized, on the other, are assumed to
exist independently, proponents of 'experiential realism' argued for a much tighter
connection between categories and real world objects. In particular, categories were
taken to be associated with and organized around particularly (cognitively and
perceptually) salient representatives. Today, this idea is commonly known as the
essence of 'prototype theory', and the most salient instances of a category are called
'prototypes' (sometimes also 'stereotypes', e.g. in the work of the philosopher
H. Putnam; cf. Putnam 1975: 169 ff.).

Among the most prominent early proponents of prototype theory is the psy-
chologist Eleanor Rosch, who carried out a number of groundbreaking experi-
ments in the 1970s (e.g. Rosch 1973a, b, 1975a, b). Rosch showed that there are very
clear intersubjective (though culture-specific) intuitions as to the degree to which a
given element is 'representative' or 'typical' of a category. For instance, the category
'fruit' was shown not to be represented cognitively as an unordered set of elements
meeting the biological criteria for being fruit. Rather, in western Europe, most
people think of specific types of fruits—for instance, an apple—when hearing the
word *fruit*. By contrast, plums, pines, and olives are less typical representatives of
the category fruit, with a decrease in prototypicality from left to right (cf. Rosch

1973a: 130 ff.). What the research done by Rosch shows is that (lexical) categories such as 'fruit' are, when cognitively seen, not just unordered sets but structures with a complex internal organization.

The same point was made in a cross-linguistic study on colour terms carried out by Berlin and Kay (1969); this study showed that perceptual salience has a strong, language-independent impact on lexical categorization. While languages (and even individual speakers of languages) tend to partition the colour spectrum in different ways—for instance, insofar as they use a different number of basic colour terms—for a given colour, it is usually more or less the same shade that is identified as the most typical representative. In other words, while languages may differ as to whether they have different names for red and orange, or whether they lump together red and orange under one term, there are striking correspondences as to the most typical shade of any given colour. For instance, the typical tone of *green* identified by speakers of English is very similar to the relevant tone of *midori(iro)* identified by speakers of Japanese, irrespective of the actual range of colours covered by each term (cf. Berlin and Kay 1969: 119, 125). These universal tendencies have been explained in terms of physical facts, like brightness and saturation, or physiological ones, like the make-up of the human perceptual system (cf. Croft 2003a: 275–9, and also, for a more critical appraisal, Foley 1997: 150–65 and Goddard 1998: 111–35). The most important result of the study carried out by Berlin and Kay (1969) is that categorization can be linked directly to perceptual experience and that certain (language-independent) representatives of a category are 'better', 'more salient', or simply more 'prototypical' than others.

The Berlin–Kay study can be classified as lexical semantics, and this has indeed proven to be the field in which elements of prototype theory have become particularly popular. A textbook example illustrating this type of application is the word (or, for that matter, 'category') *bird*, which covers a range of animals with different types of properties, like: (i) it can fly, (ii) it has feathers, (iii) it has a specific (S-like) form, (iv) it has wings, (v) it lays eggs, and (vi) it has a beak (cf. Geeraerts 1989: 599). However, not all birds have all of these properties. For instance, some birds cannot fly (kiwi, ostrich), have a peculiar form (penguin), or have feathers that can hardly be identified as such (kiwi, penguin). Even though all of these animals are nonetheless birds, most people would agree that they are not particularly good representatives of that category, and that the average bird is like a sparrow or a blackbird, which have all of the properties mentioned above.

As the bird example shows, one of the most salient properties of prototype theory is that categories are not defined on the basis of the smallest common denominator of necessary and sufficient conditions—for instance, birds could be defined as 'animals with two legs and feathers' in a classical approach—rather, properties are also taken into account which are not necessary for class membership. For example, the ability to fly is not a necessary but certainly a typical property of birds and

should—according to prototype theory—figure in a definition of that word. As this example shows, in prototype theory, lexical definitions are richer than in the classical model.

A further important difference between prototype theory and the classical model of categorization concerns the boundaries of a category. According to the 'classical' model, categories have clear-cut boundaries, including specific elements and excluding others. By contrast, prototype theory assumes that category boundaries are sometimes fuzzy. A standard example illustrating this point is the word *cup*, discussed in great detail by Labov (1973). Labov shows that depending on the shape and use of a 'cup-like' object, this object is often on the verge of membership to the category 'cup' without being clearly included or excluded. Obviously, fuzzy boundaries are only found with specific types of categories, most notably those containing objects which may be categorized ad hoc. For instance, the same type of container may be categorized as either a 'glass' (when it is filled with a beverage) or a 'vase' (when it contains flowers). By contrast, a penguin cannot spontaneously be categorized as, say, a seal. Also, the fact that a penguin is a bird is learnt during language acquisition. Such instances of conventionalized categorization render specific types of categories quite inflexible.

It should be mentioned that the two central postulates of prototype theory pointed out above—the internal structure and the fuzzy boundaries—should be kept apart. While having fuzzy boundaries implies having an internal structure, having an internal structure does not imply having fuzzy boundaries (compare also Löbner 2003: 186–91). This is illustrated in Figure 9.1. On the left-hand side, there is a cluster of objects centring around a core of (prototypical) category members, but there is no category boundary. On the right-hand side, the same category structure
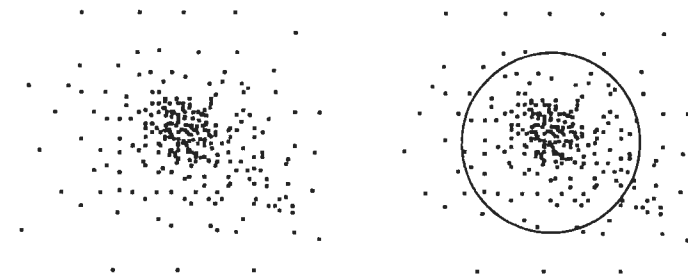
Figure 9.1. Internal structure and boundaries of categories

is represented, but a clear outer boundary is also given, thus excluding specific elements.

Having outlined the major cornerstones of what was called 'prototype theory' above, a note of caution is in order concerning the application of that term. There is no such thing as *the* 'prototype theory'. Since the beginnings of research into prototypicality, many of the claims made by early advocates of experiential realism have been modified or even discarded; some new ideas have been introduced as well; and prototype theory is not the only successor to the classical theory, either. This is not the place to offer an overview or discussion (see Kleiber 1990: 147–83, Murphy 2002), so we will restrict ourselves to some basic remarks. One important point concerns the relationship between a prototype and a category. In its strongest form, prototype theory regards prototypes as constitutive principles of a category. In other words, any element of a given category C is an element of that category by virtue of its similarity to the prototype. For instance, a stork would be categorized as a bird because it exhibits a certain similarity to a sparrow or a blackbird. This 'standard version' of prototype theory (Kleiber 1990) has been revised, most notably by some of the pioneers themselves (see e.g. Rosch 1978). In particular, the prototype was no longer regarded as a constitutive principle of a category, but merely as an effect of categorization. The direction of causality was thus reversed: given that most of the members of the category 'bird' can fly, the ability to fly becomes a prototypical property of the category 'bird', and the sparrow, as a very common bird, a prototypical member. The idea of prototypicality being an effect rather than a cause of categorization opens a new door that is particularly interesting for linguistic applications of that notion, for it allows us to consider the notion of frequency as a driving force in categorization (cf. Haspelmath 2006 for a discussion of the role of frequency in language): we may hypothesize that it is usually the most frequent members of the category or, at least, the properties most frequently found that determine prototypicality.

The reconsideration of the relationship between prototypes and categories had important consequences in another respect. While the assumption that categories are internally structured and that members exhibit different degrees of (proto-) typicality is still made by most prototype theorists, the assumption of categories without external boundaries and/or necessary conditions has repeatedly been challenged (cf. Kleiber 1990: 121–4, Löbner 2003: 186–91). In other words, while categories like the one on the right-hand side of Figure 9.1 are still taken for granted, completely amorphous categories like the one on the left-hand side are often rejected. This does not mean that one can no longer deal with Labov's cup problem. One could assume that certain elements may be contained in more than just one category. For instance, a container that could be used as both a drinking glass and a vase can simply be regarded as being contained in both categories. This does not prevent us from assuming that certain elements are clearly excluded from
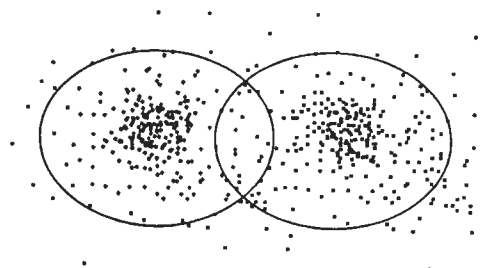
Figure 9.2. Overlap between similar categories

the category of glasses and others from the category of vases. Such 'categorial overlap' is illustrated in Figure 9.2.

Alternatively, we could assume that utensils such as cups and vases are generally categorized along two dimensions: (i) in terms of physical properties, such as material, shape, and colour, and (ii) according to what they are used for ('functional properties'). In that case, a Labov-type object would simply be categorized as a 'liquid container' by virtue of its physical properties, and depending on its actual use, it would be categorized more specifically as either a vase or a cup. Again, category membership would be a matter of 'yes' or 'no' for each instance of categorization, even though such objects have the potential to belong to more than one category.

The reconsideration of internal category structures and category boundaries has also given rise to the introduction of another important notion into prototype theory, namely, 'family resemblance', which has been taken from Wittgenstein (1953: 31–2). The idea of a family resemblance is that members of a category need not meet any necessary condition, but are related to each other by a 'chain' of similarity relations in a 'similarity network'. To illustrate this with an example given by Wittgenstein, the German word *Spiel* ('game') denotes a number of rather diverse activities ranging from card games to ball games, from games that are played alone (solitaire) to team games, from entertaining games to competitive games, etc. It is hard (if not impossible) to identify a single necessary condition for the family of games. Wittgenstein points out that the different types of games constitute a network of activities in which each node has something in common with the neighbouring nodes, but not necessarily with the more remote ones. This is represented on the left-hand side of Figure 9.3, where each circle corresponds to a specific type of sub-category—say, a specific type of game—characterized by a (set
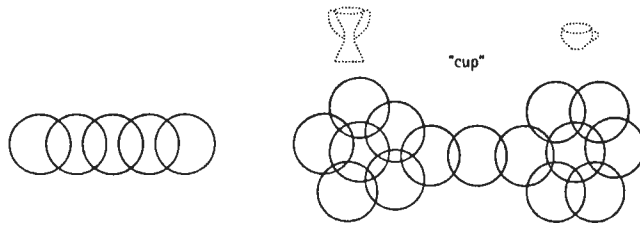
Figure 9.3. Family resemblances and subcategories

of) criterial attribute(s) (e.g. 'is played alone/in pairs/in teams', 'involves physical activity', etc.).

In the category structure represented on the left-hand side of Figure 9.3, the various sub-categories simply form a chain, which suggests that each of them has more or less the same status within the overall category. However, it is quite obvious that such a homogeneous structure will not usually be found in real world categories, since specific properties and sub-categories are clearly more important than others (e.g. 'is entertaining' is certainly more central than 'can be played alone'). If sub-categories are distributed unevenly within the superordinate category, this will yield a structure such as the one on the right-hand side of Figure 9.3. For instance, the category 'cup' can be regarded as consisting of two major sub-categories, one of which is used for drinking while the other is a sports trophy. There may be a few objects that are located somewhere in between the two sub-categories, but the majority of cups cluster around representatives of one of the two sub-categories.

As this example shows, the idea of 'family resemblances' paves the way for a polysemy-oriented treatment of lexical meanings within the framework of prototype theory. Instead of searching for the smallest common denominator of a category, internal semantic variation is allowed, and different sub-meanings can be identified, perhaps with specific prototypes for each sub-meaning. In linguistic typology, the idea of 'family resemblances' has been exploited in the concept of 'semantic maps', which capture the relationship between networks of notional categories and formal categories of specific languages (see section 6).

Let us briefly summarize some of the central hypotheses of prototype theory and their impact on matters of categorization. It is to be kept in mind that not every postulate applies to every 'version' of prototype theory, and that some aspects may be relevant to specific types of categories but not to others:

(i) Unlike in the classical model of categorization, in prototype theory it is not (or not only) the necessary and (jointly) sufficient conditions that are taken into consideration, but (also) properties that are not necessary but typical.
(ii) On the basis of (i), categories may have an internal structure, i.e. there may be more or less central representatives of a category.
(iii) Categories may have fuzzy boundaries, which means that sometimes the question of whether or not a given object is an element of a category cannot clearly be answered (this assumption has repeatedly been challenged).
(iv) Some categories constitute networks of elements which are organized in such a way that each element shares some property with the neighbouring nodes. The relationship holding between the elements of such a category is called 'family resemblance'.

4. PROTOTYPES AND WORD CLASSES

Next to lexical semantics, another domain of linguistics where concepts of prototype theory have widely been used is that of word classes, both in particular languages and cross-linguistically. As pointed out in section 3, word classes are often defined in terms of necessary and sufficient conditions. However, this is not always possible, especially in languages with a poor morphology and great 'categorial flexibility', such as English and Mandarin Chinese (see Bisang, this volume). The observation that English word classes cannot easily be defined in terms of necessary and sufficient conditions was made even before prototype theory was well established in linguistics. Crystal (1967) points out that several criteria can be used to define word classes (phonological, morphological, lexical, semantic, syntactic; cf. also Lyons 1977: 423–30 on the definition of word classes). This raises the obvious question of what to do if the different criteria do not lead to the same result. Crystal (1967: 46) proposes a 'statistical approach':

What seems to us to be intuitively the most satisfactory solution should to a large extent reflect our unconscious awareness of proportions of frequencies. This approach would also seem to be the only way whereby one can give meaning to the notion of 'centrality' of membership of a word class.

In terms of prototype theory, this amounts to establishing a set of typical properties exhibited by the members of a word class and to determining the number of properties exhibited by each element. Crystal outlines such a procedure for nouns and takes the following criteria into account: (a) may act as a subject, (b) inflects for number, (c) co-occurs with an article, and (d) has a morphological indication of being a noun. This

gives us the following classes: (a) a 'central class' of nouns that exhibit all four properties (*hardship, peroration*); (b) two somewhat less central classes of nouns that have three of the relevant properties (*boy* and *girl*, which lack an overt indicator of their nominal status, and *information*, which does not inflect for number); (c) one class of nouns that exhibit two of the properties (*news*, which may act as a subject and inflects for number); finally, (d) a 'peripheral class' of nouns whose only nominal property is that they can occur as a subject (*phonetics*). The different intersections between these four criterial attributes are shown on the left-hand side of Figure 9.4. The right-hand side illustrates that the category 'noun' in English can be regarded as a concentric system if nouns are classified according to the number of criteria they meet.

The idea of determining degrees of word class membership on the basis of a quantitative method has become a commonplace of research into lexical categorization (see Hopper and Thompson 1984, Plank 1984, Schachter 1985, Sasse 1993a, 2001, 2002a, Aarts 2004). It should be noted, however, that this type of approach faces a number of serious problems (cf. Croft 2007a). First, the choice of properties determining class membership (or non-membership) seems quite arbitrary. Thus, Crystal takes it that the most typical nouns are characterized by a formal indicator of their nominal status—a derivational suffix—which is why *hardship* and *peroration* qualify as 'better' nouns than *boy* or *girl.* But *hardship* and *peroration* are derived nouns, and it seems counterintuitive to claim that derived nouns are 'better' than basic nouns. How could such a question be decided on a priori grounds? Second, even if we were able to determine a set of relevant properties for each word class, the mere number of, say, adjectival or pronominal properties exhibited by an element would not be a very significant piece of information, since presumably some properties are more important than others.

Still, the prototype approach to word classes can be used to describe the overall architecture of the lexicon and take account of transition phenomena and overlap. Such a gradience-based characterization of the English lexicon was proposed by
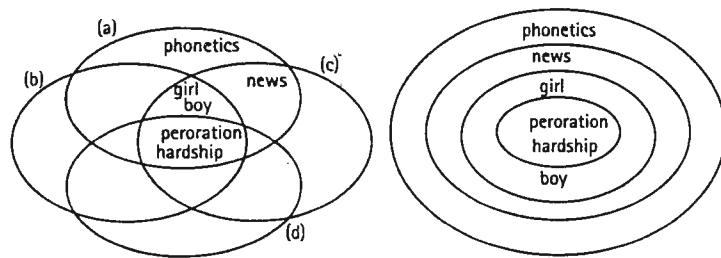
Figure 9.4. Prototypicality of English nouns according to Crystal (1967)

Table 9.1. Category squish in Mirrinh-Patha (from Sasse 2001: 498)

	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Noun	+	+	+	±	±	±	−	−	−	−	−
Adj	+	+	+	+	+	+	−	−	−	−	−
Nerb	±	+	+	+	+	+	+	−	−	−	−
Voun	−	−	−	+	+	+	+	+	+	+[a]	−
Verb	−	−	−	+	+	+	+	+	+	+	+

[a] 3rd person singular subject only

Ross (1972, 1973), who showed that word classes as well as word class systems can be represented as 'quasi-continua' or 'squishes', whose endpoints are constituted by specific prototypes, for example, verbs and nouns for the lexicon as a whole, or specific types of nominal expressions for the class of 'nouns'. Other, non-prototypical categories occupy intermediate positions in such systems. The idea of 'categorial squishes' has proven a useful tool to model gradience in word class membership and has been applied to various languages (e.g. Walsh 1996 for the Australian language Murrinh-Patha and Sasse 2002a for the Iroquoian language Cayuga). Table 9.1 shows a category squish of Murrinh-Patha (the classes 'nerb' and 'voun' are so called because of their intermediate status).[3]

As has become apparent, the idea of regarding word classes as exhibiting features of prototypicality and gradience can be regarded as an attempt to rescue the very notion of 'word class'. If such classes cannot always be determined on the basis of necessary and sufficient conditions, it seems questionable to what extent they qualify as constitutive principles of grammar at all. In fact, the conceptual primacy of categories like word classes has been challenged in the framework of 'Radical Construction Grammar' (Croft 2001). Croft argues that word classes—just like syntactic relations holding between the elements of a word class—are derivative of the constructions in which they occur. In other words, linguistic knowledge is primarily represented in the form of constructional schemas. Constructional schemas, in turn, comprise slots for elements that can be associated with specific 'categories'; but such 'categories' are epiphenomenal. This approach appears to boost the number units of analysis assumed for a given language. For instance, no (language-specific) category 'adjective' is assumed as a linguistic primitive. Instead, Croft takes a construction of the form

[3] The criteria are: (a) compatibility with the 'propriety suffix' -*ma*, 'associated with'; (b) case inflection; (c) compatibility with nominal classifiers; (d) cross-referencing object pronoun; (e) body-part incorporation; (f) number indicator; (g) adverb incorporation; (h) cross-referencing benefactive pronoun; (i) tense-aspect-mood suffix; (j) compatibility with the 'primary auxiliary'; (k) other cross-referencing pronouns.

Table 9.2. Word classes according to Croft (1991: 67, 2003a: 185–7)

	Reference	Modification	Predication
Objects	*object reference:* UNMARKED NOUNS	*object modifier:* genitive, adjectivalizations, PPs on nouns	*object predication:* predicate nominals, copulas
Properties	*property reference:* de-adjectival nouns	*property modifier:* UNMARKED ADJECTIVES	*property predication:* predicate adjectives, copulas
Actions	*action reference:* action nominals, complements, infinitives, gerunds	*action modifier:* participles, relative clauses	*action predication:* UNMARKED VERBS

[Det Adj N] as basic (the 'attributive construction'), and it is only relative to this construction that a category label can be assigned to the Adj element ('the attributive role Adj in the [Det Adj N] construction'). According to Radical Constructionalists, this 'non-reductionism' is not a conceptual disadvantage, since categories—being derivative of the constructions in which they occur—have no central status in grammatical knowledge anyway (cf. Croft 2001, 2007a).

A prototypical approach also lends itself naturally to a cross-linguistic treatment of word classes. The main difference from the language particular methods pointed out above is that when talking about lexical categories from a cross-linguistic perspective, these categories will have to rely more on notional categories. One of the first pertinent in-depth studies was carried out by Dixon (1977), who presents a cross-linguistic investigation of adjectives (see Wierzbicka 1986b, Bhat 1994, Wetzer 1996, Stassen 1997). Dixon identifies a core class of adjectives that are generally morphologically basic, namely, adjectives of 'age, dimension, value and colour', and states that the relevant items 'are likely to belong to the adjective class, however small it is' (1977: 56). As Croft (2003a: 184) puts it, '[i]f a language has an adjective class, it will include words referring to the basic adjective concepts (dimension, age, color, value) in that class. If a language includes nonbasic adjective concepts in the adjective class, then it will include basic adjective concepts in that class.'[4]

As observed by Croft (2003a: 184), 'Dixon's analysis provides an external basis for the comparison of lexical categories, the semantic class of the lexical items.' However, Croft

points out that if one aims to analyse parts-of-speech systems as a whole, an additional (orthogonal) parameter of classification needs to be taken into account, viz. the difference between reference, modification, and predication (which he calls 'propositional acts'). Cross-classifying the 'semantic class' of an expression ('objects', 'properties', 'actions') with the 'propositional act' ('reference', 'modification', 'predication') yields a grid of nine cells (see Table 9.2).[5] Prototypical nouns, adjectives, and verbs are located on the diagonal crossing the grid from the top left to the bottom right corner. This is due to the fact that specific pairs of parameter settings for 'propositional act' and 'semantic class' prototypically go hand in hand: (i) 'objects' and 'reference' (nouns), (ii) 'properties' and 'modification' (adjectives), and (iii) 'actions' and 'predication' (verbs). The less typical pairs of parameter settings can also be expressed in (most) languages, but they usually require derivation (e.g. de-adjectival nouns for reference to properties, participles for modification through action descriptions).

5. PROTOTYPICALITY IN SYNTACTIC AND SEMANTIC RELATIONS

A problem parallel to the one concerning the definition of word classes emerges when we aim to provide a definition of grammatical relations, such as 'subject' (cf. Keenan 1976b, Comrie 1989: 104–23). First, even within one language, elements commonly identified as the subject of a sentence may exhibit heterogeneous properties; for instance, morphosyntactic properties, such as agreement and case assignment; semantic properties, such as semantic role; and pragmatic properties, such as topicality. To illustrate this with a frequently cited example, subjects in Icelandic are usually in the nominative case, but there are also so-called 'oblique subjects', i.e. noun phrases in the dative which behave like a subject in several semantic, pragmatic, and also syntactic respects. (6) is an example of a nominative subject, and (7) illustrates an 'oblique subject':

(6)   Icelandic (Eythórsson and Barðdal 2005: 824)
       Ég   er   íslenks.
       I.NOM   am   Icelandic
       'I am Icelandic.'

---

[4] One may wonder, of course, to what extent this generalization is falsifiable at all: whenever there is a word class containing the relevant adjective concepts, we can simply call this class 'adjective', which makes the generalization a truism. However, the mere fact that there is a group of notional categories that tend to be encoded uniformly across languages is interesting in itself.

[5] A similar classification of semantic functions is proposed by Hengeveld (1992), whose analysis is based on the notions 'predication', 'modification', and 'reference' and the presence/absence of morphological marking. However, Hengeveld's overall conclusions are quite different from those arrived at by Croft (see Bisang, this volume).

(7)   Icelandic
      Mér   er   kalt.
      me.DAT   is   cold
      'I am cold.'

Oblique subjects differ from nominative subjects in not showing agreement with the verb. However, they have other properties characteristic of subjects. For instance, just like nominative subjects, they may be unexpressed in control infinitives. This is shown in (8) (nominative subject) and (9) (oblique subject):

(8)   Icelandic (Eythórsson and Barðdal 2005: 834)
      Ég   geri bara það sem   mér   er   sagt að   ∅   gera.
      I.NOM   do   only it.ACC which me.DAT is told to   PRO.NOM do
      'I just do what I am told to do.'

(9)   Icelandic
      ekki   það   sem   mér   er   sagt að   ∅   líka vel   við.
      not   it.ACC which me.DAT is told to   PRO.DAT like well with
      'not what I am told to like.'

Under the assumption that every sentence has a subject, subjects consequently cannot be defined on the basis of structural properties like case-marking alone. The problem becomes even more severe if we regard 'subject' as a universal notion; that is, if we assume that every sentence of every language has a subject. In ergative languages, for instance, both absolutive and ergative arguments have properties of what is traditionally called a 'subject'. A definition on the basis of necessary and sufficient seems out of the question (cf. Comrie 1989: 110–22).

The solution proposed by Keenan (1976b) is parallel to the one chosen by Crystal (1967) to account for the heterogeneous behaviour of nouns in English: Keenan provides a 'list of 30 odd properties which subjects characteristically possess' (1976b: 311). This allows one to identify the subject of a given sentence (in a given language) in a numerical way. The list of typical subject properties provided by Keenan includes properties such as 'independent existence', 'indispensability', 'autonomous reference', 'case-marking properties', and 'semantic role'.

Obviously, this approach raises the same questions that were discussed in the context of a quantifying approach to word classes: what properties should be used to define a subject, and are they equally important? These questions are particularly central when it comes to the contrast between ergative and accusative languages. While formal properties in ergative languages often seem to indicate that it is the absolutive argument which qualifies as a subject—it typically exhibits less morphological marking and is 'indispensable'—most semantic and pragmatic criteria seem to speak in favour of the ergative argument (e.g. animacy, agentivity, topicality).

In view of these difficulties, the question arises to what extent 'subject' can be regarded as a meaningful cross-linguistic concept at all. It is true that specific morphosyntactic, semantic, and pragmatic properties of arguments with a 'privileged' status tend to co-occur, for instance, parsimonious morphological encoding and 'indispensability', or animacy, agentivity, and topicality. But such prototypicality effects could be described without recurring to the notion of 'subject' as well.

A problem that is closely related to the question of subjecthood and that has likewise been a challenge to the classical model of categorization in grammar has given rise to another influential study making use of prototype concepts. Dowty (1991) provides an analysis of the mapping from semantic to syntactic roles that is based on a 'relativized' approach, very much like the analyses of Crystal (1967) and Keenan (1976b). Instead of positing a finite number of semantic roles, Dowty (1991) proposes a characterization of semantic roles in terms of specific clusters of properties that are usually associated with either agenthood ('Proto-Agent entailments') or patienthood ('Proto-Patient entailments'). As Proto-Agent entailments, he identifies (i) volitional involvement in the event or state, (ii) sentience (and/or perception), (iii) causing an event or change of state in another participant, (iv) movement, and, in parentheses, (v) existing independently of the event named by the verb. The Proto-Patient properties are (i') undergoes change of state, (ii') incremental theme, (iii') causally affected by another participant, (iv') stationary relative to movement of another participant, and, again in parentheses, (v') not existing independently of the event, or not at all (Dowty 1991: 572).

One of the strengths of Dowty's proposal is that it makes possible what we may call a 'relativized' model of argument selection or 'linking' (the mapping from semantic roles to syntactic roles; note that a similar model has been developed independently by proponents of Role and Reference Grammar, e.g. Foley and Van Valin 1984, Van Valin and LaPolla 1997). Dowty postulates the following principle:

In predicates with grammatical subject and object, the argument for which the predicate entails the greatest number of Proto-Agent properties will be lexicalized as the subject of the predicate; the argument having the greatest number of Proto-Patient entailments will be lexicalized as the direct object. (Dowty 1991: 576)

Such principles have been shown to be language-independently applicable and can be used to relate case-marking and situation semantics to each other in a highly systematic way (cf. Primus 1999 and this volume).

Prototype effects in the domain of argument structure have also been attributed to what we may broadly call the 'verbal domain'. It is one of the idealizations of contemporary linguistics that each verb is assumed to come with a specific potential to link up with other elements (valency). One of the most important relevant differentiations is the one between transitive and intransitive verbs. This distinction, however, is simplifying in many respects, from both a language-

particular and a cross-linguistic perspective. In their study on 'transitivity', Hopper and Thompson (1980) argue that 'transitivity' should be regarded as a prototypical property of clauses, and they identify a cluster of grammatical properties typically displayed by 'highly' transitive clauses and a corresponding cluster of complementary properties associated with a low degree of transitivity (see Kittilä, this volume, and Rice 1987). The number of participants—in a traditional view, the only property distinguishing transitive from intransitive clauses—is one of the parameters taken into account, but other parameters are also relevant: (i) kinesis (non-/action), (ii) aspect (non-/telic), (iii) punctuality (non-/punctual), (iv) volitionality (non-/volitional), (v) affirmation (affirmative/negative), (vi) mode (realis/irrealis), (vii) agency (high/low in potency), (viii) affectedness of (the object) O (high/low), and (ix) individuation of O (highly individuated/non-individuated).

Transitivity, then, viewed in the most conventional and traditional way possible—as a matter of carrying-over or transferring an action from one participant to another—can be broken down into its component parts, each focusing on a different facet of this carrying-over in a different part of the clause. Taken together, they allow clauses to be characterized as MORE or LESS transitive. (Hopper and Thompson 1980: 253)

According to this point of view, even one-participant events may qualify as relatively high in transitivity if many of the parameters mentioned above are specified as positive (e.g. *Susan left*).

Having split up the notion of transitivity into several components, Hopper and Thompson (1980: 254) observe that 'these component features of Transitivity COVARY extensively and systematically' (emphasis original). This co-variation concerns both the co-occurrence of specific notional categories and formal parameters of encoding. For example, properties of events such as kinesis, aspect, and punctuality are often reflected in formal properties of the object, such as the marking of case or individuation. Such phenomena are well known from languages like Finnish, Estonian, Russian, and Turkish but can be observed in many non-European languages as well (cf. Hopper and Thompson 1980: sections 2.3–8).

6. SEMANTIC MAPS

In the examples considered above, concepts from prototype theory were used to define analytic notions like 'noun', 'subject', '(proto-)agent', or 'transitive', which are indispensable tools in the description and comparison of languages. In this section, we will illustrate how aspects of prototype theory can be used to illuminate the encoding of notional categories. In particular, the idea of structuring a larger conceptual domain in terms of a family resemblance graph has been used in the concept of 'semantic' or 'conceptual maps' (for an overview of the uses of semantic maps in linguistic typology, cf. Haspelmath 2003, van der Auwera and Temürcü 2006). In the following, we will briefly present two pertinent studies: the one by Haspelmath (1997) on indefinite pronouns and the one by van der Auwera and Plungian (1998) on modality.[6]

In his study on indefinite pronouns, Haspelmath (1997: 2–3) distinguishes between nine basic types, which differ in their contexts of use:

  (i) specific/known to speaker
      Someone called while you were away: guess who!
  (ii) specific/unknown to speaker
      I heard something, but I couldn't tell what kind of sound it was.
  (iii) non-specific/irrealis
      Please try somewhere else.
  (iv) polar question
      Did anybody tell you anything about it?
  (v) conditional protasis
      If you see anything, tell me immediately.
  (vi) standard of comparison
      In Freiburg the weather is nicer than anywhere in Germany.
  (vii) direct negation
      Nobody knows the answer.
  (viii) indirect negation
      I don't think that anybody knows the answer.
  (ix) free choice
      Anybody can solve this simple problem.

As the examples given show, English has three series of pronouns (*some-*, *any-*, and *no-*) which cover different portions of the overall domain (*some-*: (i)–(iii); *any-*: (iv)–(vi), (viii), and (ix); *no-*: (vii)). This is, of course, not the only partitioning possible. For instance, Swedish *någon* can be used in all contexts except (ix), thus having a much wider distribution than any of the English pronouns (cf. (10) and (11)). Other languages have indefinite pronouns that are more specialized than English *some-* or *any-*. For example, Latin pronouns ending in *-dam* (e.g. *quidam*, cf. (12)) can only be used in contexts of type (i) (cf. (12)), and Kannada pronouns ending in *-oo* are only used in contexts of type (ii) (cf. (13)):

(10)   Swedish (Holmes and Hinchliffe 1994: 185)
       Några   tror   att   hon   är   galen.
       some   believe   that   he   is   insane
       'Some people/some of us think that he is insane.'

---

[6] Table 9.2 is a semantic map, too, and Croft's Construction Grammar (2001) is a maximally-semantic-map-based theory of syntax.

(11) Swedish (Holmes and Hinchliffe 1994: 195)
      Jag arbetar hårdare än   någon gruvarbetare.
      I   work   harder   than any   miner
      'I work harder than any miner.'

(12) Latin (Rubenbauer and Hofmann 1995: 234)
      philosophus   qui-dam
      philosopher.NOM   PRO.3M.SG-dam
      'a certain philosopher'

(13) Kannada (Haspelmath 1997: 40)
      Yaar-oo   bandaru.
      who-INDF   came
      'Someone came.'

The different sub-categories of indefinite pronouns do not just represent an unordered set of use types but are to varying degrees similar to each other. Different degrees of similarity can be represented in the form of 'semantic maps', i.e. 'similarity networks', in which conceptual similarity is reflected in spatial proximity. The semantic map for indefinite pronouns given by Haspelmath is displayed in Figure 9.5.

The range of use types associated with a given marker can now be indicated by identifying the relevant region on the map. This is shown for Swedish and Latin in Figure 9.6.

Given that indefinite pronouns always cover contiguous regions on the semantic map, we can derive a number of implicational statements from them: if some
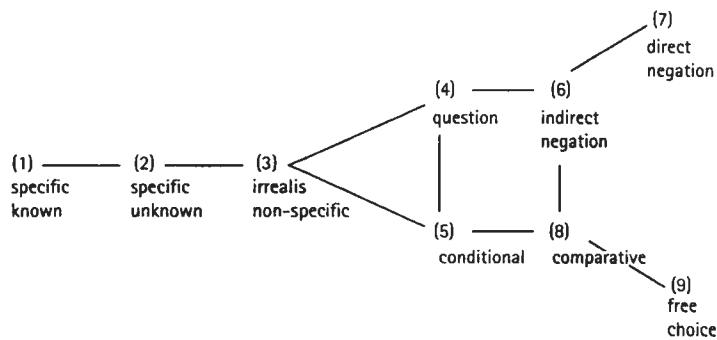
Figure 9.5. A semantic map for indefinite pronouns (Haspelmath 1997: 64)

marker can be used in two contexts A and B, it can also be used in all contexts in between A and B. For instance, pronouns that can be used in both a 'specific/known' and a 'non-specific/irrealis' context but not in the intermediate 'specific/unknown' function are thus excluded. This is of course not accidental, but results from the fact that neighbouring nodes on semantic maps are characterized by shared features. Various sub-regions on the map can be identified using the following semantic parameters (see Haspelmath 1997: 119–22):

(a) known vs. unknown to the speaker ((i) vs. the rest);
(b) specific vs. non-specific ((i) and (ii) vs. the rest);
(c) scalar endpoint vs. no scalar endpoint ((iv)–(viii) vs. the rest);
(d) in scope of negation vs. not in scope of negation ((vii) and (viii) vs. the rest); and for those uses with a scalar endpoint ((iv)–(viii)),
(e) endpoint on non-reversed scale vs. endpoint on reversed scale ((ix) vs. the rest).

An interesting point is that some regions turn out to be more frequently covered by markers than others. Thus, indefinite pronouns for uses (ii), (iii), (iv), (vi), and (vii) seem to be frequent, while indefinite pronouns for uses (ii), (iii), (v), (viii), and (ix) are not: though the constellation as such is perfectly acceptable, Haspelmath (1997: 76–7) has not found any attestation for it. The frequent pronouns would seem to be deserving of the epithet 'prototypical'. Bybee, Perkins, and
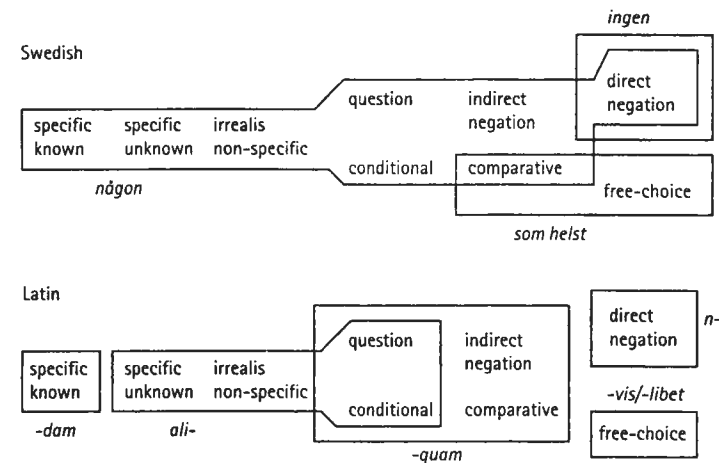
Figure 9.6. Indefinite pronouns in Swedish and Latin (Haspelmath 1997: 68–9)

Pagliuca (1984) would call them 'universal gram types', 'mediating between the universal concepts and the language-specific grams' (p. 48).

Apart from indicating restrictions on the formal encoding of specific meanings on a synchronic basis, semantic maps can also be used to illustrate the direction of diachronic developments within a given domain. Whenever the domain covered by some marker on a semantic map changes, the relevant developments can only affect neighbouring nodes. While this follows naturally from the (synchronic) observation that markers may only cover contiguous regions on a semantic map, we can add more specific information by illustrating the possible direction of change between neighbouring nodes. This is illustrated for the domain of modality in Figure 9.7.

The domain of modality is represented in Figure 9.7 as a two-dimensional space that is structured by (i) the modal partitioning into the two values 'possibility' (upper half) and 'necessity' (lower half), and (ii) the 'source' of modality, from left to right: (a) 'participant-internal' (ability, need), (b) 'participant-external' (possibility and necessity resulting from some external circumstances), and (c) 'epistemic' (possibility and necessity based on inferences made by the speaker). 'Deontic' modality represents a special case of participant-external modality in which the external source of modality corresponds to some other participant's volition.

Figure 9.7 indicates the possible directions of diachronic change: while a given modal marker may extend its territory from participant-internal to participant-external modality, some other changes, such as epistemic possibility to participant-external possibility, are unattested. In cases like the above, in which the semantic categories may be expressed by elements with different degrees of grammaticalization,
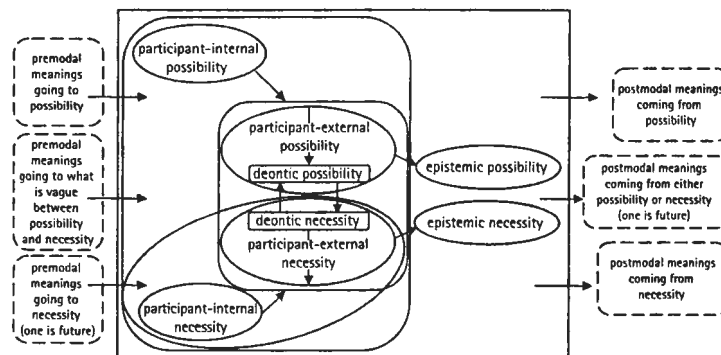
Figure 9.7. Modality's semantic map (van der Auwera and Plungian 1998: 111)

the diachrony-enriched semantic map can be seen as encompassing grammaticalization paths.

7. CONCLUSIONS

Defining linguistic categories is an indispensable component of linguistic analysis, be it language-particular or cross-linguistic. Given the various types of gradience phenomena that can be observed in human conceptualization and natural language, such definitions cannot easily or always be provided on the basis of necessary and sufficient conditions. As we hope to have shown, aspects of prototype theory, like the assumption of internal category structures and family resemblances, can be very useful in many domains of grammar and lexicon, and in linguistic conceptualization more generally. Even though it has, at the same time, become apparent that prototype theory cannot account for all the problems of categorization, it certainly has its place in contemporary linguistics.

FURTHER READING

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CHAPTER 10

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IMPLICATIONAL HIERARCHIES*

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GREVILLE G. CORBETT

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1. THE BASIC LOGIC OF HIERARCHIES

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Hierarchies are one of the most powerful theoretical tools available to the typologist. They allow us to make specific and restrictive claims about possible human languages. This means that it is easy to establish what would count as counterexamples, and as a result, there are relatively few hierarchies which have stood the test of time.

Hierarchies are built out of typological statements which are chained together. Let us start with an example:

(1)   The committee have already discussed the proposal six times.

In British English, and to a lesser extent in some other varieties of English, it is normal to find a plural verb (*have*) in agreement with a noun phrase headed by a singular noun such as *committee*. This is an instance of 'semantic agreement', i.e. agreement according to meaning (since *the committee* implies more than one individual member). However, it is not simply that *committee* always allows the possibility of semantic agreement. We do not find:

(2)   *These committee...

Here, only agreement according to form, or 'syntactic agreement', is possible. There are numerous other examples in the literature (see Corbett 2006: 7.3–7.4 for references) where we find semantic agreement to be possible in the predicate but not in attributive position. We do not find the reverse. This means that we can make the simple implicational claim:

(3)   The possibility of semantic agreement in attributive position *implies* the possibility of semantic agreement in predicate position.

There are further agreement domains, as in these examples:

(4)   a. The committee, which has met...   b. The committee, who have met...

(5)   a. The committee.... It...   b. The committee.... They...

From a range of evidence, of which these examples are just a part, we can make two further implicational claims:

(6)   Semantic agreement in predicate position *implies* semantic agreement of the relative pronoun.[1]

(7)   Semantic agreement of the relative pronoun *implies* semantic agreement of the personal pronoun.

Each of these implicational claims is of interest to the typologist if taken individually. However, they are evidently connected, and we can chain them together into a hierarchy with considerable predictive power:

(8)   The Agreement Hierarchy (Corbett 1979)
       attributive > predicate > relative pronoun > personal pronoun

Note that the claims are chained together in terms of their content; we are not dealing with a simple stacking up of unrelated implications. We have represented this chaining using the '>' sign. It represents decreasing canonicity of agreement domains (Corbett 2006: 1.4.3).[2] With it goes greater likelihood of semantic agreement, which could equally be indicated with '<'. The use of either symbol makes good sense: the crucial point is the relative ordering of the four positions. What counts as top or bottom may vary according to the phenomenon and to one's point of view.

Given the hierarchy as in (8), a basic claim would be that if semantic agreement is available at any position on the Agreement Hierarchy, it must be available at all

[1] For English, we can infer the number of the relative pronoun only from that of its predicate.
[2] The relative pronoun is the least important of the hierarchy positions, given that many languages use other strategies for forming relative clauses.

attributive	predicate	relative pronoun	personal pronoun	

= semantic agreement

Figure 10.1. Systems allowed by the Agreement Hierarchy

positions to the right. The constraining effect of the hierarchy applied in this way can be seen in Figure 10.1.

In the way that we have stated the constraint, eleven of the theoretically possible sixteen situations are ruled out. However, hierarchies are in fact much more powerful than this, as we shall now see.[3]

2. MONOTONIC INCREASE

So far we have considered only binary choices at the different points of the hierarchy (semantic agreement is either possible or not possible). However, the published claim for the Agreement Hierarchy is much stronger and reads as follows:

(9) For any controller that permits alternative agreements, as we move rightwards along the Agreement Hierarchy, the likelihood of agreement with greater semantic justification will increase monotonically.

A monotonic increase is simply one with no intervening decrease, thus the following series each represent a monotonic increase: 1–2–3–4, 1–1–1–2, 10–42–42–88, 1–1–3–3. In contrast, the following series do not: 2–1–2–3, 2–2–8–6. The appeal to a monotonic increase means that the hierarchy can be applied to constructions which show optionality and variability, as is certainly the case with *committee* nouns in English. The claim is that semantic agreement is as likely or more likely in the predicate as compared with attributive position; and then semantic agreement is as likely or more likely in the relative pronoun as compared with the predicate, and so on.

This is a strong claim. Specifically for the English construction, there has been a detailed investigation by Levin (2001), and we shall report just some of his results here. Levin worked with substantial corpora of written and spoken language, checking not just for *committee* but for a further 25 similar nouns (2001: 50),

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[3] If there is a proposed hierarchy but with some counterexamples, serious statistical issues arise: the obvious interpretation may well not be correct, and it is necessary to apply appropriate statistical tests. See Cysouw (2003b), Maslova (2003), and Dryer (2003) for discussion. The discussion in those papers concentrates on cases where there are binary choices (such as 'possible' versus 'impossible') at each position on the hierarchy. We shall move on to instances where the requirement is for a monotonic increase along the hierarchy; this bears a heavier burden of proof.

Table 10.1. *Committee* nouns in spoken American English and spoken British English (Levin 2001: 109)

Corpus	Verb		Relative pronoun		Personal pronoun	
	n	% pl.	n	% pl.	n	% pl.
LSAC	524	9	43	74	239	94
BNC	2,086	32	277	58	607	72

which we shall call '*committee* nouns'.[4] Let us consider his data on spoken language (Table 10.1). Levin used the Longman Spoken American Corpus (LSAC), which has five million words, and the ten-million-word section of the British National Corpus (BNC) devoted to spoken language.

There is a substantial amount of data represented here for the three positions on the Agreement Hierarchy where there is a potential choice (recall that in attributive position we find zero per cent semantic agreement for these controllers). Thus, of the 524 examples of verb agreement with *committee* nouns in the LSAC, 9% showed semantic agreement, and so on. For both varieties, there is clear evidence of a monotonic increase in semantic agreement as we move rightwards along the hierarchy. The two varieties differ considerably, but each shows a pattern fully in accord with the requirement of the Agreement Hierarchy.

Since the English example is familiar and perhaps not too surprising, I will give a rather different set of data to confirm the effect of the Agreement Hierarchy. The data concern quantified expressions in Serbian/Croatian/Bosnian, consisting of a lower numeral ('two', 'three', 'four') or *oba* 'both' and a masculine noun of the first inflectional class. I have cited this construction previously, because it is so specific and unusual and yet it fits within the constraints of the Hierarchy perfectly. Moreover, there has been a second corpus study, confirming the results of earlier work.

In this construction, the noun stands in a special form, a survival of the dual number which is synchronically the same as the genitive singular. Attributive modifiers in this construction must take the ending -*a*. This form too is a remnant of the dual number, and here I will non-committally label it as 'remnant'.[5] It is an instance of syntactic agreement:

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[4] Since the relative pronoun does not mark number, Levin first checked his substantial data and confirmed that *which* normally takes a singular verb and *who* is normally followed by a plural. He then counted relative pronouns as singular or plural on this basis, rather than establishing their number each time from the verb. Since relative *that* allows greater choice, he included predicates of *that* within the predicate count. These decisions blur the picture somewhat, but Levin gives explicit information to allow others to recalculate and reinterpret his results (2001: 32–3, 55–60).

[5] A case can be made for treating it synchronically as the neuter plural (Corbett 1983: 13–14, 89–92).

(10) Serbian/Croatian/Bosnian
dv-a   dobr-a   brat-a
two-M.NOM   good-REMNANT   brother(M)-SG.GEN
'two good brothers'

In the predicate, the syntactically agreeing form (the remnant form) is possible, but so too is the masculine plural form, which represents semantic agreement:

(11) Serbian/Croatian/Bosnian
on-a   dv-a   brat-a   su
that-REMNANT   two-M.NOM   brother(M)-SG.GEN   AUX.3PL
nesta-l-a/nesta-l-i
disappear-PST-REMNANT/disappear-PST-M.PL
'those two brothers have disappeared'

The relative pronoun is also found in both forms:

(12) Serbian/Croatian/Bosnian
dv-a   brat-a   koj-a/koj-i...   On-i...
two-M.NOM   brother(M)-SG.GEN   who-REMNANT/who-M.PL...   3-M.PL...
'two brothers who.... They...'

However, as also illustrated in (12), the personal pronoun offers no choice; it must stand in the masculine plural form *oni* (we might have expected a remnant form, **ona*, but that form is not accepted).[6]

We have seen syntactic agreement in attributive position; both types of agreement occur in the predicate and the relative pronoun, and only semantic agreement is found with the personal pronoun. We have statistical data on the distribution of forms in the two relevant domains. The first set was collected before

Table 10.2. Semantic agreement (per cent) with lower numerals in Serbian/Croatian/Bosnian

	Attributive	Predicate	Relative pronoun	Personal pronoun
Sand (1971)	[0%]	18%	62%	[100%]
Serbian texts		(n=376)	(n=32)	
Leko (2000)	1%	42%	56%	100%
Bosnian texts	(n=507)[a]	(n=259)	(n=52)	(n=18)

[a] Leko (2000: 268) records six plural attributive modifiers, but these are of the frozen modifier *nekih* 'some', which is genitive plural, and not strictly relevant.

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[6] The pronoun is identical in a few forms with the demonstrative *onaj* 'that' (as in (11)); this is not significant for our examples.

my claim about the Agreement Hierarchy was first made. The figures are derived from Sand (1971: 55–6, 63), who surveyed texts mainly from Serbian and had a large proportion of newspapers in her sample. A second survey, by Leko (2000), specifically tests the validity of the Agreement Hierarchy (Table 10.2). This survey uses the Oslo Corpus of Bosnian texts from the 1990s (around 1.5 million words).

I give the percentage of masculine plural forms (semantic agreement) from the total of plural forms (the masculine plural and the remnant forms).[7] The figures in square brackets are included for the positions where Sand gives no data, since there is essentially no choice. The number of personal pronouns in Leko's count is small because subject pronouns are frequently dropped.

This construction is highly language-specific, and it is restricted to a few numerals together with nouns of one type only. Yet we still find a remarkably clear picture. Each successive cell in the table shows a monotonic increase in the likelihood of agreement with greater semantic justification. While the two corpora differ, they show essentially the same pattern. And more generally, the requirement of monotonic increase is much more constraining than the situation illustrated in Figure 10.1. For further discussion of the Agreement Hierarchy, see Cornish (1986: 203–11), Barlow (1991), and Wechsler and Zlatić (2003: 83–94).

3. EXAMPLES OF HIERARCHIES

We now turn to examples of typological hierarchies and will consider in turn syntactic, morphosyntactic, and lexical hierarchies.

3.1 Syntactic

A well-known syntactic hierarchy is the Accessibility Hierarchy, as presented in Keenan and Comrie (1977, 1979).

(13)   The Accessibility Hierarchy (Keenan and Comrie 1977)
       SU > DO > IO > OBL > GEN > OCOMP

The Hierarchy concerns the noun phrase positions which can be relativized, and the claim is that a SU(bject) is more accessible to relativization than a D(irect) O(bject), which is in turn more accessible than an I(ndirect) O(bject), and so on

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[7] The predicate may occasionally also be singular, something found much more frequently with higher numerals. To be consistent with Sand's count, we omit four such examples from Leko's figures.

through major OBL(ique), adnominal GEN(itive), and O(bject of) COMP(arison). Keenan and Comrie provide a semantic definition for relative clauses, such that a given language may have more than one relativization strategy (for instance, it may use relative clauses and participial phrases). However, the *primary* relative clause-forming strategy must apply to a top segment of the Hierarchy. In other words, if it applies to any position on the Hierarchy, it must also apply to all positions above that. It might apply just to the subject, or just to the subject and direct object, and so on. Let us begin with English examples, going from the top of the Hierarchy:

(14)   The student who is presenting the paper . . .

(15)   The paper which the student presented . . .

(16)   The student to whom I lent the book . . .

(17)   The book about which everyone is talking . . .

(18)   The student whose bike I borrowed . . .

(19)   The man who Mary is taller than . . .

The last example is possible, even if somewhat forced. Contrast this with French, where there are examples comparable to (14)–(18), but it is not possible to relativize on the last position on the Hierarchy (Keenan and Comrie 1977: 74):

(20)   French
       *le   jeune   homme   que   que   Marie
       DEF.ART.M.SG   young   man(M)   than   whom   Marie
       est   plus   grand-e
       be.3SG   more   tall-F.SG
       'the young man than whom Marie is taller'

This is an interesting difference between the two languages, brought out by the Hierarchy. Note that it is not necessary that every language should distinguish each position; the claim is rather that if there is a distinction, then any difference in accessibility will be constrained by the Hierarchy.

A great deal of data has been put forward and discussed concerning the Accessibility Hierarchy, and there are issues which continue to require consideration. The Hierarchy depends on the notion 'subject', which itself needs careful analysis in many languages. There are also interesting problems which arise when a language has more than one relativization strategy. For discussion of this important Hierarchy, see Comrie (1989: 155–60) and Song (2001a: 211–56).

3.2 Morphosyntactic

Here there are two well-established examples. There is the Agreement Hierarchy, which we have already discussed (section 1), and the Animacy Hierarchy, to which

we now turn. This hierarchy has been proposed in several variants and under various names. For an account of the precursors, see Corbett (2000: 55–6). We shall give a version modified from that presented by Smith-Stark (1974):

(21)   The Animacy Hierarchy (Corbett 2000: 56, following Smith-Stark 1974)
        speaker > addressee > 3rd person > kin > human > animate > inanimate
        (1st person (2nd person
        pronouns)   pronouns)

This Hierarchy constrains number marking as follows:

(22)   As we move rightwards along the Animacy Hierarchy, the likelihood of number being distinguished will decrease monotonically (i.e. with no intervening increase).

In many languages, we find, for instance, that not all nominals can distinguish number. Even in English, where number-differentiability extends further down the Hierarchy than in most languages, we come at the bottom to nouns like *health* and *friendliness* which do not distinguish number. For a survey of the evidence available, see Corbett (2000: 57–75). To take an interesting example showing the constraint at work, consider the Austronesian language Muna (a member of the Western Malayo-Polynesian branch), spoken on Muna, an island off the southeast coast of Sulawesi, Indonesia (van den Berg 1989: 51–2). Here we concentrate on verb agreement (rather than on the marking of nominals). Plural pronouns and plural nouns denoting humans take plural agreement:

(23)   Muna
        ihintu-umu   o-kala-amu
        2-PL   2-go-PL
        'you go'

Nouns denoting inanimates, even when carrying a plural marker (as in (24)), take singular agreement:

(24)   Muna
        bara-hi-no   no-hali
        good-PL-his   3SG.RLS-expensive
        'his goods are expensive'

That leaves non-human animates, which may take a singular or a plural verb:

(25)   Muna
        o   kadadi-hi   no-rato-mo/do-rato-mo
        ART   animal-PL   3SG.RLS-arrive-PFV/3PL.RLS-arrive-PFV
        'the animals have arrived'

In Muna, the data available suggest that noun marking and agreement are in accord with the Animacy Hierarchy; however, the cut-off point for agreement is higher than that for marking on the noun. Note, too, the variable behaviour of the non-human animates, which fits with the monotonic requirement of the constraint.

3.3 Lexical

It may seem surprising that there could be a typological hierarchy for lexis, but a particularly famous one, the Berlin and Kay Hierarchy, is of this type, and it has generated a good deal of research. It was proposed in part as a reaction to extreme forms of linguistic relativity, since it showed that colour terms—often a standard example to demonstrate relativity—are subject to typological constraints. Since it was first proposed, the Hierarchy has undergone various revisions; it retains its interest both for the ongoing debates on linguistic relativity and for the wealth of research on many languages which it stimulated.

As originally formulated by Berlin and Kay (1969: 5), the hierarchy consists of the following positions:

(26)   The Berlin and Kay Hierarchy

							PURPLE
WHITE		GREEN					PINK
	< RED <			< BLUE <	BROWN	<	
BLACK		YELLOW					ORANGE
							GREY

The Hierarchy constrains the possible inventories of basic colour terms as follows: the presence of any given term implies the existence of all those to the left (thus a language with a basic term for YELLOW will have basic terms for WHITE, BLACK, and RED). For example, Berlin and Kay (1969: 46, 60, 64) claimed that Dani (New Guinea) has terms for light shades [WHITE] and dark [BLACK], while Tiv (Nigeria) has in addition a term for RED, Hanunóo (Philippines) also has a term for GREEN, and so on.

Berlin and Kay were concerned with *basic* colour terms. Intuitively, it is clear that *red* is a basic colour term, while *avocado* and *the colour of my favourite sweater* are not. However, defining 'basic colour term' is not straightforward. Berlin and Kay gave a set of criteria (four main and four supplementary ones); these criteria are discussed in Corbett and Davies (1995), where various linguistic and behavioural measures for basicness are proposed and evaluated.

The Hierarchy constrains the possible colour inventories substantially, allowing relatively few of those which would otherwise be theoretically possible. In fact, it proved too restrictive, and so it underwent a series of revisions as more data and more systems emerged (see Kay, Berlin, and Merrifield 1991 and Kay, Berlin, Maffi, and Merrifield 1997 for a restatement of the Hierarchy). The restatement is less straightforwardly hierarchical in nature, which is why we retain the original version for exposition.

4. SUPPORT FROM OTHER PHENOMENA

Any proposed hierarchy must be justified by the range of data which it explains and the closeness of fit between the data and the claim made. Further support may also be available from rather different phenomena. That is, when a hierarchy is proposed and justified on the basis of one set of data, the case is strengthened if the hierarchy proves applicable to other phenomena, too. Let us see how this applies to the hierarchies already discussed.

The Accessibility Hierarchy was proposed to account for relative clause formation. It was then applied to a quite different phenomenon: the behaviour of the different noun phrases involved in causative constructions (Comrie 1975a, 1976b). This extension is discussed critically in Song (1996: 159–85) and Dixon (2000: 54–9).

The Agreement Hierarchy accounts for the possible patterns of syntactic and semantic agreement. It was later shown to be relevant to a related but different problem: the control possibilities of possessive adjectives (Corbett 1987). Here the question is not one of the distribution of different types of agreement (as in section 1) but rather whether the control of agreement of different targets is possible or not.

The Animacy Hierarchy has wide application. We saw above how it relates to number; it is also a determining factor in the distribution of case-marking patterns (nominative–accusative and ergative–absolutive). Indeed, it was work by Silverstein (published in 1976 but presented earlier) on case-marking which inspired Smith-Stark's use of the Hierarchy for the typology of number. For further discussion of its application to case, see Comrie (1989: 185–200) and Filimonova (2005).

By its nature, however, the Berlin and Kay Hierarchy applies to colour terms and cannot be extended to further phenomena.

5. USE OF HIERARCHIES FOR RESEARCH ON INDIVIDUAL LANGUAGES

Hierarchies are typically proposed on the basis of cross-linguistic data, i.e. in the nature of typology. Once proposed and justified, they have on occasion provided useful insights into individual languages. Just some illustrative examples are given here. Thus, Keenan (1975) applied the Accessibility Hierarchy in a study of relativization in English, with interesting results. He argued that the Hierarchy could be justified only cross-linguistically, since no one language could provide sufficient cut-off points to support the whole Hierarchy. Given that, would it then be reflected in a language which allows relativization at all points on the Hierarchy,

and for which it could therefore be argued to be irrelevant? Keenan collected 2,200 examples of relative clauses from a selection of English texts. Relativization on indirect objects was taken together with obliques. Usage showed a good fit with the Hierarchy in that relativization on subject position was by far the most frequent, followed by direct object, oblique, and genitive (and interestingly, there were no examples of relativization on the object of comparison like (20) above). This appears impressive. There is a possible alternative explanation, as Keenan himself points out, according to which the distribution would merely reflect the overall distribution of noun phrases in texts (i.e. subjects are the most frequent, then direct objects, and so on). This alternative suggestion has not actually been demonstrated.

Keenan further investigates different sorts of written texts, contrasting those with evidently simple sentence structures with those which presented greater complexity. Those which were more complex on other grounds showed more instances of relativization for positions lower on the hierarchy, as compared with the simpler texts (while still following it). Thus, use of relative clauses for less accessible positions goes hand in hand with other markers of complexity. And in general, Keenan shows that the Hierarchy is relevant for a language which, in principle, can relativize on all positions on the Accessibility Hierarchy. More recently, Herrmann (2005: 48–86) investigates relative clause strategies in British English dialects, and she pays particular attention to the Accessibility Hierarchy.

The Agreement Hierarchy was used to inform a series of small corpus studies of different Slavonic languages (Corbett 1983: 11–41, 158–9). Later, it was tested rigorously in a large-scale study of varieties of English (Levin 2001) and in a smaller investigation of Bosnian (Leko 2000).

The Berlin and Kay Hierarchy also proved an important tool for research into individual languages. It could be that there is simply a divide between basic and non-basic terms, the Hierarchy defines different possible inventories, and there is no more to be said. Corbett and Morgan (1988) investigated the other possibility: that even in a language with a full set of basic terms, the Hierarchy can still be observed. In other words, some terms are 'more basic' than others. One line of investigation was frequency of use. If the Hierarchy is no longer reflected in a language with a full inventory of colour terms, we have no prediction concerning frequency. If, however, the Hierarchy is still reflected, and we take frequency as an indicator of psychological salience (one of the Berlin and Kay criteria), then we may see effects of the Hierarchy in frequency. From a corpus of over one million words of 20th-century Russian (Zasorina 1977), we can extract the data given in Table 10.3.

If we bear in mind the null hypothesis, namely, that the Hierarchy should have no effect, then the picture presented here is quite striking. There is an evident pattern which is similar to the Hierarchy. Thus, the two most frequent terms are indeed *belyj* 'white' and *černyj* 'black'. The degree of correlation with the hierarchy is high, tau = .77, p < .001 (i.e. this would occur by chance less than once in 1,000).

Table 10.3. Frequency of basic colour terms in Russian texts

Term	No. of occurrences	Rank (basic terms)
belyj 'white'	471	2
černyj 'black'	473	1
krasnyj 'red'	371	3
zelenyj 'green'	216	4
želtyj 'yellow'	109	8
sinij 'dark blue'	180	5
goluboj 'light blue'	137	6
koričnevyj 'brown'	23	10
fioletovyj 'purple'	22	11
rozovyj 'pink'	49	9
oranževyj 'orange'	15	12
seryj 'grey'	116	7
Highest non-basics (for comparison)		
belosnežnyj 'snow-white'	67	
ryžyj 'ginger'	59	
buryj 'brown'	31	

See Corbett and Davies (1995: 304–12) for discussion of appropriate statistical tests for data relating to the Hierarchy.

There are also questions raised by the data in (30). Three basic colours are 'out of order'. First, *želtyj* 'yellow' has fewer occurrences than would fit its position on the Hierarchy; this is a common problem with YELLOW, found in several other languages besides Russian. *Koričnevyj* 'brown' is also low; it is taking over from an earlier BROWN term *buryj* (Corbett and Morgan 1988: 45, 48, 51–2). In this corpus, *buryj* is actually more frequent than *koričnevyj*; other counts of 20th-century Russian have reported *koričnevyj* to be the more frequent (Corbett and Morgan 1988: 47). *Seryj* 'grey' is higher than expected; this proved a general problem with the Hierarchy, and GREY was given 'wild card' status.

There are two general points here. There is a remarkable similarity between the Hierarchy and the frequency data in Russian. The match is not complete, and the Hierarchy leads us to new questions about Russian. The most interesting of these is the situation of blue. Both *sinij* 'dark blue' and *goluboj* 'light blue' behave as basic terms in Russian (and their frequency, shown in Table 10.3, is one piece of the evidence). This makes Russian particularly interesting in this respect. For fuller discussion, see Corbett and Morgan (1988) and Corbett and Davies (1995: 328–30).

6. FURTHER APPLICATIONS

6.1 Diachrony

Since a hierarchy constrains what is a possible language, it is also a constraint on language change, because languages move from one possible state to another. And indeed the requirement of monotonic increase sets bounds within which it is easy to conceive of particular changes.

As one example, changes in the balance of syntactic and semantic agreement often begin at the pronoun end of the Agreement Hierarchy. This is understandable, since the pronoun can be indefinitely distant from its antecedent, and this can lead to uncertainty as to the antecedent. Various examples are discussed in Corbett (1991: 248–59), including the interesting study of Wald (1975), who describes a change running through the gender system of some thirty Bantu languages in accord with the Agreement Hierarchy.

The Berlin and Kay Hierarchy is particularly relevant to diachronic study. Colour terms appear to have an evolutionary development. Most areas of typological interest are cyclical in nature: they rise, develop, decay, and are lost (and they can arise anew). Yet colour inventories seem only to grow.

6.2 Varieties

Linked to the issue of diachrony is that of varieties of a given language, since these may be the result of different changes or else of the same changes operating at different speeds. The most substantial study relating to hierarchies here is that of Levin (2001), who shows how the different varieties of English are remarkably different in their use of agreement and how at the same time this variation is subject to the constraint of the Agreement Hierarchy.[8]

7. FURTHER THEORETICAL ISSUES

We consider an extension of hierarchies and the relation of hierarchies to semantic maps.

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[8] Typological hierarchies also form the stimulus for psycholinguistic work: see Keenan and Hawkins (1987) for a study based on the Accessibility Hierarchy, and Corbett and Davies (1995: 312–25) for discussion of psycholinguistic approaches to the Berlin and Kay Hierarchy.

7.1 Sub-hierarchies

In some instances, the data are more complex than can be described by a simple hierarchy. For instance, Comrie (1975b) gives a hierarchy of predicate types, justifying this hierarchy mainly on the evidence of agreement with honorific pronouns. We might imagine that we could slot this hierarchy of predicate types into the Agreement Hierarchy simply by splitting the predicate position. However, this will not work, since the predicate type which favours semantic agreement to the greatest extent, the nominal predicate, is more likely to take semantic agreement than is the relative pronoun. We need a sub-hierarchy anchored in the Agreement Hierarchy at the predicate position (which is narrowed to the verbal predicate) with the other predicate types extending out (somewhat like a branch line on a railway):

(27)   The Agreement and Predicate Hierarchies

```
                        noun
                         ↗
                     adjective
                       ↗
                    participle
                   ↗
attributive  >  predicate  >  relative  →  personal
                verb          pronoun      pronoun
```
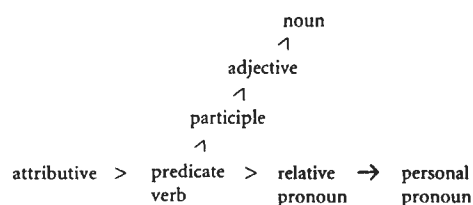
The claim for the monotonic increase in semantic agreement then applies to each link of the combined hierarchies. The resulting constraint is that semantic agreement will be more likely for predicate nouns than for predicate adjectives, and so on; however, there is no direct claim about the relative frequency for predicate nouns as compared with relative pronouns. For details and for the evidence in favour of this solution, see Corbett (1983: 87–8, 89–92, 163–74, 2006: 7.7.1) and Leko (2000: 271–7).

7.2 Semantic maps

It is worth asking how hierarchies relate to semantic maps, as proposed by Anderson (1974, 1982). A clear account of semantic maps is provided by Haspelmath (2003). The important point to note is that 'an implicational hierarchy allows far fewer language types and thus makes stronger predictions than an implicational map' (Haspelmath 2003: 238). For critical discussion of semantic maps, see Gil (2004: 414–6; also van der Auwera and Gast, this volume).

8. CONCLUSION

Hierarchies are a key part of linguistic typology. Even those which are restricted to binary choices make substantial testable claims. When we introduce the notion of monotonic increase, hierarchies allow us to make very strong claims. Given this, it is not surprising that relatively few have survived. The ones that do hold up in the face of the data place severe and interesting constraints on what is a possible human language.

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CHAPTER 11

PROCESSING EFFICIENCY AND COMPLEXITY IN TYPOLOGICAL PATTERNS

JOHN A. HAWKINS

1. INTRODUCTION

This chapter presents a research programme in which typological patterns are ultimately explained in terms of language processing and use. The central hypothesis is that grammars (implicational universals, hierarchies, and distributional preferences) are conventionalizations of the patterns and preferences that one observes in the performance of languages with structural choices (between competing word orders, relative clause structures, morphological alternatives, etc.). A number of typologists have been coming to this conclusion in recent years, and in Hawkins (2004), I refer to it as the 'Performance–Grammar Correspondence Hypothesis':

(1) *Performance–Grammar Correspondence Hypothesis* (PGCH)
     Grammars have conventionalized syntactic structures in proportion to their degree of preference in performance, as evidenced by patterns of selection in corpora and by ease of processing in psycholinguistic experiments.

Greenberg (1966a) was the first to draw attention to such correlating patterns in his discussion of markedness hierarchies, such as Singular > Plural > Dual > Trial/Paucal. Morphological inventories across grammars and declining allomorphy provided evidence for these hierarchies, while declining frequencies of use in languages with rich inventories suggested not only a correlation with performance but a possibly causal role for it in the evolution of the grammatical regularities themselves (Greenberg 1995: 163–4; see 3.2 below for illustration). Givón (1979: 26–31) meanwhile observed that performance preferences in one language corresponded to an actual categorical requirement for the relevant rule or property in another. The strong preference for definite over indefinite grammatical subjects in English, for example, has been conventionalized into a categorical requirement for definite subjects in Krio and other languages. Bybee and Hopper (2001) document the clear role of frequency in the emergence of a number of grammatical structures, and in Hawkins (1990, 1994, 2004), I argued that the preferred word orders in languages with choices are those that are most productively conventionalized as fixed orders in languages with less freedom.

The PGCH in (1) defines a very different relationship between performance and grammars from the classic one presented in Chomsky (1965) and subsequent publications. Although (competence) grammar is an important component of an overall performance model for Chomsky, he has argued that grammars are ultimately autonomous and independent of performance factors, and are determined by an innate U(niversal) G(rammar). In order to test the PGCH, therefore, we need to examine variation data both across and within languages. If patterns in the one (in grammars) match patterns in the other (in performance), the hypothesis will be supported. If there is no such match, it will not be. I will argue here that there is significant support for the PGCH. To make the discussion less anecdotal, illustrative data will be presented around some general organizing principles that describe common patterns in grammars and performance. Three of these principles will be presented here (following Hawkins 2004): Minimize Domains (section 2), Minimize Forms (section 3), and Maximize Online Processing (section 4). The first will be illustrated with patterns involving relative clauses; the second, with morphological data and markedness hierarchies; and the third, with a number of linear precedence regularities that hold across different language types. These principles are not claimed to be exhaustive or exclusive of others, but they simply have wide applicability to a broad range of patterns. Section 5 presents my conclusions, summarizes some general issues raised by this approach to linguistic typology, and discusses challenges that remain.

2. MINIMIZE DOMAINS

One clear principle of efficiency and complexity, evident in both grammars and performance, involves the size of the syntactic domain in which a given grammatical relation can be processed. How great is the distance separating interrelated items, and

how much material needs to be processed simultaneously with the processing of this relation? In those languages and structures in which domain sizes can vary in performance, we see a clear preference for the smallest possible domains. In those languages and structures in which domain sizes have been grammatically fixed, we see the same preference in the conventions. The relevant organizing principle here is defined as follows in Hawkins (2004: 31):

(2) *Minimize Domains* (MiD)

  The human processor prefers to minimize the connected sequences of linguistic forms and their conventionally associated syntactic and semantic properties in which relations of combination and/or dependency are processed. The degree of this preference is proportional to the number of relations whose domains can be minimized in competing sequences or structures, and to the extent of the minimization difference in each domain.
  Combination = Two categories (A and B) are in a relation of combination iff they occur within the same syntactic mother phrase or maximal projection (phrasal combination), or if they occur within the same lexical co-occurrence frame (lexical combination).
  Dependency = Two categories (A and B) are in a relation of dependency iff the parsing of B requires access to A for the assignment of syntactic or semantic properties to B with respect to which B is zero-specified or ambiguously or polysemously specified.

Consider relative clause formation. It involves a dependency between the head of the relative clause and the position relativized on, i.e. the gap, subcategorizer, or resumptive pronoun within the clause that is co-indexed with the head; compare Hawkins (1999, 2004) for a summary of the different formalizations and theories here. I have argued in Hawkins (1999, 2004) that various hierarchies can be set up on the basis of increasing domain sizes for relative clause processing, measured in terms of the smallest number of nodes and structural relations that must be computed in order to match the relative clause head with the co-indexed gap, subcategorizer, or resumptive pronoun. One of these hierarchies is Keenan and Comrie's original (1977) Accessibility Hierarchy, which is formulated as (3) in Comrie (1989) (SU=subject, DO=direct object, IO=indirect object, OBL=oblique, GEN=genitive):

(3) Accessibility Hierarchy (AH): SU > DO > IO/OBL > GEN

Examples of relative clauses formed on each of these positions are given in (4).

(4) a. the professor$_i$ [that $\emptyset_i$ wrote the letter]   *SU*
   b. the professor$_i$ [that the student knows $\emptyset_i$]   *DO*
   c. the professor$_i$ [that the student showed the book to $\emptyset_i$] *IO/OBL*
   d. the professor$_i$ [that the student knows his$_i$ son]   *GEN*

A 'filler-gap' or 'filler-subcategorizer' domain for relativization on the DO position necessarily contains a co-occurring SU (and more phrasal nodes); a relative on a SU need not contain (and regularly does not contain) a DO. A relativized IO contains a SU and a DO. It is co-occurrence asymmetries such as these between arguments, coupled with the added phrasal complexity of the lower AH positions (OBL and especially GEN), that I believe underlies the Accessibility Hierarchy. Whether this is the correct account or not, there are clear patterns across grammars, and there are equally clear correlating patterns in performance, which I shall now summarize.

2.1 Patterns in the grammar of relative clauses

One of the most striking patterns that Keenan and Comrie (1977) presented in favour of (3) involved languages that 'cut off' at different points down the hierarchy; that is, their grammars permitted relative clauses to be formed on all higher positions above the cut-off, but not on lower positions. Illustrative languages cited by Keenan and Comrie are those in (5):

(5) Rules of relative clause formation and their cut-offs within the clause:
   SU only: Malagasy, Māori
   SU & DO only: Kinyarwanda, Indonesian
   SU & DO & IO only: Basque
   SU & DO & IO & OBL only: North Frisian, Catalan
   SU & DO & IO & OBL & GEN: English, Hausa

A further pattern involved the distribution of gap strategies ([–Case] in Keenan and Comrie's terminology) and resumptive pronouns (as a type of [+Case] strategy). The difference between the two can be illustrated with the following pair from Hebrew (Ariel 1990):

(6) a. Shoshana hi ha-isha$_i$ [she-nili ohevet $\emptyset_i$]
     Shoshana is the-woman   that-Nili loves

   b. Shoshana hi ha-isha$_i$ [she-nili ohevet ota$_i$]
     Shoshana is the-woman   that-Nili loves her

The sentence in (6a) involves a gap, and that in (6b), a resumptive pronoun. Languages with gaps show the same hierarchy pattern as (5), i.e. for relativization as a whole (regardless of strategy): if a gap is grammatical on a low position of the AH, it is grammatical on all higher positions. Resumptive pronouns show the reverse pattern: if a resumptive pronoun is grammatical on a high position, it is grammatical on all lower positions (that can be relativized at all).

  This can be seen graphically in Table 11.1, in which I quantify the distribution of gaps to pronouns for 24 languages from the Keenan–Comrie language sample that

Table 11.1. Languages combining [−Case] gaps with [+Case] pronouns (Keenan and Comrie 1977)

	SU	DO	IO/OBL	GEN
Aoban	gap	pro	pro	pro
Arabic	gap	pro	pro	pro
Gilbertese	gap	pro	pro	pro
Kera	gap	pro	pro	pro
Chinese (Peking)	gap	gap/pro	pro	pro
Genoese	gap	gap/pro	pro	pro
Hebrew	gap	gap/pro	pro	pro
Persian	gap	gap/pro	pro	pro
Tongan	gap	gap/pro	pro	pro
Fulani	gap	gap	pro	pro
Greek	gap	gap	pro	pro
Welsh	gap	gap	pro	pro
Zurich German	gap	gap	pro	pro
Toba Batak	gap	•	pro	pro
Hausa	gap	gap	gap/pro	pro
Shona	gap	gap	gap/pro	pro
Minang-Kabau	gap	•	•/pro	pro
Korean	gap	gap	gap	pro
Roviana	gap	gap	gap	pro
Turkish	gap	gap	gap	pro
Yoruba	gap	gap	0	pro
Malay	gap	gap	RP	pro
Javanese	gap	•	•	pro
Japanese	gap	gap	gap	gap/pro
Gaps =	24 [100%]	17 [65%]	6 [26%]	1 [4%]
Pros =	0 [0%]	9 [35%]	17 [74%]	24 [96%]

Key: gap = [−Case] strategy
pro = copy pronoun retained (as a subinstance of [+Case])
• = obligatory passivization to a higher position prior to relativization
0 = position does not exist as such
RP = relative pronoun plus gap (as a subinstance of [+Case])
[−Case] gap languages may employ within the relative clause a general subordination marker, no subordination marking, a participial verb form, or a fronted case-invariant relative pronoun. For Tongan, an ergative language, the top two positions of the AH are Absolutive and Ergative respectively, not SU and DO; compare Primus (1999).

have both. Gaps decline down the AH, 100% to 65% to 25% to 4%; pronouns increase (0% to 35% to 75% to 96%).

The intuition that emerges from this reverse hierarchy pattern is that gaps are associated with simpler environments (the smaller 'filler-gap domains', especially SU and DO) and extend to lower positions only if all higher AH positions also permit a gap. Conversely, pronouns favour more complex environments (GEN and OBL) and extend to simpler ones only if the complex positions also permit a pronoun. A plausible explanation that will be supported by the performance data in 2.2 is that gaps are harder to process than resumptive pronouns, and prefer smaller structural domains for the various relations that need to be computed in relative clause processing. For example, the pronoun *ota* in (6b) provides a local and minimal domain for processing the lexical co-occurrences (i.e. the argument structure) of the verb *natan* (loves), and does not need to extend this search for arguments to the head of the relative itself (*isha*). Only co-indexing need apply non-locally, linking $isha_i$ and la_i, making domains of processing more minimal overall (see below).

Numerous language-particular rules confirm this pattern of gaps in smaller relativization domains and pronouns in larger ones; for example, in Cantonese. The pronoun is ungrammatical in the simple relative (7b) but grammatical in (8), in which there is a bigger distance between co-indexed pronoun and relative clause head, i.e. a more complex relativization domain (Matthews and Yip 2003):

(7) a. [Ngo5   ceng2 $\emptyset_i$]   go2   di1 $pang4jau5_i$
         I   invite   those CLF   friend
      'friends that I invite'

    b. *[Ngo5 $ceng2_i$ $keoi5dei6_i$]   go2   di1 $pang4jau5_i$
          I   invite   them   those CLF   friend

(8) [Ngo5   ceng2   ($keoi5dei6_i$)   sik6-faan6]   go2   di1 $pang4jau5_i$
       I   invite   (them)   eat-rice   those CLF   friend
     'friends that I invite to have dinner'

It should be pointed out that these patterns and limitations on relativization are quite surprising from a purely grammatical perspective. They are different from the kinds of subjacency constraints of Ross (1966), Chomsky (1981), and Rizzi (1982) that apply across clause boundaries, and no formal principle has been proposed, to my knowledge, that predicts or in any way motivates the AH cut-off patterns of (5) and the reverse hierarchy pattern of Table 11.1 for gaps and pronouns. There have been isolated attempts in the formal literature to describe the AH cut-off for a particular language in a descriptively adequate way (see Cole 1976 for Hebrew). But such descriptions do not explain why the observed universals exist rather than countless others that could just as readily be formalized given current grammatical machinery (e.g. relativization on a DO only, or pronouns high and gaps low). The fact that there is a correlation between patterns of performance and processing

complexity is of some theoretical interest, therefore, for the whole question of the origin of grammatical conventions (cf. section 5).

2.2 Patterns in the performance of relative clauses

Some initial performance support for the AH as a complexity ranking was proposed by Keenan and Hawkins (1987) on the basis of a repetition experiment conducted on speakers of English, children (11 years) and adults. The prediction was that repetition accuracy would correlate with positions on the hierarchy, subjects being easiest. The data, shown in (9), bear this out (GEN-SU stands for relativization on a genitive within a subject; GEN-DO, for relativization on a genitive within a direct object, as in (4d)):

(9)   Accuracy percentages for English relativizations in a controlled repetition experiment

	SU	DO	IO	OBL	GEN-SU	GEN-DO
Adults	64	62.5	57	52	31	36
Children	63	51	50	35	21	18

The relative ranking SU > DO has been corroborated by a number of further studies in the psycholinguistic literature, mostly from English. Wanner and Maratsos (1978) were the first to provide experimental evidence for a measurable processing load within a filler-gap domain and for the added processing load of DO relatives compared with SU. Pickering and Shillcock (1992) found significant reaction time differences between the two positions in a self-paced reading experiment; compare King and Just (1991), Holmes and O'Regan (1981), Ford (1983), and Hawkins (1999, 2004) for further references and for a metric measuring increasing processing complexity down the AH.[1] These experimental results suggest that, as the surface domains grow that need to be processed in order to link the relative clause head with the position relativized on, the amount of simultaneous processing and the demands on working memory increase. If the position relativized on is a gap, then the very identification of this position is difficult and requires access to the gap's subcategorizer and/or its structural environment, and to the filler (i.e. the relative clause head) upon which the gap is dependent. All of these considerations are reflected in the definition of a filler-gap domain given in Hawkins (1999, 2004), which identifies the smallest amount of surface structure containing information sufficient for the unambiguous parsing of a filler-gap dependency.[2]

[1] Gibson's (1998) 'locality' principle makes many similar predictions to those of MiD, and the wealth of experimental support that he summarizes there carries over to the MiD.

[2] A Filler-Gap Domain (FGD) is defined as follows in Hawkins (1999): A FGD consists of the smallest set of terminal and non-terminal nodes dominated by the mother of a filler and on a connected path that must be accessed for gap identification and processing; for subcategorized gaps,

Some corpus data from Hebrew (Ariel 1999) provide performance support for the grammatical patterns involving gaps versus pronouns presented in 2.1. Ariel shows that the Hebrew gap is favoured with smaller distances between filler and gap. For example (6a) above, with a minimal distance between filler and gap, is significantly preferred over (6b) with a resumptive pronoun. The pronoun becomes productive when filler-gap domains would be larger, as in (10).

(10)   Shoshana hi ha-isha$_i$ [she-dani   siper   she-moshe   rixel
Shoshana   is   the-woman that-Danny   said   that-Moshe   gossiped
she-nili   ohevet   ota$_i$]
that-Nili   loves   her

This intuition is formalized in Hawkins (2004) by calculating how minimal the total domains can be for Filler-Gap (or Filler-Subcategorizer) processing, for Head–Pronoun co-indexing, and for Lexical Argument Structure processing (FGD, HPD, and LD respectively):

(10′)   a.   Shoshana hi [ha-isha[she-dani siper she-moshe rixel she-nili ohevet Ø]]
FGD: --
                1   2   3   4   5   6   7   8   9   10

LD: *ohevet*   --
                1   2   3   4   5   6   7   8   9   10

                                              Domian total = 20

b.   Shoshana hi [ha-ishai[she-dani siper she-moshe rixel she-nili ohevet otai]]
HPD: --
            1   2   3   4   5   6   7   8   9   10   11

LD: *ohevet*   ----------------------
                                              1   2   3

                                              Domain total = 14

In (10′b), the pronoun provides a local argument *ota* (her) for lexical processing of *ohevet* (loves), whereas in (10′a) lexical processing needs to access the more distant head *ha-isha* (woman) in order to assign a direct object to *ohevet*. The subject *nili* is adjacent to *ohevet* in both cases. More generally, pronoun retention can be hypothesized to reflect the sizes of the domains in which these various relations are

the path connects the filler to the gap's subcategorizer and includes, or is extended to include, the gap's dependent and disambiguating arguments (if any); for non-subcategorized gaps, the path connects the filler to the gap site; all constituency relations and co-ocurrence requirements holding between these nodes belong to the description of the FGD.

processed. The bigger the improvement, the greater will be the preference for the pronoun.[3]

Finally, consider some performance data of relevance to the AH involving the acquisition of relative clauses, specifically the (second) language acquisition of Swedish by speakers of languages whose grammars have productive resumptive pronouns in relatives (Persian and Greek) and by speakers whose grammars do not (Spanish and Finnish). Swedish itself has relative clauses not unlike those of English: a relative pronoun co-indexed with the head of the relative is moved to the left of the relative clause, leaving a gap (or subcategorizer) with no resumptive pronoun. Acquisition data quantified by Hyltenstam (1984) for the different groups of learners show two clear patterns (see. Table 11.2). First, the frequency of resumptive pronouns in Swedish L2 is greater when the L1 has productive pronouns (Persian and Greek) than when it does not. This 'transfer effect' is relevant to theories of second language acquisition, and confirms its significance among the various factors that shape second language acquisition (compare the papers in Doughty and Long 2003

Table 11.2. Gaps and pronouns in Swedish second language acquisition (Hyltenstam 1984)

	SU (%)	DO (%)	IO/OBL (%)	GEN (%)
Gaps				
Persian>Swedish	100	42	25	8
Greek>Swedish	100	58	42	8
Spanish>Swedish	100	83	62	8
Finnish>Swedish	100	100	100	33
Pronouns				
Persian>Swedish	0	58	75	92
Greek>Swedish	0	42	58	92
Spanish>Swedish	0	17	38	92
Finnish>Swedish	0	0	0	67

[3] Other processing factors impact on preferences for relative clause variants, beyond minimal domains of the kind defined here. For example, the overall size and complexity of a relative clause leads to a preference for the explicit relative pronoun in English (vs. zero), even when additional material in the relative is in postverbal (or post-gap) position and falls outside the filler-gap and lexical domains of Hawkins (2004); compare Race and MacDonald (2003) and Jaeger and Wasow (2005). There are also more resumptive pronouns in adjunct rather than argument positions in Hebrew and in non-restrictive vs. restrictive relatives (Ariel 1999). Domain minimization is just one pattern predictor, therefore, and it remains to investigate whether grammars have responded to the other patterns as well. Some factors, such as overall terminal length of the relative, will be harder to grammaticalize, for reasons discussed in Hawkins (1994: 19–24).

and Ramat 2003 for discussion of these factors). Second, what is of significance in the present context is that the general pattern of gaps to pronouns is always the same, regardless of transfer: gaps decline from top to bottom down the AH, while pronouns increase. The absolute quantities for pronouns are higher in the L1s that retain pronouns, but the relative distribution of gaps to pronouns is exactly what we have seen in the grammatical data of Table 11.1, further confirming the processing basis for gaps in smaller, and pronouns in more complex, environments.

3. MINIMIZE FORMS

The second principle of efficiency and complexity to be proposed here is (11):

(11)   *Minimize Forms* (MiF)
The human processor prefers to minimize the formal complexity of each linguistic form (F) (its phoneme, morpheme, word, or phrasal units) and the number of forms with unique conventionalized property assignments, thereby assigning more properties to fewer forms. These minimizations apply in proportion to the ease with which a given property (P) can be assigned in processing to a given F.

The processing of linguistic forms and of conventionalized property assignments (such as their meanings and syntactic properties) requires effort. Minimizing forms and their property assignments can reduce that effort by fine-tuning it to information that is already active in processing, through accessibility, high frequency, and inferencing strategies of various kinds. According to MiF, minimization is accomplished, first, by reducing the set of formal units in a form or structure and, secondly, by reducing the number of forms with unique property assignments.

3.1 Form minimization patterns in performance and grammars

Examples abound whose patterning suggests that a reduction in form processing is an advantage, as long as the relevant information can be recovered in processing. Consider the use of pronouns versus full NPs (*he/she* versus *the professor*; cf. Ariel's 1990 discussion of high versus low accessibility in discourse correlating with less versus more formal structure respectively), Zipfian (1949) effects (the shorter *TV* for the high-frequency *television*), compounds (*paper plate* for *plate made of paper*; *paper factory* for *factory that makes paper*; cf. Sperber and Wilson's 1995 theory of relevance to, and activation of, real-world knowledge in the processing of minimal

structures), coordinate deletions (*John cooked Ø and Fred ate the pizza*), and control structures involving understood subjects of verbs within non-finite subordinate clauses (whose controllers are in a structurally accessible matrix clause position). Filler-gap dependencies in, for example, relative clauses are also plausibly motivated by (11). Gaps can be identified by reference to their subcategorizer and to the filler with which they are co-indexed. The result is a more minimal structure than resumptive pronoun counterparts, but the advantage of minimalism disappears in complex environments in which processing domains become larger (cf. 2.2).

Form reduction is supported further by the Economy Principle of Haiman (1983) and by the data that he summarizes from numerous languages. It is also reminiscent of Grice's (1975) second Quantity maxim for pragmatic inferencing ('Do not make your contribution more informative than is required'), and more specifically of Levinson's (2000a) Minimization principle derived from it ('Say as little as necessary'; i.e. produce the minimal linguistic information sufficient to achieve your communicational ends).

The minimization principle of (11) adds a second factor to this efficiency logic, beyond forms themselves and defined in terms of the properties that are conventionally associated with forms. It is not efficient to have a distinct form (F) for every possible property (P) that one might wish to express in everyday communication. To do so would greatly increase the number of form–property pairs in a language and the length and complexity of each proposition. Choices have to be made over which properties get priority for unique assignment to forms, and the remaining properties are then assigned to forms that are ambiguous, vague, or zero-specified with respect to the property in question. It is up to the context, broadly construed, to permit assignment of the intended P1 to a form (F) that is compatible with a larger set of properties {P}.

There are numerous semantic and syntactic properties that are frequently occurring in performance and that have priority in grammatical and lexical conventions across languages. The property of causation is invoked often in everyday language use and is regularly conventionalized in the morphology, syntax, or lexicon (Comrie 1989, Shibatani 1976a). Agenthood and patienthood are frequently expressed and are given systematic (albeit partially different) formal expression in ergative-absolutive, nominative-accusative, and active languages (Primus 1999). Very frequent speech acts (asserting, commanding, and questioning) are each given distinct formal expression across grammars, whereas less frequent speech acts—such as baptizing or bequeathing—are assigned separate lexical items but not a uniquely distinctive construction in the syntax (Sadock and Zwicky 1985). Within the lexicon, the property associated with *teacher* is used frequently in performance; that of *teacher who is late for class,* much less so. The event of *X hitting Y* is selected frequently; that of *X hitting Y with X's left hand,* less so. The more frequently selected properties are conventionalized in single lexemes or unique categories, phrases, and constructions in all these examples. Less frequently used properties must then be expressed

through word and phrase combinations, and their meanings must be derived by a process of semantic composition. This makes the expression of more frequently used meanings shorter, that of less frequently used meanings longer, which makes communication more efficient overall.

(11) asserts that there is a trade-off between form minimizations as defined here and the ease with which such additional properties can be assigned to forms through processes that are variously described as processing enrichments, inferences, implicatures, and sentence-internal dependencies of various sorts (e.g. filler-gap dependencies). This provides a check on how far minimization can go (one cannot minimize everything and assign all properties through enrichment), and it enables us to make some testable predictions for grammars and performance:

(12)   *Form Minimization Predictions*

    a. The formal complexity of each F is reduced in proportion to the frequency of that F and/or the processing ease of assigning a given P to a reduced F (e.g. to zero).

    b. The number of unique F:P1 pairings in a language is reduced by grammaticalizing or lexicalizing a given F:P1 in proportion to the frequency and preferred expressiveness of that P1 in performance.

In effect, form minimizations require compensating mechanisms. (12a) asserts that frequency and processing ease regulate reductions in form (their associated properties are more readily inferable), while frequency and preferred expressiveness regulate the grammaticalization and lexicalization preferences of (12b), which also makes utterances shorter.

3.2 Greenberg's markedness hierarchies

The effects of these predictions can be seen clearly in Greenberg's (1966a) markedness hierarchies, such as (13):

(13)   Sing > Plur > Dual > Trial/Paucal (for number) (Greenberg 1966a, Croft 2003a)
    Nom/Abs > Acc/Erg > Dat > Other (for case marking) (Primus 1999)
    Masc, Fem > Neut (for gender) (Hawkins 1998)
    Positive > Comparative > Superlative (Greenberg 1966a)

Greenberg argued that these hierarchies also defined frequency rankings for the relevant properties in each domain. For example, the relative frequencies of number inflections on nouns in a corpus of Sanskrit were:

(14)   Singular = 70.3%; Plural = 25.1%; Dual = 4.6%

The other hierarchies had similar frequency correlates. In other words, these hierarchies appear to be *performance frequency rankings* defined on entities within common

grammatical and/or semantic domains. The ultimate causes of the frequencies can be quite diverse (real-world frequencies of occurrence, communicative biases in favour of animates rather than inanimates, syntactic and semantic complexity). What is significant for grammars is that these performance rankings are reflected in cross-linguistic patterns that conventionalize morphosyntax and allomorphy in accordance with (12a and b).

(15) *Quantitative Formal Marking Prediction*
       For each hierarchy (H), the amount of formal marking (i.e. phonological and morphological complexity) will be greater or equal down each hierarchy position.

(15) follows from (12a). For example, in Manam, the third singular suffix on nouns is zero; the third plural is -*di*; the third dual is -*di-a-ru*; and the third paucal is -*di-a-to* (Lichtenberk 1983). The amount of formal marking increases from singular to plural, and from plural to dual, and is equal from dual to paucal, in accordance with the hierarchy in (13). Similarly, English singular nouns are zero-marked, whereas plurals are formally marked, generally with an -*s* allomorph.

(16) *Morphological Inventory Prediction*
       For each hierarchy (H [A > B > C]), if a language assigns at least one morpheme uniquely to C, then it assigns at least one uniquely to B; if it assigns at least one uniquely to B, it does so to A.

(16) follows from (12b). A distinct dual implies a distinct plural and singular in the grammar of Sanskrit, and a distinct dative implies a distinct accusative and nominative in the case grammar of Latin and German (or a distinct ergative and absolutive in Basque; cf. Primus 1999). A unique number or case assignment low in the hierarchy implies unique and differentiated numbers and cases in all higher positions.

(17) *Declining Distinctions Prediction*
       For each hierarchy (H), any combinatorial features that partition references to a given position on H will result in fewer or equal morphological distinctions down each lower position of H.

(17) also follows from (12b). For example, unique gender-distinctive pronouns can exist for the singular and not for the plural in English (*he/she/it* vs. *they*), whereas the converse uniqueness is not predicted.
      More generally, (16) and (17) lead to a general principle of cross-linguistic morphology:

(18) *Morphologization*
       A morphological distinction will be grammaticalized in proportion to the performance frequency with which it can uniquely identify a given subset of entities {E} in a grammatical and/or semantic domain (D).

This principle enables us to make sense of cases of 'markedness reversals'. For example, in certain nouns in Welsh whose referents are much more frequently

plural than singular, like 'leaves' and 'beans', it is the singular form that is morphologically more complex than the plural; that is, *deilen* ('leaf') vs. *dail* ('leaves'), *ffäen* ('bean') vs. *ffa* ('beans') (cf. Haspelmath 2002: 244).

4. MAXIMIZE ONLINE PROCESSING

The third principle I propose is (19):

(19) *Maximize Online Processing* (MaOP)
       The human processor prefers to maximize the set of properties that are assignable to each item (X) as X is processed, thereby increasing O(nline) P(roperty) to U(ltimate) P(roperty) ratios. The maximization difference between competing orders and structures will be a function of the number of properties that are unassigned or misassigned to X in a structure/sequence (S), compared with the number in an alternative.

This principle asserts that it is preferable to be able to recognize syntactic and semantic properties efficiently throughout the processing of a sentence, and a quantitative metric for measuring this (in terms of OP-to-UP ratios) is proposed in Hawkins (2002, 2004).[4] What is dispreferred is, first, any significant delay or 'look ahead' (Marcus 1980) in online property assignments, and second any misassignment of properties online. Misassignments result in so-called garden path effects, whereby one analysis is chosen online and is then subsequently corrected in favour of a different analysis when more material has been processed. A famous example is *the horse raced past the barn fell*, which is first assigned a main clause reading and then a reduced relative reading when the (matrix verb) *fell* is encountered (see MacDonald, Pearlmutter, and Seidenberg 1994). Such backtracking is difficult for the processor, but it is also inefficient, since initial property assignments are wasted and make no contribution to the ultimate syntactic and semantic representation of the sentence.

4.1 Maximize Online Processing in typological patterns

We see a clear reflex of (19) in a number of patterns across languages that involve asymmetrical ordering preferences between two categories (A and B), regardless of the language type. Ordering A before B maximizes online processing in these cases;

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[4] Notice that Maximize Online Processing is formulated in terms of parsing and the hearer, since the speaker does not make structural misassignments online and can enrich unassignments based, inter alia, on knowledge of what is to be produced later.

the reverse would involve significant unassignments or misassignments, and MaOP provides a plausible explanation for these conventionalized asymmetries. A sample is given in (20), together with my best estimate of the level of quantitative support for each preference.

(20) a. Displaced WH preposed to the left of its (gap-containing) clause [almost exceptionless; 4.2 and Hawkins 1999, 2004]
Who$_i$ [did you say $\emptyset_i$ came to the party]

b. Topic to the left of a dependent Predication [exceptionless for some dependencies; highly preferred for others; 4.3 and Hawkins 2004]
e.g. Japanese *John wa gakusei desu* 'Speaking of John, he is a student' (Kuno 1973)

c. Head Noun (Filler) to the left of its (gap-containing) Relative Clause e.g.
the students$_i$ [that I teach $\emptyset_i$]
If a language has basic VO, then N+Relative [exceptions = rare; 4.2 and Hawkins 1983, 2004]

VO	OV
NRel (English)	NRel (Persian)
*RelN	RelN (Japanese)

d. Antecedent precedes Anaphor [highly preferred cross-linguistically; 4.4]
e.g. *John washed himself* (SVO), *Washed John himself* (VSO), *John himself washed* (SOV) = highly preferred over, e.g. *Washed himself John* (VOS)

e. Wide Scope Quantifier/Operator precedes Narrow Scope Q/O [preferred; 4.4]
e.g. *Every student a book read* (SOV languages) $\forall\exists$ preferred
A book every student read (OSV orders in SOV languages) $\exists\forall$ preferred

f. Restrictive Relative precedes Appositive Relative (4.4 and Hawkins 2002, 2004)
If N+Relative, then restrictive before appositive relative [exceptionless?]
e.g. *Students that major in mathematics, who must work very hard* (R+A)
Students, who must work very hard, that major in mathematics (A+R)

In these asymmetric orders, there is an asymmetric dependency of B on A: the gap is dependent on the filler (for gap-filling), the anaphor on its antecedent (for co-indexation), the predication on a topic (for e.g. argument assignment), the narrow scope quantifier on the wide scope quantifier (the number of books read depends on the quantifier in the subject NP in *Every student read a book/Many students read a book// Three students read a book*), and so on. The assignment of dependent properties to B is more efficient when A precedes, since these properties can be assigned immediately in online processing. In the reverse, B + A, there would be delays in property assignments online ('unassignments') or misanalyses ('misassignments'). For example, if the gap were to precede the wh-word in *[you said $\emptyset_i$ came to the party] who$_i$* there would be a delay in assigning the subject argument to *came*; similarly, if the predication *gakusei desu* preceded the topic *John wa* in Japanese. Let us pursue this idea in more detail.

4.2 Fillers First

Gaps are dependent on their fillers for co-indexation and co-reference, and also for recognizing the position to be filled (in conjunction with access to the subcategorizer, if there is one), whereas fillers are not so dependent on their gaps. This results in a preference for fillers before gaps or Fillers First (20a, c), cf. Hawkins (1999, 2004) and Fodor (1983). When the gap follows the filler, the filler can be fully processed online, and the properties that are assigned by reference to the filler can be assigned immediately to the gap online, resulting in an efficient distribution of property assignments throughout the sentence. But if the gap precedes, its full properties can only be assigned retrospectively when the filler is encountered, resulting in a processing delay and in frequent garden path effects as matrix and subordinate clause arguments are redistributed to take account of a gap that is activated by late processing of the filler (Antinucci, Duranti, and Gebert 1979, Clancy, Jacobsen, and Silva 1986). Therefore, Fillers First maximizes online property assignments.

When the filler is a wh-word in a wh-question (20a), there is unambiguous cross-linguistic support for Fillers First: almost all languages that move a wh-word to clause peripheral position move it to the left, not to the right (Hawkins 2004). In relative clauses (20c), there is also clear support, but Fillers First is now in partial conflict with a Minimal Domain preference for noun-final NPs in head-final languages (Hawkins 1994, 2004). Head-initial languages have consistently right-branching relatives (e.g. [V [N S]]), which are motivated both by MiD and by Fillers First. But head-final languages have either left-branching relatives ([[S N] V]), which is good for MiD but which positions the gap before the filler, or right-branching relatives ([[N S] V]), which is good for Fillers First but which creates non-adjacency between heads and makes domains for phrasal processing longer. The variation here points to the existence of two preferences, whose predictions overlap in one language type but conflict in the other.

The head-final languages that prefer left-branching relatives appear to be the rigid ones like Japanese, in which there are more containing head-final phrases (such as V-final VPs) that prefer the head of the NP to be final as well (by MiD). Non-rigid head-final languages have fewer containing phrases that are head-final and so define a weaker preference for noun-finality, allowing Fillers First to assert itself more, which results in more right-branching relatives (see Lehmann 1984 for numerous exemplifying languages).

4.3 Topics First

A related structure involves topicalized XPs with gaps in a sister S. These generally precede S across languages (Gundel 1988, Primus 1999). The reverse ordering could

be optimal for scope marking, but it is either ungrammatical or dispreferred, and this provides further evidence for MaOP. The asymmetry disappears when a co-indexed pronoun replaces the gap, resulting in left- or right-dislocation structures, suggesting that it is the gap that contributes substantially to the linear precedence asymmetry. The preference for Topics First is motivated by the dependence of the gap on the filler for gap identification and filling, as before. In addition, the 'aboutness' relation between the predication and the topic (Reinhart 1982), coupled with the regular referential independence or givenness of the topic, means that semantic processing of the predication is often incomplete without prior access to the topic, whereas the topic can be processed independently of the predication. For example, Tsao (1978) gives numerous examples from Mandarin Chinese of a topic phrase providing information that is required for interpretation of the predication, making these predications *dependent* on the topic as this term is defined here. These examples include:

(i) **argument assignment** to, and disambiguation of the subcategorizer in, the predication:

(21) Jang San (a), dzwo-tyan lai kan wo.   (argument assignment)
      Jang San (Topic Part), yesterday (he) came (to) see me.

(ii) **argument enrichments**, whereby the topic provides a **possessor** (22), **class** (23), **set** (24), or **restrictive adjunct** (25) relative to which an argument in the predication is interpreted:

(22) Jei-ge ren (a), tounau jyandan.   (argument enrichment:
      This-Classif man (Topic Part), (his) mind (is) simple.   possessor-possessed)

(23) Wu-ge pinggwo (a), lyang-ge hwai-le.   (argument enrichment:
      Rice-Classif apples (Topic Part), two-Classif (are) spoiled.   class-member)

(24) Ta-de san-ge haidz (a), yi-ge dang lyushr.   (argument enrichment:
      His three-Classif children (Topic Part), one-Classif serve-as lawyer. set-member)

(25) Jei-jyan shr (a), wo-de jingyan tai dwo-le.   (argument enrichment:
      This-Classif matter (Topic Part), my experience too many.   restrictive adjunct)

and (iii) **predicate enrichments**, whereby the topic provides a **location** (26), **time** (27), or **cause** (28) adjunct, or a domain for **superlative** (28) interpretation relative to which the predication is interpreted:

(26) Nei kwai tyan (a), daudz jang de hen da.   (predicate enrichment:
      That piece land (Topic Part), rice grows Part very big (in it).   location)

(27) Dzwo-tyan (a), Jang San lai kan wo.   (predicate enrichment:
      Yesterday (Topic Part), Jang San came (to) see me.   time)

(28) Weile jei-ge haidz, wo bu jr chr-le dwoshau ku.   (predicate enrichment:
      For (/on account of) this-Classif child, I have endured much hardship.   cause)

(29) Yu (a), wei-yu syandzai dzwei gwei.   (predicate enrichment:
      Fish (Topic Part), tuna is now the most expensive.   superlative domain)

If predication and topic were reversed in these examples, there would be little impact on the online processing of the topic, but significant aspects of the interpretation of the predication would be delayed; that is, there would be online unassignments and misassignments. In (22), for example, it would be unclear whose mind was intended; in (25), the absence of the restriction imposed by the topic would lead to an overly general interpretation online that could be untrue (my experience in general vs. my experience in this matter); in (29), the expensiveness of tuna must be interpreted relative to fish, not, say, food in general, and unless this restriction is contextually given, it cannot be assigned online when fish follows.

These asymmetries predict a topic + predication ordering preference, thereby avoiding temporary unassignments or property misassignments online. Across languages, argument enrichments and predicate enrichments (i.e. with fully asymmetric dependencies) appear to be entirely topic + predication (Gundel 1988), i.e. for gap-containing non-dislocation predications. Argument assignment dependencies (which are predominantly but not fully asymmetric, since a topic can also be dependent on the predication for theta-role assignment) are preferably topic + predication (Hawkins 2004).

4.4 Other linear precedence asymmetries

Further ordering asymmetries that are plausibly motivated by MaOP include the preference for antecedents before their anaphors (dependent on the former for co-indexing and co-reference (20d)), and wide scope before narrow scope operators and quantifiers (20e). Positioning the wide-scope item first permits immediate assignment of the appropriate interpretation to the narrow-scope item, by reference to the already processed wide-scope item, and avoids un/misassignments online. Compare the different interpretations of the indefinite singular *a book* in *All the students read a book/Some students read a book/Three students read a book*). When *a book* precedes (*A book all the students read*, etc.), there is no higher scope element in working memory relative to which a narrow scope interpretation can be assigned, and the preferred interpretation shifts to wide scope.

Also relevant here is the preference for restrictive before appositive relatives exemplified by (30) in English (cf. (20f)):

(30)   a. Students that major in mathematics, who must of course work hard, . . .
       R+A

b. *Students, who must of course work hard, that major in mathematics,
   . . . A+R

In the online processing of (30b), there would always be a semantic garden path. The appositive relative would first be predicated of all students and would then be revised to a predication about that subset only of which the restrictive relative was true, once the latter was encountered and processed. The ordering of (30a) avoids the regular garden path by placing together all the items that determine the reference set of which the appositive clause is predicated, positioning them before the appositive claim in surface syntax. R+A appears to be widespread in head-initial languages. For head-final languages, compare Hawkins (2004: 241) and Lehmann (1984: 277–80).

Notice finally that in contrast to the asymmetrical dependencies of (20), dependencies between a verb and, for example, a NP direct object are symmetrical. A NP depends on a V for case-and theta-role assignment and also for mother node recognition (VP) and attachment (Hawkins 1994), while a V depends on a NP for selection of the intended syntactic and semantic co-occurrence frame (e.g. transitive vs. intransitive *run* [*John ran/John ran the race*]), and for the intended semantics of V from among ambiguous or polysemous alternatives (*ran the race/the water/the advertisement/his hand through his hair*; cf. Keenan 1979). These symmetrical dependencies are matched by symmetric ordering patterns across languages (A+B/B+A), for example, VO and OV. Therefore, asymmetric orderings appear to involve strong asymmetries in dependency (as defined here in processing terms, cf. (2) above), whereas symmetrical dependencies result in symmetric orderings (Hawkins 2004).

5. CONCLUSIONS

I conclude that typological patterns can be profitably described, predicted, and to a significant extent explained in terms of principles of efficiency and complexity in processing. More generally, I have proposed a Performance–Grammar Correspondence Hypothesis (1) whereby preferences in performance (in languages with variation) are matched by conventionalized structures in grammars. Three general principles have been proposed: Minimize Domains (section 2); Minimize Forms (section 3); and Maximize Online Processing (section 4). These principles, individually and in combination, can motivate a broad range of preference data in performance and in grammars. They are simple and intuitive principles that reflect an even more general Zipfian principle of least effort (cf. Zipf 1949), yet they can explain many subtle properties of syntax that have been largely viewed as innate and non-functional hitherto, in accordance with Chomsky (1965) and subsequent

publications. They also explain numerous typological patterns of the kind summarized here, many of which either are not predicted by grammar-only principles or provide frequent exceptions to generative parameters (cf. Newmeyer 2005, Hawkins 2004).

Conversely, these patterns become relevant to theories of processing (and acquisition, cf. 2.2), since grammars are hereby claimed to be conventionalizations of the same processing mechanisms that psychologists find evidence for in experimental and corpus data. Grammatical patterns can suggest principles for testing in relevant languages (e.g. the Accessibility Hierarchy in section 2 led to predictions for processing and acquisition), and they can provide a check on psycholinguistic hypotheses (many of which are still too Eurocentric and based on an insufficient sample of the world's languages) and can lead to improved processing theories (cf. Hawkins 2004, Yamashita and Chang 2001).

It remains to be seen how much of classic typology (and of core syntax and syntactic variation within generative grammar) can be explained in terms of the PGCH (1). I believe the examples we have seen are just the tip of an iceberg. And if these performance–grammar correspondences are valid, then any explanation that accounts for grammars only, as in the Chomskyan philosophy of grammar (Chomsky 1965, 1986b, Hoekstra and Kooij 1988), will be missing significant generalizations. The alternative proposed here views grammars and grammatical evolution as complex adaptive systems (Gell-Mann 1992), with efficiency and ease of processing driving the adaptation in response to prior changes. Innate syntactic knowledge is not the ultimate explanation, although the processing architecture that underlies these ease of use and efficiency regularities is most plausibly innate.

It will ultimately be necessary to answer some general questions raised by this approach. How exactly do the preferences of performance gradually become fixed conventions in language evolution, whereby only the preferred structure is generated and the dispreferred options are eliminated altogether? Kirby (1999) gives a clear discussion of the issues here, and provides an intriguing computer simulation of grammars evolving out of performance preferences. Haspelmath (1999b) discusses the question from the perspective of Optimality Theory, and argues that the constraints of this theory can be functionally motivated by performance preferences like those proposed here and that different constraint rankings and outputs can become conventionalized through a process of diachronic adaptation. There are also psycholinguistic issues that are raised by these performance preferences. How exactly can these efficiencies be implemented in current production and comprehension models with the result that they could actually be predicted? And to what extent do the needs and benefits of the speaker overlap with those of the hearer, to what extent are they different, and to what extent does the speaker accommodate to the hearer?

These are big issues that arise independently of the central hypothesis of this chapter, which is that there is a correspondence between the preferences of

performance and those of grammars, whatever the precise causality of the perfor-mance data turns out to be. This hypothesis is at variance with the proposed autonomy of grammars from performance which has dominated generative think-ing since Chomsky (1965). The evidence of this chapter suggests that syntax is, to a significant extent at least, performance-driven, and this results in the typological patterns that we have seen here. And studying these patterns from the perspective of the PGCH (1) results in an interdisciplinary research programme that we can call 'Processing Typology', in whose pursuit I invite all interested parties to join me.

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CHAPTER 12

LANGUAGE UNIVERSALS AND LINGUISTIC KNOWLEDGE*

SONIA CRISTOFARO

1. INTRODUCTION

One major difference between the typological approach to language universals, and the approach taken within generative grammar and its offspring concerns the status of language universals in terms of a speaker's linguistic knowledge: whether or not language universals are part of grammatical representation in a speaker's mind.

Typological universals are empirically established generalizations that describe distributional patterns for particular grammatical phenomena across languages. These distributional patterns are regarded as universal to the extent that they are found in all languages or in a statistically significant number of languages. Howev-er, the typological approach as such has no implications as to whether these patterns are part of a speaker's linguistic knowledge. In fact, this issue has not

even been taken into account in the typological literature until quite recently, and many of the factors that are usually invoked to account for typological universals (such as processing or frequency), albeit arguably valid for all speakers, are in principle independent of linguistic knowledge as such.

This is in sharp contrast to the generative approach, where language universals are conceived as a set of entities that are specifically represented in a speaker's mental grammar. This originates from the status of universals in the theory. In this approach, the very reason to postulate language universals in the first place is to account for the uniformity and rapidity of language learning. Since the primary linguistic data available to the language learner are argued to be largely insufficient to construct the target grammar, an initial, universal prespecification of the brain is postulated, specifying the form of the grammar of a possible human language. This prespecification takes the form of the principles and parameters that represent the bulk of Universal Grammar.

A significant consequence of this line of reasoning is that in principle, in order to establish the universal nature of some particular linguistic property, it is not necessary to ascertain empirically whether that property is actually found in all languages. Rather, if a particular linguistic property cannot arguably be learned, then it can be assumed to be part of the universal genetic endowment of a speaker's mind.[1]

Because of the differences in nature and theoretical status between typological universals and the universals postulated within generative grammar, typological universals have been argued to be irrelevant to Universal Grammar or, more generally, a speaker's linguistic knowledge. For example, Newmeyer (1998, 2002, 2004, 2005) has repeatedly argued that typological generalizations—for example, implicational hierarchies—cannot possibly be represented in a speaker's mental grammar and should be accounted for in terms independent of Universal Grammar as such. Similar remarks are made in Haspelmath (2004b) and Dryer (2006a, 2006c). In contrast, however, a number of proposals have been elaborated within the Principles and Parameters Theory (particularly, Baker 2001, Baker and McCloskey 2005) and Optimality Theory that aim to incorporate typological universals, at least exceptionless ones, into Universal Grammar.

In what follows, a number of arguments will be offered supporting the view that typological universals as such should not be regarded as part of a speaker's linguistic knowledge. Based on proposals by Dryer (1996, 1997a) and Croft (2001), it will be also argued that there is no evidence that a speaker's linguistic knowledge consists of an

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[1] This approach has resulted in a tendency to establish universals on the basis of in-depth investigation of one or a few languages only, rather than broad-range language samples, as is done in the typological approach. This tendency is particularly evident in earlier versions of generative grammar, but has continued even after the importance of cross-linguistic comparison was emphasized in the Principles and Parameters Theory. For example, Baker (2001) establishes a complex parameter hierarchy based on a dozen languages, selected on the basis of their structural diversity rather than any particular systematic sampling criterion.

inventory of universal grammatical categories and relations that can be defined in formal terms. Contrary to what is assumed by generative linguists and many typologically orientated linguists, we only have distributional evidence for language-specific and construction-specific grammatical categories and relations, and universals of grammar are rather found in a number of principles of correspondence between language form and language function manifested in these categories and relations.

2. LANGUAGE UNIVERSALS AND GRAMMATICAL REPRESENTATION

2.1 Overview

In the typological approach, three types of universal elements are posited that are manifested in the grammatical organization of human languages: universals of language proper, functional principles, and the range of conceptual situations that can be encoded by linguistic expressions.

Universals of language proper are patterns concerning the distribution of specific grammatical features. These are of two types: non-implicational and implicational universals. Non-implicational universals are patterns concerning the distribution of single features, for example, vowels. These features are either universally present or universally absent in human languages, leaving no room for variation (for example, all languages have vowels). Implicational universals are patterns concerning the relation between different features, such that all languages that have a feature X also have a feature Y.

While the individual features involved in non-implicational universals are really universal—that is, they are manifested in all languages—those involved in implicational universals may or may not be present in a language. What is universal in this case are not individual features as such, but the fact that all languages conform to the same pattern, namely, the implicational relationship between X and Y. Due to its implicational nature, the pattern leaves room for cross-linguistic variation; for example, there may be languages with both X and Y, languages with Y but without X, and languages with neither X nor Y.

The typological approach also posits universal functional principles, that is, principles of correspondence between language form and language function that are arguably valid for all speakers and give rise to the distributional patterns described by non-implicational and implicational universals. Some of these principles pertain to the semiotic (i.e. semantic and pragmatic) function of linguistic elements. This is, for example, the case with iconicity, the well-known principle of correspondence

between the structure of linguistic expressions and the conceptual situations they encode (see e.g. Haiman 1983, 1985, Croft 2003a, Newmeyer 1992, 1998). Other principles pertain to the external function of linguistic elements, as manifested in language use, language acquisition, and language processing (Croft 1995b). For example, there is a well-known implicational pattern whereby if conceptual situations that are less frequent at the discourse level are associated with zero-marking, so will conceptual situations that are more frequent at the discourse level. This is arguably because more frequent conceptual situations are easier to recognize and therefore need not be expressed overtly. This is an instance of the general economic principle whereby speakers do not express information overtly whenever they can afford to do so, i.e. when this information is recoverable anyway (e.g. Haiman 1985, Bybee 1988, Croft 2003a). Another case of a functional principle involving the external function of linguistic elements is represented by processing ease, which has been argued to underlie a number of cross-linguistic patterns, such as the Accessibility Hierarchy for relativization (e.g. Keenan and Comrie 1977, Hawkins 1994, 2004).

An important point that should be stressed in this connection is that in the typological approach, functional principles are assumed to operate at the diachronic rather than the synchronic level (Croft 2000a, Dryer 2006a, 2006c, Bybee, this volume). Functional principles motivate the creation of novel constructions but play no role in the propagation of these constructions, nor in a speaker's acquisition and use of existing constructions. Speakers produce existing constructions because they hear them from other speakers, not because of the functional principles underlying those constructions. As a result, particular constructions may be maintained in a language because they are conventionalized, even when the functional motivation underlying them has ceased to hold for the language. For example, particular word order patterns originally motivated in terms of processing ease—for example, GN order in an OV language—may be maintained in a language even when independent word order changes have taken place in the language—for example, a shift from OV to VO—so that the principle of processing ease no longer applies (e.g. Croft 2003a: ch. 8, Newmeyer 2002: 60–64, 2005: 184–7; also see Song, this volume). Thus, while individual constructions arise in response to functional principles, not all the constructions of a language may be functionally motivated at the synchronic level.

Also, while all functional principles are valid for all speakers, only particular principles become active in a speaker's mind at a particular time, leading to the creation of constructions reflecting those principles. This is the basis of the competing motivation model first proposed by DuBois (1985, 1987) and widely adopted in typological research ever since. Different functional principles are in competition to shape the same grammatical domain; that is, in different languages or at different stages of the same language, individual grammatical domains may be encoded by different constructions, responding to different functional principles. This accounts for cross-linguistic and diachronic diversity.

In addition to functional principles and the distributional patterns described by implicational and non-implicational universals, the range of conceptual situations encoded by linguistic expressions is also assumed to be universal in the typological approach. As Bates and MacWhinney (1989: 6–7) put it, human cognition provides the basic meanings and communicative intentions that any natural language must encode, and there are certain basic categories of perception and thought that any language must deal with, such as principles of motion, space, and time, and principles of human action and intention. Also, all languages have to develop ways to encode functions inherent in the communicative process itself, such as identification of referents, establishment of a given referent as a discourse topic, shifting or subordinating topics, and creating cohesion across the discourse as a whole. As a result, while individual formal features and combinations thereof may not be universal, the conceptual situations they express are arguably universal (for some qualifications to this hypothesis, see the extensive discussion in Croft 2001: ch. 3).

In a model that has acquired growing importance in typological research, i.e. the semantic map model (see e.g. Haspelmath 2003 and references therein), not only are conceptual situations universal, but they may also be related by universal relationships of similarity in a speaker's mind. These are manifested in a number of recurrent patterns of multifunctionality found for individual morphosyntactic features cross-linguistically. The latter are typically associated with more than one conceptual situation; for example, a single case marker or adposition may be associated with a variety of senses, and a single verbal affix may be associated with a variety of temporal or aspectual values. The range of conceptual situations associated with a single morphosyntactic feature is typically similar from one language to another. This may be due to some universally perceived similarity between the relevant conceptual situations that is iconically reflected by the fact that these situations are encoded in the same way at the morphosyntactic level.

Individual conceptual situations form a conceptual space in a speaker's mind, i.e. a structured space where similar conceptual situations are located in adjacent positions. Individual languages may select particular regions involving adjacent conceptual situations in the conceptual space, and associate these conceptual situations with the same morphosyntactic feature. This will yield a semantic map for that feature in the relevant language. While the conceptual space is universal, semantic maps are language-specific. This is illustrated in Figure 12.1, where X, Y, and Z represent individual situations in a conceptual space, and the boxes represent possible semantic maps drawn on the conceptual space in individual languages.

In principle, all the universal elements just described could be part of a speaker's linguistic knowledge. That individual conceptual situations (independently of whether or not they are universal) should be part of a speaker's linguistic knowledge is relatively uncontroversial, in that these situations represent the conceptual counterpart of the morphosyntactic structures found in the language, and any linguistic theory must allow for linking devices between morphosyntactic structure and
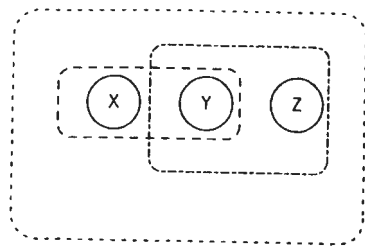
Figure 12.1. Semantic maps and conceptual space

conceptual structure in a speaker's mental grammar. One could further assume that a speaker's mental grammar includes constraints disallowing languages that do not display particular formal features or patterns, as described by non-implicational and implicational universals, or constructions that do not reflect particular functional principles, for example, the iconic principle whereby the range of conceptual situations expressed by a single construction should display a number of similarities, as manifested in their position in the universal conceptual space.

As increasing attention has been devoted to typological universals within the generative approach, a number of proposals that make these assumptions have in fact been put forward. In what follows, it will be shown that these proposals do not correspond to the typological view, and a number of arguments in support of this view will be offered.

2.2 Typological universals and grammatical representation

While in the typological approach no claim has ever been made that non-implicational or implicational universals are part of a speaker's mental grammar, this hypothesis has been proposed in various versions within generative grammar.

The idea underlying this hypothesis is basically that since non-implicational and implicational universals involve patterns that are manifested in all languages, these patterns might be the result of (innate) constraints in Universal Grammar, which license languages obeying the relevant patterns and disallow languages disobeying them (Newmeyer 2004: 531).

The nature of these constraints differs for non-implicational and implicational universals. Non-implicational universals can be incorporated into Universal Grammar in the form of constraints allowing languages that display a property X and disallowing languages that display no such property (Baker and McCloskey 2005:

3). Implicational universals, in contrast, should be incorporated into Universal Grammar in such a way as to guarantee that they involve properties that are not present in all languages and that the implicational relationship between these properties allows for a variety of language types. The Principles and Parameters Theory provides a ready background to do so, in that it is especially designed to account for language variation. In this theory, language variation originates from different possible settings of a number of universal parameters. Implicational universals can be incorporated into the model in two ways. First, specific parameter settings can be posited that determine the presence of clusters of features in the language, thus accounting for two-way implicational patterns. For example, different settings of the head parameter have been argued to be responsible for a number of two-way word order correlations, such as NG order and prepositions for 'head-first' and GN and postpositions for 'head-last' (see e.g. Ouhalla 1999: 297–302).

Second, one-way implicational patterns can be integrated into the model in the form of implicational relationships between parameter settings. Such relationships have been proposed on a number of occasions in the generatively oriented literature (see Newmeyer 2005: 42–4 for a comprehensive review). The only work where this approach is pursued in a systematic and comprehensive way is Baker (2001), where an elaborate implicational hierarchy involving different universal parameters and their possible settings is proposed (though see Newmeyer 2004 and 2005: 84–7 for in-depth criticism of both the architecture and the empirical foundations of this hierarchy). The relevant parameters are polysynthesis, head directionality, topic prominence, ergativity, verb attraction, verb serialization, and subject placement. These parameters are hierarchically ordered, so that a specific setting for a parameter X in a language implies specific settings for other parameters that are hierarchically dependent on X. If X has a different setting, there is no implication as to the values of the other parameters, which allows for the variety of types actually found in the world's languages. In Baker's view, the implicational relations between the settings of the various parameters limit the number of decisions a language learner has to make, and Baker's prediction is that the fewer such decisions, the more frequent the language type will be.

However, the idea that non-implicational and implicational universals are part of Universal Grammar faces a number of problems. First, the very existence of the implicational relationships that have been argued to originate from specific parameter settings is questionable. For example, a number of phenomena that have been argued to depend on the Null Subject Parameter—such as null thematic subjects, null non-thematic subjects, and *that*-trace violations—do not appear to be correlated cross-linguistically (Croft 2003a: 80–84, Newmeyer 2005: 88–92). Similarly, different categories appear to display different values of the same parameter; for example, languages are not consistently head-initial or head-final in all syntactic categories.

As extensively argued by Newmeyer (2005: 87–98), these facts show that the idea that specific parameter settings determine particular feature clusters is simply not

supported by empirical evidence.[2] In principle, this does not exclude the possibility that other feature clusters could actually be amenable to explanation in terms of specific parameter settings, or that the inventory of possible parameters and their settings could be reformulated so as to account for existing feature clusters. So this is not really a major problem for the idea that non-implicational and implicational universals are part of Universal Grammar. This idea, however, is seriously undermined by two other problems that have been pointed out in both the typological and the non-typological literature (e.g. Newmeyer 1998, 2004, 2005, Haspelmath 2004b).

In order for non-implicational and implicational universals to be part of Universal Grammar, they have to be exceptionless, because by definition Universal Grammar involves the same components for all speakers. Yet very few, if any, typological universals are free from exceptions. Baker and McCloskey (2005) suggest that many typological universals could probably be made exceptionless if more variables were considered; that is, if universals of the form 'if X and Y, then usually W' could be turned into statements of the form 'If X and Y and Z, then always W'. However, this hypothesis has already been formulated and extensively tested in the typological literature over the past two decades. While in many cases leading to significant reformulations of existing universals (such as the complex universals of Hawkins 1983), this approach has not eliminated the statistical, rather than exceptionless, nature of most universals.

The statistical nature of typological universals is natural, indeed expected in the typological model. As in this model individual constructions originate from functional principles and a competition is postulated between different functional principles (see the discussion in section 2.1), exceptions to a functionally motivated pattern may originate from the action of a competing principle. For example, the well-known two-way correlation between NG order and prepositions and GN order and postpositions has been accounted for in terms of a diachronic principle whereby adpositional constructions originate from the grammaticalization of possessive constructions and maintain the original order of the latter (e.g. Bybee 1988; this correlation has also been accounted for in terms of processing ease: see, most recently, Hawkins 2004). This principle is limited in its scope, in that there may be other competing grammaticalization processes leading to the development of adpositional constructions from sources other than possessive constructions (Dryer 2006a). In this case, exceptions to the word order correlation pattern between adpositional constructions and possessive constructions may arise.

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[2] In earlier versions of generative grammar, this fact was accommodated by arguing that languages are consistent in their parameter settings for different categories at the level of deep rather than surface structure. In some versions of the Principles and Parameters Theory and in the Minimalist Program, however, the idea that there are holistic parameter settings that determine the properties of different categories has been abandoned. Rather, parameter settings are argued to be part of the set of idiosyncratic properties specified in the lexical entries of individual categories, rather than being associated with the principles of Universal Grammar (see e.g. Ouhalla 1999: 301). In this way, different categories may display different values for the same parameter.

Similarly, the notion of typological markedness proposed in Croft (2003a) includes structural markedness—that is, the fact that a particular value of a category is expressed by at least as many morphemes as other possible values of the same category (cf. the discussion of zero-marking in section 2.1 above)—and inflectional markedness—i.e. the fact that a particular value of a category does not display more inflectional distinctions than other possible values of the same category. A result of inflectional markedness is that inflectional distinctions develop in an unmarked category value before they develop in the corresponding marked category value, if they develop there at all. Croft (2003a: 242–3) discusses a number of cases where this phenomenon leads to exceptions to well-attested markedness patterns. For example, in a number of languages where animate and inanimate forms make no distinction between singular and plural, an overt morpheme is introduced to distinguish plural forms in the animate.

This is the case with number indexation in the verb for third person forms in Lakhota (Table 12.1). Cross-linguistically, the animate is unmarked with respect to the inanimate, and the singular is unmarked with respect to the plural. This is arguably motivated in terms of the greater textual frequency of the singular with respect to the plural and the animate with respect to the inanimate (Croft 2003a: ch. 4). The development of the overt morpheme for the animate plural leads to exceptions to these patterns, in that the plural comes to have more inflectional distinctions than the singular, and the animate (plural) is expressed by an overt morpheme, whereas the inanimate (plural) is not. In this case, the typological unmarkedness of the animate, which leads to the development of the singular/plural distinction, overrides the typological markedness of both the plural (as manifested at the inflectional level) and the inanimate (as manifested at the structural level).

Exceptions to a universal pattern may also arise from phenomena independent of the functional principles involved in the pattern itself. For example, exceptions to the word order correlation pattern between possessive constructions and adpositional constructions may also originate from phenomena independent of the grammaticalization processes leading to the development of adpositional constructions, such as the fact that word order in possessive constructions changes after adpositional constructions have developed (Dryer 2006a).

These facts show that the distribution of a particular pattern across the world's languages is a matter of the relative strength of the principle motivating that

Table 12.1. Number indexation in the verb for third person forms in Lakhota (Croft 2003a: 242)

	Singular	Plural
Animate	-Ø	-pi
Inanimate	-Ø	-Ø

pattern compared to other principles. Typological universals reflect the probability of particular language states arising, rather than the possibility vs. impossibility of particular language types. In the limiting case, the probability of a particular language state arising is zero, leading to an exceptionless universal. Otherwise, low-probability language states may occasionally arise in a language, which leads to exceptions to high-probability states (Dryer 1997c, Croft 2003a: ch. 8).[3] These facts would be difficult to accommodate in a model where universal constraints in a speaker's mental grammar license or disallow particular patterns for all languages, because in such a model there would be no obvious and non-ad hoc way to account for the fact that exceptions to these patterns may arise in individual languages (but see the discussion of Optimality Theory in section 2.3).

A more general problem with the idea that non-implicational and implicational universals are part of Universal Grammar is that there appears to be no obvious motivation for this idea in the first place. In the typological approach, the reason why all languages obey the same non-implicational or implicational patterns is that these patterns originate from a number of functional principles that are valid for all languages. These principles provide, in many cases, a plausible explanation for the universal patterns, to the point that even proponents of Universal Grammar recognize that Universal Grammar might have been shaped by these principles (see e.g. the discussion of Chomsky 1981 in Newmeyer 1998: 154–7, as well as the review of different positions on this issue in Kirby 1999: ch. 5). In fact, functional principles play a direct role in generatively oriented theories such as Optimality Theory and the Iterated Learning Model (Kirby 1999, Kirby, Smith, and Brighton 2004).

If language universals originate from functional principles, there is no need to postulate additional principles motivating them in the form of constraints that are specifically represented in a speaker's mental grammar (Dryer 2006c, Newmeyer 2002, 2004).[4] What is represented in a speaker's mental grammar are individual constructions that obey universal, functionally motivated patterns, not the patterns as such.

2.3 Functional principles and grammatical representation

While generative grammar does not exclude the possibility that functional principles may have contributed to shaping particular grammatical constraints, these

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[3] Along these lines, Maslova (2000) goes as far as to argue that, unless the current distribution of linguistic types can be proven to be entirely free from genetic bias, typological universals should be established on the basis of the transition probability from one language type to another, rather than on the basis of any attested synchronic pattern.

[4] The classical argument for such constraints in generative grammar is that the corresponding patterns cannot be learned, and must therefore be part of the speaker's innate endowment. However, none of the features involved in typological universals has been proved to be unlearnable so far.

principles are widely believed to have no role in synchronic grammatical representation in a speaker's mind.

A widespread belief in the non-typological literature is that in the functionalist tradition that provides a major basis for the typological approach, functional principles are part of a speaker's linguistic knowledge. For example, Baker and McCloskey (2005: 5) say that in the functionalist tradition, functional pressures are built directly into individual grammars. Similarly, in discussing the competition between the functional principles underlying different word order patterns, such as iconicity and participant prominence, Newmeyer (1998: 140–41) observes that in much functionalist work there is an implicit assumption that an optimal grammatical description specifies direct linkages between the formal properties of language and the external forces that are responsible for them. In fact, for Newmeyer (2005: ch. 5), the positions of prominent functionalists—such as Haiman, Dik, and Hopper—fall within what he calls Atomistic Functionalism, the idea that there is a direct linkage between properties of particular grammars and functional motivations for those properties. Atomistic Functionalism also includes Optimality Theory, where the functional motivations underlying a number of universal constraints in a speaker's mental grammar are explicitly assumed to be part of that grammar.

The positions held by typologists with regard to this issue, however, are more diverse than that. The claim that particular distributional patterns should be accounted for in terms of functional principles does not imply that these principles are parts of the grammatical representation in a speaker's mind, and most typological literature (including the literature mentioned in Newmeyer 2005: ch. 5) makes no particular assumption about that. This is also because, until quite recently, typologists have focused on defining what functional principles underlie the universal distributional patterns attested cross-linguistically, rather than examining the status of these principles in terms of a speaker's linguistic knowledge. However, a number of recent works that explicitly address this issue reveal two different views.

In the first view, outlined in a number of works by Dryer (1997a, 2006a, 2006c), functional principles are not part of a speaker's linguistic knowledge. These principles operate at the diachronic level, in that they motivate the creation of individual constructions (see the discussion in section 2.1), but there is no reason to assume that they are part of the synchronic grammatical representation in a speaker's mind. For example, Dryer (2006a) argues, the universal correlation between OV order and postpositions and VO order and prepositions is at least partially motivated by the tendency to maximize constructions that are easy to process. This means that languages with mixed word orders are likely to evolve towards consistent orders, while languages with consistent word orders will remain constant. This does not mean, however, that the principle of processing ease that motivates the correlation pattern is built into the mental grammar of individual speakers. Individual speakers produce sentences with VO order and prepositions,

or OV order and postpositions, because these sentences are conventional in their language, not because these sentences are easier to process.

This view is basically in line with the position defended by Newmeyer (1998: 140–42, 2002: 60–64, 2005: ch. 5), who also uses evidence from word order change to argue that functional principles play a role in the creation of novel constructions in language change, but they are not part of synchronic grammatical representation in a speaker's mind. Newmeyer (2005: ch. 5) labels this position Holistic Functionalism.

This view involves a sharp distinction between the level of language change, where functional principles are operative, and the synchronic grammatical representation in a speaker's mind, where these principles play no role. This distinction, of course, reflects the classical Saussurean dichotomy between synchrony and diachrony. This dichotomy, however, has been questioned in the approach that Croft (1995b) labels 'integrative functionalism', as instantiated, for example, in Emergent Grammar (Hopper 1987) and subsequent work on language change carried out in typological perspective (e.g. Heine, Claudi, and Hünnemeyer 1991, Croft 2000a, Hopper and Traugott 2003). Building on data from grammaticalization studies and sociolinguistic studies, proponents of this approach argue that language change is not really external to the synchronic grammatical system of individual speakers. Language change occurs as speakers create novel constructions based on functional principles, and the novel constructions are gradually adopted by other speakers, as manifested in variable patterns of use in the adult speech community (Croft 1995b, 2000a). Both the novel constructions created by individual speakers and the functional principles underlying them are fully integrated into the grammatical system of those speakers, which is inherently variable and dynamic.

This view does not exclude the possibility that there may be cases where functional principles play no role in a speaker's production of individual constructions, as assumed by Newmeyer and Dryer. In this view, there are two mechanisms by which speakers produce individual constructions. On the one hand, speakers create novel constructions based on functional principles that are part of their mental grammar. On the other hand, however, speakers may acquire and use particular constructions because those constructions are conventional in their speech community or they have heard them from other speakers anyway. This is the scenario depicted by Newmeyer and Dryer, but this scenario only accounts for the transmission of existing constructions, not the creation of novel ones.

The idea that an adult speaker's mental grammar is inherently variable and dynamic is in contrast with the generative view, where grammatical systems can only be altered in the process of language acquisition. This view is defended by Newmeyer (1998: ch. 2), who argues that the fact that speakers use novel constructions does not demonstrate that these constructions are assimilated into their grammatical competence. Rather, speakers may acquire novel constructions, but these constructions are integrated into the grammatical system only when the following generations acquire the language. Yet, as of now, no conclusive evidence

has been provided that innovations cannot be incorporated into an adult speaker's mental grammar. Newmeyer (1998: 67–74) argues that there are a number of facts suggesting that an adult speaker's grammatical system is resistant to change. For example, acquisition of new constructions under the influence of superimposed dialects during adulthood is difficult and highly unsystematic, a number of changes involved in creolization (such as morphophonemic reduction) cannot occur in an adult speech community, and Universal Grammar is arguably not accessible to adult learners of a second language. These facts, however, show that an adult speaker's grammatical system is less sensitive to external input than a child's system, and that adult speakers do not produce the same types of change as children do. These facts do not demonstrate that adult speakers cannot create novel constructions based on functional principles, nor that either the novel constructions or the underlying functional principles are not integrated in their mental grammar.

It is worth comparing the two views just described with the one generatively oriented model where functional principles can be directly incorporated into a speaker's mental grammar, Optimality Theory.[5] In Optimality Theory, possible grammatical structures are licensed by competing constraints that are represented in a speaker's mental grammar. The various constraints are universal, but they are ranked differently in different languages. The structures found in individual languages result from the action of an Evaluator component of the grammar, which evaluates a range of structures corresponding to different constraints and selects the optimal structure with respect to the ranking of constraints in the language (Kager 1999: ch. 1).

Proponents of Optimality Theory widely assume that the various constraints are functionally motivated. For example, phonological constraints are argued to be motivated in terms of articulatory and perceptual ease, while syntactic constraints are argued to be ultimately rooted in iconicity and economy (see Haspelmath 1999b and Newmeyer 2002, 2005: ch. 5 for reviews). This idea basically corresponds to the assumption that functional principles underlie the creation of novel constructions. In fact, Optimality Theory is similar to the competing motivation model, in that in both models, different constructions reflect different competing functional principles that account for the constructional variety found both cross-linguistically and within individual languages.

A crucial difference between the two approaches, however, is that in Optimality Theory all of a number of forms reflecting different competing constraints are

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[5] The Iterated Learning Model (Kirby 1999, Kirby, Smith, and Brighton 2004) is another example of a generatively oriented model that incorporates functional principles. In this model, individual constructions reflect functional principles, such as the principle of least effort, and language universals emerge from a selection process that takes place during language acquisition and filters out constructions that are difficult to parse. However, functional principles are not part of a speaker's linguistic knowledge (Kirby 1999: 126).

generated in a speaker's grammar, and the actual form of the grammar results from the selection among these forms operated by the Evaluator component of the grammar. From a typological perspective, this is an unwarranted and unnecessary complication of the model. In the typological approach, all possible functional principles are present in a speaker's mind, because speakers can create novel constructions based on these principles at any time (Croft 1995b: 515). When a novel construction is created, this is because the corresponding functional principle has become active, and the novel construction replaces, or coexists with, pre-existing constructions based on competing principles. There does not appear to be any reason to assume that all of the constructions reflecting different competing principles have to be simultaneously created and evaluated in a speaker's mind (for similar remarks, see Newmeyer 2002: 73–6, 2005: 205–25, and Haspelmath 2008a).

Also, in the typological approach, a speaker's production of individual constructions may originate either from the action of specific functional principles (at least in the view of integrative functionalism) or from the fact that those constructions are conventional in the language, or they are used by other speakers anyway. In Optimality Theory, in contrast, a speaker's production of individual constructions is entirely dependent on the constraints licensing those constructions and the functional principles to which the various constraints are synchronically linked in a speaker's mental grammar. As is observed by Newmeyer (2002: 60–64, 2005: 184–7; see also Croft 2003a: 85), this hypothesis cannot account for the fact that particular constructions may be maintained in a language because they are conventionalized, even when they are no longer motivated in terms of any functional principle (see the discussion in section 2.1).[6]

3. LINGUISTIC KNOWLEDGE: WHAT IS UNIVERSAL?

As should be clear from the discussion in the previous sections, the typological approach explicitly assumes that a speaker's linguistic knowledge includes the following universal components: the conceptual situations that are expressed in

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[6] In discussing Newmeyer's critique of Optimality Theory, Bresnan and Aissen (2002) argue that factors such as conventionalization determine the ranking of individual constraints in a language, but the constraints as such are completely independent of the factors that determine their ranking. As a result, a particular construction may be at the same time the product of a historical process of conventionalization and the result of an optimization function over motivated constraints in a synchronic grammar. However, if the fact that speakers produce a particular construction is due to conventionality, there is no obvious reason to further assume that that structure also originates from a functionally motivated constraint active in a speaker's synchronic grammar, unless one assumes a priori that the grammar includes all possible constraints along with their outputs.

human languages; the similarity relations between these conceptual situations (as representable in a conceptual space); and, at least under some analyses, the functional principles that govern the match between particular forms and particular conceptual situations.

These components pertain to the function rather than the form of linguistic structures. The question then arises as to whether, in addition to these components, a speaker's mental grammar also includes any universal formal components. This question is particularly relevant in the light of the generative approach to language universals, where a number of universal formal constraints are posited licensing grammars with particular features and disallowing grammars without such features. These constraints imply that a speaker's mental grammar includes a variety of universal formal features that represent the building blocks of all human languages. In earlier versions of generative grammar, these features are substantive universals and formal universals—that is, respectively, syntactic categories and relations such as noun, verb, noun phrase, subject, or direct object, and rules and constraints that have to be present in the grammar, such as phrasal formation rules, derivation rules, and constraints thereon. In more recent versions, these features include universal principles (e.g. the Projection Principle, the principles of X-bar theory), parameters along with their possible settings in the Principles and Parameters Theory (see the discussion of Baker 2001 in section 2 above), or basic structure-building operations (e.g. Merge), economy-driven principles, and interface conditions (e.g. Full Interpretation) in the Minimalist Program.

In spite of the emphasis placed on the structural diversity of human languages, there appears to be a widespread tendency among typologists to postulate a number of universal grammatical categories and relations definable in formal terms, such as parts of speech, subject, or direct object. These categories and relations are very much the same as those postulated in both traditional grammatical analysis and generative grammar, where they are subject to parameterization and represent the domain of application of universal principles. For example, Universal Grammar includes a subject relation that plays a role in principles such as the Extended Projection Principle and parameters such as the subject placement parameter of Baker (2001).

Exactly because of the structural diversity displayed by the world's languages, however, these categories and relations turn out to be extremely difficult to define in cross-linguistically valid terms (see e.g. Dixon 1994, Dryer 1997a, Van Valin and LaPolla 1997: ch. 6, and Croft 2001 for grammatical relations; Hopper and Thompson 1984, 1985, and Croft 1991 for parts of speech; Koptjevskaja-Tamm 1993b for finiteness; and Cristofaro 2003 for subordination). In what follows, this will be illustrated in detail with regard to a well-known issue, the cross-linguistic validity of grammatical relations, and a number of problems with this approach will be outlined. An alternative approach, according to which there are no universal grammatical categories and relations, will then be described.

Grammatical relations—such as subject—are commonly identified on the basis of a number of morphosyntactic phenomena that define specific alignment patterns for the two arguments of transitive verbs and the only argument of intransitive verbs, i.e. after Dixon's (1994) terminology, A, O, and S arguments. These phenomena—which include verbal agreement, argument omission in clause linkage, and case-marking—are taken as evidence that the arguments involved in the relevant alignment patterns stand in a grammatical relation with the verb, as well as with the clause as a whole (see Croft 2001: 23–5 and Matthews 2007: 1–7 for detailed discussion of the differences between these two types of relation). However, the same morphosyntactic phenomena do not reflect the same alignment patterns from one language to another. For example, case-marking defines an A + S alignment pattern in nominative languages but an S + O alignment pattern in ergative languages. Also, different morphosyntactic phenomena may define the same alignment patterns in one language but different alignment patterns in another. For example, case-marking and argument omission in clause linkage both reflect an A + S alignment pattern in nominative languages, but in ergative languages, they may reflect an S + O and an A + S alignment pattern, respectively. Finally, not all the constructions used to define particular grammatical relations are present in all languages, which means that grammatical relations cannot be defined in the same way from one language to another. For example, since many languages do not have inflectional case systems or verbal agreement, a different way to define grammatical relations should be found for these languages (for detailed discussion of these issues, see e.g. Dixon 1994, Palmer 1994, and Croft 2001).

All this challenges the idea that there are cross-linguistically valid grammatical relations, because these relations are not manifested in the same way from one language to another, either in terms of alignment patterns or in terms of the morphosyntactic phenomena that define these alignment patterns. These facts have been variously accommodated for in the literature (see Dryer 1997a for an exhaustive review). Sometimes, grammatical relations are defined in terms of specific alignment patterns, regardless of whether or not these alignment patterns are manifested in the same morphosyntactic phenomena from one language to another. For example, Anderson (1976) defines subject as an A + S alignment pattern, and argues that any morphosyntactic phenomenon that reflects this alignment pattern in any language is a manifestation of the subject relation. In this way, if a morphosyntactic phenomenon used to define subject in one language is absent from some other language or does not reflect the same alignment pattern, one can take any other morphosyntactic phenomenon in that language that reflects the same alignment pattern.

Alternatively, grammatical relations are defined in terms of particular morphosyntactic phenomena, regardless of whether or not these phenomena define the same alignment patterns from one language to another, and whether or not other morphosyntactic phenomena in the language define the same alignment pattern.

For example, Dowty's (1991) notion of subject is based on syntactic criteria such as argument omission in clause linkage. This leads Dowty to conclude that subject corresponds to A and S arguments in nominative languages, and S and O arguments in ergative languages, because these arguments display the same behaviour with respect to the relevant syntactic criteria.

In yet another approach, grammatical relations involve prototypes, and languages may display prototypical or non-prototypical instances of the same grammatical relation. For example, in Keenan (1976b) (see also Comrie 1988b and Givón 1995), subject is defined in terms of a variety of morphosyntactic, semantic, and pragmatic phenomena that may not occur in exactly the same combinations cross-linguistically. Particular combinations of phenomena are regarded as the prototypical realization of subject, and languages displaying different combinations are argued to have non-prototypical subjects.

A basic problem with all these approaches, as argued extensively by Dryer (1996, 1997a) and Croft (2001), is that if grammatical relations do not display exactly the same properties from one language to another, there is no distributional evidence to conclude that one is dealing with the same grammatical relations in the various languages. As Dryer (1996: 2) puts it, all of these approaches are based on an a priori assumption that particular grammatical relations are manifested in all languages, or at least are part of the universal vocabulary for describing languages, even if not all languages have them. As a result, particular properties shared by grammatical relations in different languages are taken as evidence that one is dealing with the same universal grammatical relations, and languages where these properties are not found are claimed to have non-prototypical grammatical relations or to lack grammatical relations altogether. However, these approaches arbitrarily disregard the differences that individual grammatical relations actually display cross-linguistically.

Dryer (1996, 1997a) suggests an alternative approach, according to which grammatical relations are language-specific. In this view, nominative and ergative languages do not have the same grammatical relations, and different morphosyntactic phenomena define different grammatical relations, both cross-linguistically and within individual languages. There are no non-prototypical grammatical relations, because there is no universal grammatical relation prototype that is part of a speaker's mental grammar and from which particular languages deviate.[7]

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[7] As is pointed out by Dryer (1997a: 132–5), this does not exclude the possibility that the prototypical vs. non-prototypical status of particular conceptual situations (in terms e.g. of cognitive saliency) may have a role in a speaker's use of particular constructions. The point is, however, that the notion of cross-linguistic prototype for grammatical relations or categories is unlikely to be represented in a speaker's mental grammar; i.e. it is unlikely that a speaker's mental grammar specifies that the grammatical relations or categories of their language are prototypical or non-prototypical with respect to the grammatical relations or categories of other languages.

The language-specific grammatical relations, however, display a number of cross-linguistic similarities, and these similarities are due to universal functional principles. For example, A and O arguments are usually marked differently, independently of the alignment pattern found in the language (see e.g. Comrie 1989, Dixon 1994). This is arguably because these arguments occur together in transitive clauses and should therefore be kept distinct. This is confirmed by the fact that, cross-linguistically, A and O arguments are sometimes marked in the same way (i.e. they are both left unmarked) when there is a difference in animacy between the two, which makes it possible to recover syntactic roles anyway (A and O arguments being typically associated with more animate and less animate roles, respectively). Also, if a grammatical relation is zero-marked, this will be the one including S arguments, i.e. nominative in nominative languages and absolutive in ergative languages. Dixon (1994: ch. 3) accounts for this pattern in terms of an economic principle whereby, since S arguments are the only arguments of intransitive clauses, they need not be distinguished from other arguments by means of overt marking (but see Dixon's original discussion for qualifications and exceptions).

In Croft (2001), this same approach is applied to a variety of grammatical categories, such as parts of speech, voice, and head. Croft argues that since the various formal features used to define these categories do not have the same distributional properties from one language to another, these categories are language-specific (see also Haspelmath 2007 for a recent assessment and endorsement of this view). Croft further argues that since different morphosyntactic phenomena define different grammatical categories and relations even within the same language (as shown, for example, by the languages where different morphosyntactic phenomena define accusative and ergative patterns respectively), grammatical categories and relations can only be defined with respect to specific morphosyntactic phenomena, or, in Croft's terminology, they are construction-specific. However, universal principles appear to govern the match between particular formal features and particular functions in the language-specific and construction-specific categories.[8]

This approach does not exclude the possibility that there may actually be specific formal features that display the same distributional patterns across languages or constructions, possibly identifying cross-linguistically or cross-constructionally valid grammatical categories and relations. In the functionalist view subscribed to by Dryer and Croft, whether or not particular grammatical categories and relations are manifested in all languages depends on whether or not the functional principles underlying them are overridden by competing principles in individual languages. Since different functional principles prevail within the same grammatical domain in different languages, grammatical categories and relations will be language-specific. However, if a particular functional principle is not overridden by competing principles, the corresponding grammatical categories or relations will be manifested in all languages.

For example, Dixon (1994: 131–42) describes a non-implicational universal whereby all languages display A + S alignment patterns in contexts such as imperatives and complements of verbs such as 'can', 'try', 'begin', or 'want'. In Dryer's and Croft's terms, this means that there is a grammatical relation that is cross-linguistically valid, in that it involves the same alignment pattern (A + S) and is defined by the same syntactic phenomena (such as argument omission in imperative sentences and co-referentiality of arguments between main and complement clauses) in all languages. This is due to semantic reasons, in that in imperatives the addressee is asked to be an agent (and thus may have either an A or an S role), and the semantics of 'can', 'try', 'begin', or 'want' implies that the A argument of these verbs is co-referential with the A or S argument of the complement clause. The semantic principle leading to the association of A with S is manifested in all languages. This association, however, is construction-specific, because not all the syntactic phenomena involving argument alignment display the relevant alignment pattern.[9]

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[8] An approach to grammatical relations similar to that of Dryer and Croft is taken in Van Valin and LaPolla (1997: ch. 6). Based on the distributional evidence for grammatical relations in various languages, Van Valin and LaPolla also argue that grammatical relations are language-specific and construction-specific, and a number of functional principles govern the organization of individual grammatical relations. However, their notion of grammatical relations differs from that adopted by Dryer and Croft in that it only encompasses syntactic relations, not just any relation that plays a role in the grammar of the language. This leads Van Valin and LaPolla (see also Van Valin 1993) to argue that languages such as Acehnese have no grammatical relations, because a number of morphosyntactic phenomena in these languages appear to be sensitive to the semantic distinction between agentive and non-agentive participants (or actor and undergoer), not to a distinction between verb arguments as such. Thus, in this view, grammatical relations are not universal not because they are not the same from one language to another (as is assumed by Dryer and Croft), but because there are languages that lack them altogether (see Bhat 1991 for a similar view). Yet, as is observed by Dryer (1997a: 126–8), once

one recognizes the language-specificity of grammatical relations in general, there appears to be no reason why a semantically based relation that plays a role in the grammar of a particular language should not be regarded as a grammatical relation of that language. The relevant relation may not be the same as grammatical relations in other languages, but this is exactly what is expected given the language-specificity of grammatical relations.

[9] This analysis is in the spirit, though not the letter, of Dixon's original discussion, where it is argued that there is a universal relation of subject that involves an A + S alignment pattern and is always manifested in imperative sentences and complements of verbs such as 'can', 'begin', and the like. Dixon (1994: 141-2) observes that these constructions must involve identification of A and S at the underlying syntactic level, purely because of their semantic content and the semantic nature of A and S functions, and it is these semantic factors that lead to the grouping of A and S as the universal relation 'subject'. In some languages, this relation will only be manifested in these constructions, while in others it will have a role in a wider array of syntactic domains. This formulation seems to imply that the relation of subject is the same in all languages despite the fact that it is not manifested in the same range of syntactic phenomena from one language to another.

By rejecting the universality of grammatical categories and relations, this approach accounts for the structural diversity of the world's languages, and the fact that grammatical categories and relations do not have exactly the same properties from one language to another. At the same time, by positing universal principles of correspondence between particular forms and particular functions, this approach also accounts for the similarities that individual grammatical categories and relations do indeed display cross-linguistically.

However, while Dryer's and Croft's arguments demonstrate that there is no distributional evidence to posit cross-linguistically and cross-constructionally valid grammatical categories and relations, this fact should be kept distinct from the issue of the status of grammatical categories and relations in terms of mental representation. The way in which grammatical categories and relations are represented in a speaker's mind is logically independent of their distributional properties. For example, it is in principle possible that the mental representation of individual categories and relations encompasses either all of their distributional properties or only a subset of properties, while the other properties are represented independently. In the former case, categories and relations with different distributional properties will be represented differently, while in the latter case they might be represented in the same way. This can be illustrated with the example of prepositions (thanks to Fritz Newmeyer for pointing out this example to me). As some languages with prepositions have preposition stranding, while others do not, there is no distributional evidence that a speaker's mental grammar includes the same category of preposition in the two language types. It could, however, be the case that a grammatical category of preposition is defined in a speaker's mental grammar based on some specific property of prepositions that is the same for all speakers and is shared by prepositions cross-linguistically—for example, the ability of prepositions to be preposed to nouns—while the fact that prepositions may or may not be stranded is represented in the grammar independently of the category itself. In this case, the grammatical representation of prepositions in a speaker's mind would be the same in languages that have preposition-stranding and in languages with no preposition-stranding (leaving aside the various other properties with respect to which prepositions may differ cross-linguistically).

Also, in Dryer's and Croft's model, grammatical categories and relations are not prespecified in a speaker's mind, which means that existing categories and relations are acquired by learning, and novel ones may be created in the process of language change (as witnessed, for example, by grammaticalization processes). Croft (1998, 2001, 2003b) argues that abstract grammatical schemas are induced by speakers through processes of abstraction over learned instances of the constructions in which they are manifested. Speakers may not always induce the same schemas or reuse these schemas in the same way (for similar views, see Langacker 2000 and Taylor 2002). This implies that the grammatical categories and relations that can be identified in a language on distributional grounds will be part of a speaker's mental

grammar only to the extent that a speaker always induces those categories and relations, which may or may not be the case.

Thus, the fact that grammatical categories and relations differ in their cross-linguistic and cross-constructional properties does not in itself prove that a speaker's mental grammar consists of language-specific and construction-specific categories and relations.[10] The crucial point about Dryer's and Croft's model is, however, that since grammatical categories and relations differ in their cross-linguistic and cross-constructional properties, cross-linguistically and cross-constructionally valid categories and relations can only be posited by disposing of this diversity (e.g. by assuming that the non-overlapping properties of the relevant categories and relations are not actually part of their mental representation). This procedure is justified to the extent that independent evidence is available for specific cross-linguistically and cross-constructionally valid categories and relations—for example, psychological evidence, or the fact that positing such categories and relations makes it possible to account for some otherwise unexplainable phenomena.

Yet, as of now, no such evidence has been conclusively provided. For example, no conclusive psychological evidence is available about whether and how specific grammatical categories and relations are represented in a speaker's mind (see e.g. Croft 2001: ch. 1), and proponents of cross-linguistically and cross-constructionally valid categories and relations have tended to take for granted the existence of such categories and relations, rather than attempt to demonstrate that they can account for otherwise unexplained phenomena. In the absence of such evidence, the idea that there are cross-linguistically and cross-constructionally valid categories and relations can only be based on an a priori assumption that this should be the case (e.g. because this would simplify the architecture of the grammar, which in generative theories is regarded as an asset).[11]

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[10] Along these lines, Haspelmath (2004b) argues that the phenomenological descriptions of individual languages that can be achieved through distributional evidence and play a role in typological universals have no implications for a speaker's mental patterns.

[11] Newmeyer (1998: 342–3) argues that cross-linguistically valid categories and relations can be and are actually posited on theory-internal grounds. For example, he argues, many generative linguists accept the Internal Subject Hypothesis whereby subjects are the elements that occupy the highest argument position within VP, and the ability of these elements to raise to the [Spec, IP] position accounts for several common properties of subjects cross-linguistically. A major problem with this argument is, however, that the very premises of a theory that lead to positing particular categories or relations may be questionable. For example, the hypotheses about sentence structure that underlie the Internal Subject Hypothesis are not universally accepted. Also, theory-internal considerations are often invoked to justify particular properties of a given category or relation, not the existence of that category or relation as such. For example, the Internal Subject Hypothesis provides a motivation for a particular location of subjects in sentence structure, not for the existence of a universal relation of subject as such.

4. CONCLUDING REMARKS

The increasing attention devoted to cross-linguistic variation and the typological approach within generative grammar has raised an issue hitherto virtually ignored in typological research: that of the representational status of typological universals in a speaker's mental grammar. This has resulted in a number of attempts to incorporate into Universal Grammar both typological universals and the functional principles that arguably underlie them.

By their very nature, however, typological universals as such are unlikely to be the result of universal constraints in a speaker's mental grammar. Since a number of functional principles can be posited that provide a plausible motivation for these patterns, there is no reason to assume further that typological universals are licensed by specific constraints in a speaker's mental grammar. This is confirmed by the fact that typological universals are statistically significant rather than exceptionless patterns. This fact is incompatible with their being the result of universal constraints in a speaker's mental grammar, but is naturally accounted for by the fact that typological universals and exceptions thereto originate from the interaction of distinct functional principles at the diachronic level.

In a sense, then, it is true that, as argued by Newmeyer (1998, 2004, 2005) and Haspelmath (2004b), typological universals as such are irrelevant to grammatical representation in a speaker's mind, and speakers have no knowledge of typological universals. At the same time, however, there is one crucial respect in which typological research is relevant to the issue of a speaker's knowledge of their language, not so much in the sense that it can discover candidates for Universal Grammar, as argued by Wunderlich (2004), but rather in the sense that it suggests that there is no Universal Grammar as such. Cross-linguistic investigation reveals that there is no distributional evidence for the idea that there are universal components of grammatical representation, and as of now, this idea does not appear to be supported by any other kind of conclusive evidence either. Universals of grammar are rather found in the functional principles underlying the match between particular forms and particular conceptual situations. Insofar as they govern the creation of novel linguistic structures, these principles are part of a speaker's mental grammar, or at least they play a role in a speaker's mind.

Thus, there appears to be no evidence for universals in the sense of Universal Grammar, that is, no formal template to which the grammars of all languages conform, and no universal inventory of formal categories and relations which the grammars of all particular languages draw from (Croft 2001: 61). Rather, as is observed by Dryer (1997a: 134), we only have evidence of two things that people will have in their heads: specific information about their particular language, including some representation of the grammatical categories and relations of their language, and the functional principles underlying language in general.

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EMPIRICAL DIMENSIONS OF LINGUISTIC TYPOLOGY

WORD ORDER TYPOLOGY

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1. BASIC WORD ORDER

The two English sentences in (1) have different meanings despite the fact that they contain exactly the same (number of) words or constituents. The roles of the NPs *the girl* and *the boy* in (1a) are different from those of the same NPs in (1b): *the girl* is the 'kisser' and *the boy*, the 'kissee' in (1a), whereas their roles are reversed in (1b).

(1) a. The girl kissed the boy.
    b. The boy kissed the girl.

This difference in meaning is signalled by the difference in the positioning of the NPs relative to the verb *kissed*. While it is grammatically possible to place *the boy* before *the girl* in (1a), this alternative ordering (i.e. *The boy, the girl kissed*) is said to be non-basic or used only under limited circumstances (i.e. when the referent of the NP *the boy* needs to be contrasted with, for example, someone that the girl did not kiss). The ordering of the words in (1) (i.e. the 'kisser' or subject NP and the 'kissee' or object NP before and after the verb *kissed*, respectively) is thus taken to be basic in English. Moreover, if words do not appear in the required linear fashion, sentences will be rendered ungrammatical, as in:

(2) *Girl the kissed boy the.

In (2), the determiner *the* is incorrectly placed to the right of the noun *girl* or *boy*; it should instead appear to the left of or before the noun, as in (1). Thus, word order refers to the linear order in which words are arranged in sentences.[1]

But what is basic word order? That is, what is understood by 'basicness' of basic word order? The best way to answer this question is to explain how basic word order actually is identified in linguistic typology. It is generally thought that basic word order at the clausal level is found 'in stylistically neutral, independent, indicative clauses with full noun phrase (NP) participants, where the subject is definite, agentive and human, the object is a definite semantic patient, and the verb represents an action, not a state or an event' (Siewierska 1988a: 8). Thus, pragmatic neutrality—in conjunction with transitivity (Hopper and Thompson 1980, Kittilä, this volume)—may make it possible to identify basic word order. Other criteria may include textual frequency and formal markedness (Mallinson and Blake 1981: 125–9, Hawkins 1983: 12–16, Comrie 1989: 88–9, Dryer 1989: 70 and 2005b, Whaley 1997: 100–104). Given two competing word orders, the more frequent one is taken to be basic. Moreover, one word order may be grammatically unmarked and the other marked. For instance, the marked order may be subject to grammatical or distributional restrictions or may display a higher degree of formal complexity than the unmarked one.

It is not always a straightforward matter to determine basic word order based on these criteria. Siewierska (1988a: 8–14) offers a good discussion of some of the problems associated with frequency and markedness (also see Payne 1985, Mithun 1992, and Dryer 1995, 1997b). For instance, in many languages, use of bound pronouns, pronominal clitics, or noun incorporation results in transitive clauses with full noun phrases being extremely infrequent or rare. Siewierska (1988a: 12) also points to the observation often made by text linguists that the most frequent word order may actually vary from one type of text to another. Thus, frequency may perhaps not be a reliable parameter in the determining of basic word order in these languages. Markedness may not always serve as a useful diagnostic for basic word order, either. Whaley (1997: 103–4), for instance, makes reference to Yagua, in which the morphologically marked word order VSO turns out to be basic in terms of frequency and pragmatic neutrality as opposed to SVO, which is the morphologically unmarked order.

These problems notwithstanding, judicious use has been made of these criteria in determining basic word order. More frequently than not, these criteria do tend to converge towards a particular word order, which will then be taken to be basic. Specialists' expertise or experience in the matter, if and where available, must also be relied on. This is not to say that these and other problems can be swept under

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[1] 'Word order' is a misnomer, because what is being referred to by this term actually is constituent order. For example, S or O may be phrases, consisting of more than one word. But the term 'word order' will be retained in this chapter since it is well established in linguistic typology.

the rug. Rather, one needs to bear them in mind when evaluating existing works on basic word order or when carrying out research. In a nutshell, the criteria in question are not deterministic by any means but rather largely heuristic.

It must also be made clear that the foregoing criteria used in determining basic word order are not applicable to so-called flexible or free word order languages. The word order in these languages, at least at the clausal level, is qualitatively different from the syntactically defined word order in that the former reflects pragmatic factors or functions, not semantic roles and/or grammatical relations. The concept of basic word order (at the clausal level) is irrelevant to flexible word order languages, just as the concept of tone is to non-tonal languages.

Basic word order at the clausal level consists of the three major constituents: S(ubject), O(bject), and V(erb). There are six logical permutations of S, O, and V, each of which has been attested in the languages of the world (see Tomlin 1986 for the relative frequencies of these six word orders):

(3)   Korean (SOV)
      kiho-ka   saca-lil   cha-ass-ta
      Keeho-NOM   lion-ACC   kick-PST-IND
      'Keeho kicked the/a lion.'

(4)   Thai (SVO)
      khon níi   kàt   măa   tua   nán
      man   this bite dog   CLF   that
      'This man bit that dog.'

(5)   Welsh (VSO)
      Lladdodd draig   ddyn
      killed   dragon   man
      'A dragon killed a man.'

(6)   Malagasy (VOS)
      manasa ny   lamba   ny   vehivavy
      wash   the clothes   the woman
      'The woman is washing the clothes.'

(7)   Panare (OVS)
      piʔ   kokampö   unkiʔ
      child washes   woman
      'The woman washes the child.'

(8)   Nadëb (OSV)
      samũũy   yi   qa-wùh
      howler-monkey   people   eat
      'People eat howler-monkeys.'

Basic word order is also observed at other grammatical levels (e.g. phrasal). Most frequently discussed are PrN/NPo (preposition (Pr) + noun (N) and noun (N) + postposition (Po)), NA/AN (the order of noun (N) and adjective (A)), NG/GN (the order of noun (N) and genitive (G)), and NRel/RelN (the order of noun (N) and relative clause (Rel)). Relevant examples are as follows:

(9)   Niuean (PrN)
      To   fano   a   au   apogipogi   ki   Queen   Street
      FUT   go   ABS I   tomorrow   to   Queen   Street
      'I am going to Queen Street tomorrow.'

(10) Urubu-Kaapor (NPo)
      kaninde   rehe
      Canindé   to
      'to Canindé (a place name)'

(11) Malay (NA)
      rumah   besar   itu
      house   big   that
      'that big house'

(12) Sinhalese (AN)
      hoñdə   eloolu
      good   vegetable
      'good vegetables'

(13) Spanish (NG)
      el   coche   de   la   mujer
      the   car   of   the woman
      'the woman's car'

(14) Ket (GN)
      ob   da-quś
      father his-tent
      'father's tent'

(15) Luganda (NRel)
      ekitabo   kye   n-a-gula   kirungi
      book   REL   I-PST-buy   good
      'The book that I bought is good.'

(16) Basque (RelN)
      gizon-a-k   liburu-a   eman   dio-n   emakume-a
      man-the-SBJ   book-the   give   has-REL   woman-the
      'the woman that the man has given the book to.'

2. EARLY RESEARCH ON BASIC WORD ORDER

It was Greenberg (1966c [1963]) who first recognized word order as a potentially rich area of typological investigation. He not only identified word order patterns systematically on the basis of a 30-language sample but also discovered that certain correlations hold between the seemingly logically distinct word order properties. In so doing, he also 'established the validity and importance of a new type of universal statement, the implicational universal, thereby setting a precedent for the discovery of other universals of this logical form [$p \supset q$, where "$\supset$" is to be understood to mean "implies"]' (Hawkins 1983: 19). Greenberg's (1966c) paper also served as the empirical basis for subsequent works, including Lehmann (1973), Vennemann (1974c), and Hawkins (1983).

2.1 The inception of word order typology

Greenberg (1966c) puts forth 45 separate putative 'universal' statements based on his 30-language sample and also on his observations of a considerably larger number of languages.[2] There are 25 implicational statements that have to do with basic word order, involving as many as 34 logically distinct claims (Hawkins 1983: 22). Some of his universal statements have stood the test of time and data, which in itself is remarkable, given that he had only 30 languages to work on in his sample. For example, consider:

(17) *Universal 1*
      In declarative sentences with nominal subject and object, the dominant order is almost always one in which the subject precedes the object.

(18) *Universal 3*
      Languages with dominant VSO order are always prepositional.

The validity of (17) and (18) has been confirmed many times over (e.g. Mallinson and Blake 1981, Hawkins 1983, Tomlin 1986, Dryer 1989, 1992).[3]
   Greenberg's (1966c) implicational universal statements are all unilateral, i.e. non-reversible implicational statements. Thus $p \supset q$ can never be read alternatively as $q \supset p$. Take Universal 25 as an example:

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[2] It is not possible to determine exactly how many languages are included in Greenberg's Appendix II because he often speaks of X languages, Y group, many Z languages, etc. But with slight modification and correction, Hawkins (1983) puts the total number of the languages in Appendix II at 142.
[3] Universal 3 is often cited as an exceptionless language universal. But it is correct to say that there are a few verb-initial languages with postpositions, e.g. Yagua (Comrie 1988c: 146). Dryer (1991: 448) adds three more counterexamples: N. Tepehuan, Cora, and Guajajara.

(19)   *Universal 25*
        If the pronominal object follows the verb, so does the nominal object.

The universal in (19) should not be interpreted bilaterally as in (20).

(20)   If the nominal object follows the verb, so does the pronominal object.

The reason why Greenberg's implicational universals are formulated unilaterally is simple: bilateral interpretations of the universal statements in question are empirically unwarranted. For instance, there are many languages in which the pronominal object precedes the verb when the nominal object follows the verb—for example, French—but none in which the nominal object precedes the verb when the pronominal object follows the verb.

Another important aspect of Greenberg's work on word order is his insistence on employing different word order parameters in order to predict other word order properties (Comrie 1989: 93). Later researchers, Lehmann and Vennemann in particular, diverge from this position in an attempt to reduce various word order co-occurrences to a simple generalization or principle. Consider Greenberg's universals such as:

(21)   *Universal 3*
        Languages with dominant VSO order are always prepositional.

(22)   *Universal 4*
        With overwhelmingly greater than chance frequency, languages with normal SOV order are postpositional.

(23)   *Universal 2*
        In languages with prepositions, the genitive almost always follows the governing noun, while in languages with postpositions it almost always precedes.

Word order at the clause level is taken into account to predict the distribution of adpositions, whereas it is the distribution of adpositions that is used as the predictor of the relative position of the genitive (G) and the governing noun (N).

In the concluding section of his paper, Greenberg (1966c: 96–104) discusses the notions of dominance and harmony in an attempt to provide an explanation of the observed word order correlations. For example, Universals 3 and 4 (see (21) and (22)) indicate that prepositions occur regardless of whether word order at the clausal level is VSO or SOV, whereas there is a strict restriction as to where postpositions occur. That is, postpositions are found in SOV, not VSO, languages. This means that because of their unrestricted distribution, prepositions are 'dominant' over postpositions, which are in turn regarded as 'recessive'. It turns out that in general dominant orders are also the cross-linguistically more common permutations, appearing in the implicatum of implicational universal statements (or *q* in

$p \supset q$) (Dryer 1988, Croft 1995a: 99–100). The reason why postpositions can co-occur with SOV, not with VSO, is that they are harmonic with the order of both SV and OV. This also explains why postpositions are avoided in VSO languages: postpositions are disharmonic with VS and VO. Thus, Greenberg (1966c: 97) claims that '[a] dominant order may always occur, but its opposite, the recessive, occurs only when a harmonic construction is likewise present'. If V and adpositions are taken to be modified elements, and O and N to be modifiers, then OV and NPo can both be seen to be based on the modifier-before-modified template, as it were. Harmonic relations may thus be based on the 'polarizing' of modifiers and non-modifiers (i.e. modified), with all the modifiers placed on one side of the modified. Thus, Greenberg (1966c: 100) cautiously puts forth the notion of harmony as a possible explanation of some of the observed word order correlations.

2.2 The rise of OV–VO typology

Building on Greenberg's (1966c) work, Lehmann (1973, 1978a, 1978c) proposes what he calls the Fundamental Principle of Placement or FPP. This principle assumes that the primary syntactic construction is made up of the verb and object (NP), which are in turn 'primary concomitants' of each other in the sentence. In Lehmann's work, subject is left out of consideration because in many languages 'subjects are by no means primary elements in sentences', for example, subjectless sentences in so-called 'expletive' expressions, such as Latin *pluit* meaning 'It is raining' (Lehmann 1973: 51). He thus reduces Greenberg's word order typology to two basic word order types, namely, OV (i.e. SOV) and VO (i.e. VSO and SVO). (Note that object-before-subject languages were not considered at all in Greenberg 1966c because they were then thought to be nonexistent or at least extremely rare. When taken into account, the less common three word orders—VOS, OVS, and OSV—will also be collapsed similarly to the ordering of O and V.) The FPP stipulates that modifiers be placed on the opposite side of a basic constituent, V or O, from its primary concomitant. Thus, if one knows that a given language is OV or VO, one can predict the following: in OV languages, nominal elements—adjective, genitive, and relative expressions—are placed to the left of the noun, and in VO languages, to the right of the noun.

Lehmann (1973: 55, 1978c: 34) is well aware of a large number of languages that do not behave as the FPP predicts. For instance, languages may display properties of both OV and VO. He accounts for the existence of such 'inconsistent' or 'ambivalent' languages by claiming that they are undergoing a change from OV to VO or vice versa due to contact or internal development. But even if inconsistent languages were discounted, why do nominal modifiers position themselves in the first place in the way that the FPP predicts? Lehmann, however, does not offer any

answer to this question. At best, therefore, the FPP is no more than a generalization of Greenberg's (1966c) word (and morpheme) order correlations.

Like Lehmann, Vennemann (1974c) is firmly of the opinion that subject is of no importance or relevance to word order typology, thereby pursuing the OV–VO typology. But, unlike Lehmann, Vennemann makes an attempt to explain Greenberg's universal statements on basic word order. The thrust of his explanation is embodied in what he (1974c: 80) calls the Principle of Natural Serialization or PNS: the order of operators (i.e. dependents or modifiers in traditional parlance) and operands (i.e. heads or modifieds in traditional parlance) tends to be serialized in one direction, namely, either operators before operands, or operands before operators, as in (24).

(24)

$$\{operator \{operand\}\} \Rightarrow \begin{array}{l} [operator [operand]] \; in \; OV \; languages \\ \\ [[operand] \; operator] \; in \; VO \; languages \end{array}$$

Various categories are assigned to either of these two meta-categories, operators and operands, as in the following.

(25)

OPERATOR	OPERAND
object	verb
adverbial	verb
main verb	auxiliary
adjective	noun
relative clause	noun
genitive	noun
numeral	noun
determiner	noun
adjective	comparison marker
standard of comparison	comparative adjective
noun phrase	adposition

The status of some of the operators and operands has, however, been called into question (Mallinson and Blake 1981: 384–5, Hawkins 1983: 37–40, Comrie 1989: 98, Dryer 1992: 88–9). Whether a given category is an operator or an operand may, of course, depend on one's theoretical orientation. Some of the categories in (25) may thus be more or less controversial than others. But at least insofar as Greenberg's observations are concerned—and if (25) is accepted as valid—Vennemann's PNS takes account of them in a principled manner. For instance, NRel is far more likely to be found in VO languages than in OV languages because the relative positions of the N and the Rel are to be determined in exactly the same way as those of V and O are (but cf. section 6).

There are as many as 34 logically distinct claims about basic word order in Greenberg's (1966c) paper. The rather unwieldy number of these claims alone is a good enough reason for making an attempt to discover (an) 'organizing principle (s)' that ultimately explain(s) all these universal statements. The possibility of reducing the multiple claims about word order to a single elegant principle as in (24) does indeed seem a highly attractive option.

The position of V relative to O is the core of Vennemann's theory, as he (1974c: 79) emphasizes that 'all word order rules are dependent on the relative position of the verb, V, and its object, O, in such a way that in a syntactically consistent language all grammatically functional word order relationships can be predicted from the relative order of V and O'. Accordingly, he (1974c) speaks of OV and VO languages. This in turn gives rise to the OV–VO typology. But, as Hawkins (1983: 36) correctly points out, the verb ends up losing its special role within Vennemann's theory because categories are reduced across the board to either operators or operands. Thus, in terms of operand status, the verb relative to O is no different from any other categories on the right-hand side of the list in (25).

Moreover, Vennemann's reductionist theory runs into serious empirical problems. In Appendix II of his paper, Greenberg (1966c: 108–10) lists 24 logically possible combinations of the four word order parameters: (i) VSO/SVO/SOV, (ii) PrN/NPo, (iii) NG/GN, and (iv) NA/AN (i.e. $3 \times 2 \times 2 \times 2 = 24$). Vennemann's PNS, in contrast, positively sanctions only two combinations: the operator–operand and operand–operator sequences or OV & NPo & GN & AN and VO & PrN & NG & NA. These two PNS-sanctioned sequences can be mapped onto only three of the 24 logical possibilities:

(26)   Type 1   VSO & PrN & NG & NA
        Type 9   SVO & PrN & NG & NA
        Type 23   SOV & NPo & GN & AN

By one estimation (Hawkins 1983: 40), however, these three types account for only 68 of the 142 languages (48%) in the expanded list of Appendix II—which is revised slightly in Hawkins (1983: 52–3) in the light of new data. In Appendix II, there are no fewer than sixteen attested combination types, which means that 52% of the sample languages belong to the remaining thirteen types. In other words, more than half of the sample languages deviate from the predictions of the PNS.

The completely ignored status of subject and the collapsing of VSO and SVO into the single type VO in Vennemann's work have also drawn criticism from a number of linguists (Mallinson and Blake 1981: 379, Comrie 1989: 97, Siewierska 1988a: 18, Payne 1990: 19). Comrie (1989: 97), for instance, points out that what is true of object noun phrases is also true of other types of noun phrase. This is an important fact that should be captured in any theory of basic word order, for which there is no room

within Vennemann's theory; the same comment applies to Lehmann. But it is the elimination of subject from word order typology that has enabled Vennemann to lump VSO and SVO together without much difficulty because, with subject taken into consideration, SVO would fall under both XV (for SV) and VX (for VO), which would indeed make it impossible for the PNS to make consistent predictions about other word order properties of SVO in particular.

2.3 The status of SVO

Although Greenberg (1966c) deals with the three basic word order types—VSO, SVO, and SOV—all fifteen implicational universal statements which refer to the verb position as either the antecedent (or p) or consequent (or q) property involve VSO or SOV, but not SVO. Therefore, although Greenberg's tripartite typology of VSO, SVO, and SOV can be interpreted to be verb-based—VSO ⇒ V-initial, SVO ⇒ V-medial, and SOV ⇒ V-final—it is clear from his discussion that SVO plays no significant role in the predicting of word order properties. In fact, when all word order co-occurrences in Greenberg's (1966c) sample are examined with respect to the verb position, SVO can only be seen as a kind of mixed type between VSO and SOV, albeit inclining slightly towards VSO. Hawkins (1983: 16, 29–30) is led to claim that 'nothing correlates with SVO in a unique and principled way'. He (1983: 114–16) thus abandons the verb-based (and hence OV–VO) typology in favour of the distribution of adpositions being elevated to preferential status (see section 3).

Dryer (1991), however, has demonstrated that the ambivalence as a basic word order type of SVO is overstated, with the validity of the OV–VO typology underestimated (see section 4). He argues that both Lehmann and Vennemann were essentially correct in advancing the OV–VO typology. His evidence does show, contrary to the widely held view, that in general the word order properties of SVO languages differ little from those of the other two VO languages, i.e. VSO and VOS.[4] He (1991: 443) thus comes to the conclusion in favour of the OV–VO typology: with respect to a large number of word order properties, there is 'a basic split between VO and OV languages'. Since there are many word order properties that are characteristic of both V-initial and SVO languages, the basic distinction between OV and VO languages is justifiable, thereby providing support for the OV–VO typology.

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[4] Dryer (1991: 443–4) does not make a distinction between the two types of V-initial languages—VSO and VOS—because 'there is no evidence that VSO languages behave differently from other V-initial languages, either VOS languages or V-initial languages which are neither clearly VSO nor clearly VOS' (Dryer 1988: 190).

3. MAKING LANGUAGE UNIVERSALS EXCEPTIONLESS

Hawkins (1983: 319) works with an expanded 336-language sample of his own, although he frequently makes use of not only Greenberg's 30-language sample but also *his* expanded list for purposes of testing. He (pp. 60–63) highlights the importance and role of exceptionless universals in constructing a theory of basic word order. Although it proposes a large number of exceptionless universal statements, Greenberg's work contains a fair number of statistical universal statements (i.e. with exceptions). Hawkins (1983: ch. 3) sets out to demonstrate that statistical universals can be converted into exceptionless ones. For instance, he (pp. 66–72) comes up with the following three basic universals:

(27) a. Pr ⊃ (NA ⊃ NG)
      b. Pr ⊃ (NDem ⊃ NA)
      c. Pr ⊃ (NNum ⊃ NA)

Encoded in (27) are the (statistical) implicational universal statements: (a) if a language has preposition word order, then if the adjective follows the noun, the genitive follows the noun; (b) if a language has preposition word order, then if the demonstrative determiner (or Dem) follows the noun, the adjective follows the noun; and (c) if a language has preposition word order, then if the numeral (or Num) follows the noun, the adjective follows the noun. By transitivity, two additional implicational universals can be drawn, as in (28).

(28) a. Pr ⊃ (NDem ⊃ NG)
      b. Pr ⊃ (NNum ⊃ NG)

The implicational statements in (28) predict that Pr & NDem & GN and Pr & NNum & GN are non-attested co-occurrence patterns. But there are two counter examples to each of (28a) and (28b) in Hawkins's expanded sample, namely, Kaliai-Kove and Karen, which are not only Pr & NDem & GN but also Pr & NNum & GN. The small number of these counterexamples can perhaps be brushed aside as insignificant, but Hawkins (1983: 128–9) observes that they are SVO languages. By requiring prepositional languages to be non-SVO (or –SVO in (29)), Hawkins is able to 'eliminate' the two counter-examples and to reformulate the statistical universals in (28) into complex yet exceptionless ones:

(29) a. Pr & –SVO ⊃ (NDem ⊃ NG)
      b. Pr & –SVO ⊃ (NNum ⊃ NG)

As has already been noted, Vennemann's PNS may only be able to account for less than half of the languages of the world; more than half of the languages of the

world are counterexamples to the PNS. One of Hawkins's (1983) major contributions to word order typology is to bring these 'counterexamples' back into the fold as something to be explained in a principled way. In Hawkins's theory, there are two ways in which this reinstatement of the counterexamples can be carried out. First, he proposes two (competing) principles that have a bearing on word order correlations: the Heaviness Serialization Principle (HSP) and the Mobility Principle (MP). Second, he makes a conceptual distinction between two different types of universals, implicational and distributional, the latter adding a quantitative dimension to language universals research.

Hawkins (1983: 75) finds that only seven of the 32 mathematically possible cooccurrences of the five nominal modifiers in prepositional languages ($2^5 = 32$) are attested in Greenberg's data and in his own as enumerated below.

(30) a. Pr & NDem & NNum & NA & NG & NRel
      b. Pr & DemN & NNum & NA & NG & NRel
      c. Pr & NDem & NumN & NA & NG & NRel
      d. Pr & DemN & NumN & NA & NG & NRel
      e. Pr & DemN & NumN & AN & NG & NRel
      f. Pr & DemN & NumN & AN & GN & NRel
      g. Pr & DemN & NumN & AN & GN & RelN

What (30) clearly illustrates is that the nominal modifiers are preposed or placed before the head N 'in a fixed and predictable pattern: first the demonstrative determiner or the numeral; then both; then the adjective; then the genitive; and finally the relative clause' (Hawkins 1983: 75). Put differently, if the Rel is preposed, all the other modifiers—the G, A, Num, and Dem—must also be preposed; if the G is preposed, so are the A, Num, and Dem; and so forth. Hawkins claims that the nominal modifiers behave in this manner because some modifiers are heavier or lighter than others, and because heavier modifiers tend to occur to the right of lighter ones. Hawkins (1983: 90–91) thus proposes the HSP:

(31) *Heaviness Serialization Principle (HSP)*
      Rel $\geq_R$ G $\geq_R$ A $\geq_R$ {Dem, Num}
      where '$\geq_R$' means 'exhibits more or equal rightward positioning relative to the head noun across languages'.

In terms of Vennemann's PNS, only (30a) will be consistent or fully serialized, with the rest being inconsistent in one or more respects in terms of the ideally serialized operand–operator sequence. Thus, languages belonging to the patterns in (30b)–(30g) will all be counterexamples to the predictions of the PNS. But under Hawkins's HSP not only the completely consistent co-occurrence in (30a) but the inconsistent ones in (30b)–(30g) can also be accounted for in a principled or predictable manner. The inconsistent co-occurrences are deviations from the serialization of the preposition and the nominal modifiers, but all these deviations

do also arise from prepositional languages placing lighter constituents to the left of the head and heavier ones to the right of the head, with the differences among (30b)–(30f) depending on where languages draw the line between heavier and lighter constituents.

In postpositional languages, however, the HSP alone cannot explain the distribution of the nominal modifiers. There are certain co-occurrences of nominal modifiers in postpositional languages which militate against the HSP although they are captured by Hawkins's universals. The universals in question all involve postpositions as the antecedent property ('∨' means 'or'):

(32) a. Po ⊃ (AN ⊃ GN)
      b. Po ⊃ (DemN ⊃ GN)
      c. Po ⊃ (NumN ⊃ GN)
      d. Po ⊃ ((AN ∨ NA) & (RelN ∨ NRel))

The first three implicational statements in (32) are formulated to predict nonoccurrence of the patterns in (33).

(33) a. *Po & AN & NG
      b. *Po & DemN & NG
      c. *Po & NumN & NG

The asterisked patterns in (33) are also well within the predictions of the HSP; the lighter constituents—the A, Dem, and Num—all appear to the left of or before the N, whereas the heavier one—the G—is placed to the right of or after the N. There are no languages exemplifying the co-occurrences in (33) in either Greenberg's or Hawkins's data.

Moreover, the implicational universals in (32) also predict the co-occurrence patterns in:

(34) a. Po & NA & GN
      b. Po & NDem & GN
      c. Po & NNum & GN
      d. Po & NA & RelN

The co-occurrences in (34), however, all go against the predictions of the HSP; for instance, in (34a), the lighter constituent, the A, occurs to the right (of the head N), whereas the heavier constituent, the G, occurs to the left (of the head N). The violation is most dramatic in (34d), wherein the heaviest constituent, the Rel, is pushed to the left, and the lighter constituent, the A, to the right. In order to explain the existence of these apparent exceptions to the HSP, Hawkins (1983: 93) invokes the MP, which claims that the Dem, the Num, and the A are more mobile than the G and the Rel, and thus are able to move around their heads more easily. In consistent prepositional languages—consistent in the sense of Vennemann's PNS—all nominal modifiers are placed to the right of the head. When modifiers

move around their heads according to the MP, they will move in the direction also predicted by the HSP, i.e. lighter constituents to the left. In consistent postpositional languages, in comparison, all nominal modifiers are already placed to the left of the head. When modifiers deviate from their 'ideally serialized' positions, they can only move to the right. But this is contrary to what is predicted by the HSP insofar as lighter constituents are concerned. In general, however, the MP takes priority over the HSP (with a possible exception of Rel), thereby explaining the co-occurrences in (34).[5] It is indeed the lighter and more mobile constituents— the Dem, the Num, and the A—in (34) that have shifted from their ideally serialized positions, whereas the heavier and less mobile ones—the G and the Rel— remain in the position to the left of the head N (cf. (33) for the reverse, unattested situation).

As the reader may already have realized, all the universal statements cited in this section involve either prepositions or postpositions as the antecedent property. As mentioned in 2.3, Hawkins (1983) abandons the verb-based word order typology. He thus speaks of two major word order types: prepositional and postpositional languages.

Hawkins's approach to word order universals is, as he (1983: 163) calls it, a two-tier approach: implicational and distributional. The former type of universal is formulated to define all and only the attested co-occurrences of word order properties. The latter is appropriate for defining relative language frequencies or quantities of these co-occurrences. In order to quantify language frequencies more objectively and accurately, Hawkins (1983: ch. 4) proposes the Principle of Cross-Category Harmony (PCCH). Hawkins's PCCH aims to produce an overall profile of the ordering of all operators and operands. To see how this principle works, consider the frequency distribution of the four word order properties—clausal word order (SOV, VSO, and SVO), Pr/Po, NA/AN, and NG/GN—as in Table 13.1 (the language quantities and percentage numbers of Greenberg's 1966c Appendix II in the second column and those of Hawkins's 1983 Expanded Sample in the third column).[6]

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[5] For instance, Hawkins (1983: 95) notes that the productively attested co-occurrences of Po & DemN & NRel and Po & NumN & NRel are predicted by the HSP, but not by the MP. The HSP makes a prediction that the Rel, not the Dem, will occur to the right because the former is much heavier than the latter. The MP makes a contradictory prediction that the Dem, not the Rel, will move around the head or to the right in this case because the former is more mobile than the latter. As has been noted in the main text, it is generally the case that the MP overrides the HSP. But, since the difference in heaviness between the Dem and the Rel is substantial enough, the HSP will take precedence over the MP; hence (DemN ∨ NumN) & NRel. Hawkins (1983: 94) proposes the Mobility and Heaviness Interaction Principle to resolve the present case of conflict between the HSP and the MP.

[6] Note that the subject is regarded as an operator in Hawkins (1983: 136–7). For example, the sequence in <7> in Table 13.1 has one inconsistency, S before V, with the rest being consistently serialized as operand before operator.

Table 13.1. Distribution of clausal word orders, Pr/Po, NA/AN, and NG/GN

<1> SOV & Po & AN & GN	28(47.4%)	96(59.3%)
<2> SOV & Po & NA & GN	24(40.7%)	55(33.9%)
<3> SOV & Po & NA & NG	7(11.9%)	11(6.8%)
<4> VSO & Pr & NA & NG	19(76.0%)	38(73.1%)
<5> VSO & Pr & AN & NG	5(20.0%)	13(25.0%)
<6> VSO & Pr & AN & GN	1(4.0%)	1(1.9%)
<7> SVO & Pr & NA & NG	21(65.6%)	56(70.0%)
<8> SVO & Pr & AN & NG	8(25.0%)	17(21.2%)
<9> SVO & Pr & AN & GN	3(9.4%)	7(8.8%)

If in a given co-occurrence all operators are consistently serialized in one direction, then that co-occurrence is represented by more languages than any other co-occurrences which deviate in one or more respects from the serialized ordering: as the conflict in the ordering of the operands and operators across the different word order co-occurrences increases, the number of exemplifying languages decreases.

4. RETURN TO THE OV–VO TYPOLOGY: THE BRANCHING DIRECTION THEORY

Dryer (1992) is the most comprehensive empirical study of basic word order correlations that has ever appeared. Its comprehensiveness lies not only in the range of word order correlations examined but also in the use of a very large language sample. In this work, the correlation between the order of 24 pairs of elements and the order of verb and object is tested on the basis of a database of 625 languages, with most of his data derived from a 543-language subset of that database (Dryer 1992: 83). In conjunction with his ongoing research on word order typology, Dryer has been developing a sophisticated sampling technique that may alleviate major problems with which previous language sampling approaches are beset (cf. Bakker, this volume). This is the technique being employed in the work in question. He determines the distribution of a given property in the six large 'linguistic areas' by counting genera, not individual languages, with a view

to sifting linguistic preferences from the effect of genetic relatedness and areal diffusion.[7]

Dryer's work on basic word order is best characterized as a return to the OV–VO typology, which was promoted in the earlier work of Lehmann (1973, 1978b, 1978c) and Vennemann (1974c) but subsequently abandoned by Hawkins (1983) in favour of adpositions as the best predictor of word order properties. Dryer (1992: 82–7) thus takes the order of verb and object to be the basic predictor of word order properties. He has two primary aims: (i) to identify the pairs of elements whose order correlates with that of verb and object; (ii) to explain why such correlations exist. In the process, he also demonstrates the inadequacy of the Head-Dependent Theory (or HDT), which captures the very—if not the most—popular view that there is a linguistic preference for dependents to be placed consistently on one side of heads, i.e. either before or after heads. Vennemann (1974c) and Hawkins (1983), as has already been shown, appeal to principles similar to the HDT, differences in detail notwithstanding.

Dryer (1992) argues, however, that although the HDT adequately accounts for six pairs of elements, including the order of noun and genitive and that of verb and manner adverb, there are certain pairs of elements which do not correlate at all with the order of verb and object, contrary to what the HDT predicts, and that for some other pairs of elements what the HDT predicts is the opposite of what is actually found in the data. He also points out that different (theoretical) approaches often disagree on which element is to be taken as the head or the dependent. In common with Dryer (1992: 82), it is assumed here that, if in a given pair of elements X and Y, X tends to precede Y (statistically) significantly more frequently in VO languages than in OV languages, then <X,Y> is a correlation pair, with X being a verb patterner and Y an object patterner with respect to that correlation pair.

Dryer (1988, 1992) demonstrates that the order of noun and adjective does not correlate with that of verb and object—contrary to the widely held view: OV and VO languages tend to be AN and NA, respectively. In fact, the average proportion of genera for the AN order is higher among VO languages than OV languages! This completely contradicts what the HDT predicts about the order of adjective and noun, and that of verb and object.

Under the HDT—and, indeed, under the standard view too—articles are taken to be a type of modifier (i.e. dependent) of the noun, which is in turn assumed to be a head. The order of noun and article (or Art) is thus predicted to correlate with that of verb and object. But Dryer's work reveals that this is not the case. Whereas it is more common among OV languages in only Eurasia and South America, the ArtN order is far more common among VO languages in as many as five areas. This predominance of the ArtN order among VO languages is further substantiated by the higher average proportion of genera figure of NArt among OV languages than among VO languages in all the six areas. In the correlation pair of noun and article, therefore, the Art is a verb patterner, whereas the N that it combines with is an object patterner. This is the converse of what is predicted by the HDT.[8]

The correlation pair of auxiliary verb and content (or main) verb illustrates that the HDT may make correct or incorrect predictions depending on which element of the pair is taken to be a head or a dependent. In traditional and early generative grammar, the content verb is the head, with the auxiliary verb being the dependent. In the alternative view, the auxiliary verb is the head, with the content verb being the dependent. The data provided by Dryer (1992: 100) indicate unquestionably that the auxiliary is a verb patterner (or head) and the content verb, an object patterner (or dependent).

Dryer (1992: 105) concludes, therefore, that there is enough evidence to reject the HDT as an explanation of the word order correlations. What is his alternative explanation? He first observes that, although they are both adjunct dependents of the noun, relative clauses are object patterners and adjectives are not. He suggests that the contrast between these two is attributable to the fact that relative clauses are phrasal, whereas adjectives are non-phrasal. This leads him (1992: 108–18) to put forth what he calls the Branching Direction Theory (BDT).

(35)   *Branching Direction Theory (BDT)*
       Verb patterners are non-phrasal (non-branching, lexical) categories and object patterners are phrasal (branching) categories. That is, a pair of elements X and Y will employ the order XY significantly more often among VO languages than among OV languages if and only if X is a non-phrasal category and Y is a phrasal category.

What the BDT predicts is this: languages tend towards right-branching, in which phrasal categories follow non-phrasal categories, or towards left-branching, in which phrasal categories precede non-phrasal categories. Thus, the fundamental distinction between VO and OV languages is their opposite branching direction: right-branching and left-branching, respectively.

Returning to the correlation pairs problematic for the HDT, the pair of article and noun and that of auxiliary verb and content verb can now be accounted for by the BDT. In VO languages, there is a preference of ArtN, whereas in OV languages, there is a tendency towards NArt; articles are verb patterners, and nouns with

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[7] Unlike Hawkins (1983), Dryer (1992) is concerned not with finding exceptionless language universals but rather with statistical universals or linguistic preferences. In a way, this is dictated by his sampling decision to count genera, rather than individual languages. Exceptionless universals must by definition be absolute, admitting of not a single counterexample. But by counting genera, not languages, Dryer (1992) has no way of telling whether or not a given universal is exceptionless, since genera are genetic groups of languages.

[8] Under the so-called DP Hypothesis in generative grammar, the determiner is taken to be the head of the NP (cf. Dryer 1992: 104).

which they combine, object patterners. To put it in terms of the BDT, the ArtN order is predominant in VO languages because in these languages non-phrasal categories (V, Art, etc.) precede phrasal categories (O, N, etc.), whereas in OV languages, the N precedes the Art because the preferred branching direction of these languages is phrasal categories before non-phrasal categories.

The reason why the order of adjective and noun is not a correlation pair with respect to the order of verb and object is, according to Dryer (1992: 110–12), that both adjectives and nouns that they combine with are non-phrasal categories. For pairs like this, the BDT makes no predictions. But the non-phrasal status of adjectives (or As) may strike one as questionable, especially because adjectives can be modified by intensifiers such as *very*, thereby clearly forming adjective phrases (i.e. phrasal and branching). Moreover, if nouns that adjectives combine with are non-phrasal (e.g. *very tall girls*), why is it that nouns are regarded as phrasal when they combine with articles (e.g. *the girls*)? Dryer explains that although they may be phrasal, modifying adjectives are not fully recursive in that they rarely involve other major phrasal categories such as NPs or PPs. The use of intensifiers is also very limited or restricted, with only a handful of them taking part in the forming of adjective phrases. In other words, recursiveness must also be taken into account in distinguishing verb patterners from object patterners or vice versa: verb patterners are either non-phrasal categories or phrasal categories that are not fully recursive (e.g. adjectives), whereas object patterners are fully recursive phrasal categories.

5. SEEKING A PROCESSING-BASED EXPLANATION: THE EARLY IMMEDIATE CONSTITUENTS THEORY

Hawkins (1983) proposes two principles, HSP and MP, in order to account for various word order correlations (also see note 5). The HSP is taken to be motivated by processing ease: heavy modifiers occur to the right and light ones to the left so that the head can be recognized quickly and efficiently. In his 1994 work, Hawkins again pursues a processing-based explanation of word order correlations—in fact, of word order in general—and distributional universals, but to the extent that they can all be accounted for by a single principle or what he refers to as the Principle of Early Immediate Constituents (PEIC). The PEIC is built upon the basic assumption that words or constituents occur in the orders that they do so that their internal syntactic structures or immediate constituents (ICs) can be recognized (and produced) in language performance as rapidly and efficiently as possible. This means that different permutations of constituents may give rise to different levels of structural complexity, which in turn have a bearing on the rapidity with which

recognition of ICs is carried out in real time. Basic word order is then looked upon as conventionalization or grammaticalization of the optimal order in performance; that is, the order that maximizes efficiency and speed in processing.

There are additional assumptions that the PEIC makes in the explaining of basic word order and word order correlations. These assumptions including the PEIC itself can easily be explicated by examining a set of English sentences which contain a verb particle *up*.

(36)   a. Jessica rang up the boy.
       b. Jessica rang the boy up.
       c. Jessica rang the boy whom she met in the class up.

Leaving the (invariable) subject NP aside, the Verb Phrase (VP) in (36) is a constituent which is in turn made up of three separate ICs, i.e. V, the object NP, and the verb particle. It is well known that the further the particle is moved from the verb, the less acceptable the sentence becomes, and the less frequent in occurrence it is. Hawkins explains this by arguing that the different sentences in (36) present different degrees of structural complexity. For instance, (36c) is more difficult to process than (36a) because the former has a higher degree of structural complexity than the latter. To demonstrate this, he (1994: 58–60) invokes the concept of the Constituent Recognition Domain (CRD). This is, in effect, intended to narrow down on the minimum number of terminal and non-terminal nodes that must be taken into account for purposes of constructing the syntactic structure of a given constituent. In this context, Hawkins's (p. 62) notion of mother-node-constructing categories (MNCCs) is also crucial. MNCCs are those categories that uniquely determine the mother node of a constituent. For instance, the V is the MNCC of the VP; once the V *rang* in (36) is parsed, it immediately identifies the VP as the mother node of the V. The MNCC of the NP is either the Det or the N, with either of these two included in the CRD of the NP. For example, the (object) NP in (36) can be uniquely determined by the Det alone, since processing is carried out from left to right—in N-initial (or N-Det) languages, the N will function as the MNCC of the NP. Thus, not all terminal and non-terminal nodes in a constituent need to be parsed in order to arrive at the overall syntactic structure of that constituent.

From this kind of reasoning, Hawkins (1994: 77) draws the following conclusion:

(37)   *Principle of Early Immediate Constituents (PEIC)*
       The human parser prefers linear orders that maximize the IC-to-non-IC ratios of constituent recognition domains (CRDs).

(Note that as a shorthand for the IC-to-non-IC ratio, the number of ICs in a CRD is divided by the total number of words in that CRD (known as an IC-to-word

ratio).) Linear orders that give rise to more rapid and more efficient structural recognition in processing are (more likely to be) grammaticalized as basic word orders across languages. Moreover, word order property X may co-occur with word order property Y, not Z, because of the processing or performance motivation for optimizing EIC ratios across these word order properties. The PEIC is thus claimed to underlie not only basic word order but also word order correlations. '

For example, Dryer (1991: 452) provides ample evidence in support of the correlation between OV and postpositions, and of that between VO and prepositions. He (1992: 92–3) amplifies these correlations by observing that the position of the adpositional phrase (AdpP) coincides with that of O: the adpositional phrase before V in OV languages, and after V in VO languages. These two observations lead to the inference that OV may co-occur with preverbal NPo, and VO, with postverbal PrN. Hawkins (1994: 96–7, 255–9) explains this three-way correlation by arguing that in OV languages the preverbal postpositional phrase (PoP) gives rise to the most optimal EIC ratio for the VP, whereas in VO languages, the postverbal prepositional phrase (PrP) does so. To understand this, reconsider in terms of EIC the four orderings of verb and adpositional phrase:

(38) a. $_{VP}[V \ _{PrP}[Pr \ NP]]$
       b. $_{VP}[_{PoP}[NP \ Po] \ V]$
       c. $_{VP}[V \ _{PoP}[NP \ Po]]$
       d. $_{VP}[_{PrP}[Pr \ NP] \ V]$

Suppose one word is assigned to the V and the P each, which is not an unreasonable assumption. For the sake of simplicity, one word is also assigned to the NP; this single word is immediately dominated by a non-terminal node N. The IC-to-word ratios for (38a) and (38b) are then the most optimal, that is, 2/2 or 100%. In (38a) and (38b), the ICs are the V and the AdpP (i.e. PrP or PoP), and these two are recognized on the basis of two adjacent words dominated by the V and the Pr or the Po—the Pr or the Po is the MNCC for the AdpP. In (38c), the MNCC of the AdpP can be parsed only after the associated NP has been parsed, and in (38d), the NP will also delay processing of the V. Thus, the size of the VP CRD is increased, whereby processing efficiency is reduced. For both (38c) and (38d), the IC-to-word ratio is 2/3 or 66.7%, well below the optimal ratio for the other two orderings. Note that any increase of the NP in weight or length will further damage the already non-optimal EIC ratio of (38c) and (38d). The observation that Dryer has made about the pair of verb and adpositional phrase can thus be explained by the PEIC.

Hawkins's theory is claimed to be superior to previous studies on word order because it is based on a single principle, not on a multiplicity of principles. In his earlier work (1983), for instance, Hawkins invokes the MP in order to account for the co-occurrences in (39), all of which are counterexamples to predictions of the HSP (cf. (34)).

(39) a. Po & NA & GN
       b. Po & NDem & GN
       c. Po & NNum & GN
       d. Po & NA & RelN

In Hawkins (1994), in contrast, (39) is claimed to be explained in terms of the PEIC alone. First, assume Dem, Num, A, and N = one word, G = two words, and Rel = four words, with G consisting of the demonstrative or article and the possessor. With this assumption in place, the IC-to-word ratios for the attested co-occurrences in (39) can be computed as in Table 13.2. There are two ICs to be constructed—namely, NP and Po—for the constructing of the PoP. These ICs are recognized by two or three adjacent words, thereby achieving an EIC ratio of 100% or 66.7%. These good EIC ratios are possible in the attested co-occurrences in (39) because only single-word constituents are permitted to occur in between the N and the Po, and because constituents larger than a single word—i.e. the G and the Rel— are placed strictly to the left of the N so that the two words that must be minimally processed to construct the PoP—i.e. those words dominated by the N and the Po— can be immediately adjacent to each other.

What most clearly distinguishes Hawkins's (1994) EIC Theory from previous studies of word order is that it is (far more) capable of accounting for the ordering of multiple categories. In Hawkins (1983: 75), for instance, (40) is identified as one of the seven attested co-occurrences of five nominal modifiers in prepositional languages.

Table 13.2. EIC and attested Po & NP word order properties

	Structure	IC-to-word ratio (PoP)
a.	Po & NA & GN	
	PoP[NP[N A] Po]	2/3 (66.7%)
	PoP[NP[G N] Po]	2/2 (100%)
b.	Po & NDem & GN	
	PoP[NP[N Dem] Po]	2/2 (100%)
	PoP[NP[G N] Po]	2/2 (100%)
c.	Po & NNum & GN	
	PoP[NP[N Num] Po]	2/3 (66.7%)
	PoP[NP[G N] Po]	2/2 (100%)
d.	Po & NA & RelN	
	PoP[NP[N A] Po]	2/3 (66.7%)
	PoP[NP[Rel N] Po]	2/2 (100%)

(40)   NDem & NNum & NA & NG & NRel

But it says very little as to how all these modifiers will actually be ordered relative to the N within the same NP. Similarly, in Dryer (1992), the orders of the Art and the N, of the A and the N, of the N and the Rel, etc. are examined separately from, or independently of, one another in relation to the order of V and O. Hawkins (1994) makes a break with this tradition of word order typology by proposing a theory that provides a much wider perspective on word order typology. Dryer (1992: 116) entertains *en passant* the possibility of using the BDT to account for the sequencing of multiple categories; a number of inferences can indeed be drawn from Dryer's work as to how multiple categories will be linearized within the same syntactic domain.

There are, however, at least two ways in which the EIC Theory seems to be in a better position than the BDT (Song 2001a: 116–19). First, the BDT makes limited predictions about the ordering of categories which are all either phrasal or non-phrasal. The ordering of multiple phrasal categories within the same syntactic domain is a case in point. Given V (non-phrasal), NP (phrasal), and AdpP (phrasal), the BDT predicts the relative position of either the NP or the AdpP relative to the V, but that is as far as it can go. It cannot make further predictions about the ordering of the NP and the AdpP because they are both phrasal categories. The EIC Theory, in contrast, makes predictions about not only the ordering of V on the one hand and the NP or the AdpP on the other, but also the relative ordering of the NP and the AdpP. Thus, in VO languages, the EIC optimal order will be [V NP PrP], whereas in OV languages, it will be [PoP NP V].

Second, unlike the BDT, the EIC Theory is better equipped to handle what Hawkins (1983) refers to as distributional universals, i.e. relative frequencies of occurrence among different ordering possibilities. This can be illustrated by the sequencing of the A, the Rel, and the N. There are twelve logically possible orders of these three categories as enumerated in Table 13.3 along with their left-to-right IC-to-word EIC ratios and very rough relative frequencies of occurrence (Hawkins 1994: 271–3). Assume N = one word, A = one word, Comp = one word, S = three words, and S' = four words.

The BDT makes the general prediction about the twelve logically possible orderings in Table 13.3: all those orderings which exhibit a consistent direction of branching will occur at least very frequently, whereas those which do not will be unattested or at least very infrequent. In Dryer (1992), the BDT is not designed to predict quantitative differences among possible orderings, but it can be reworked to make such quantitative predictions so that it can be compared with the EIC Theory. Thus, inconsistencies in terms of direction of branching are counted for each of the twelve orderings as has been done in the third column in Table 13.3. Note that the internal ordering of the S' is taken here to be the basic one with which the other orderings are compared. The orderings in <1>, <2>, <3>, and <4> are all

Table 13.3. Complex NP word order properties, EIC, BDT inconsistencies, and frequencies of occurrence

Structure	Left-to-Right	EIC Ratio (aggregates) (%)	Number of BDT Inconsistencies	Attested languages
<1>	[N A S'[Comp S]]	100	–	Extensive
<2>	[A N S'[Comp S]]	100	–	Extensive
<3>	[S'[S Comp] N A]	100	–	Extensive
<4>	[S'[S Comp] A N]	100	–	Extensive
<5>	[N A S'[S Comp]]	83	2	Attested
<6>	[A N S'[S Comp]]	83	2	Attested
<7>	[N S' [Comp S] A]	63	1	None
<8>	[A S' [Comp S] N]	63	1	None
<9>	[N S' [S Comp] A]	63	1	None
<10>	[A S' [S Comp] N]	63	1	Only as marked variant
<11>	[S' [Comp S] N A]	38	2	None
<12>	[S' [Comp S] A N]	38	2	None

consistent. The remaining possibilities, however, are inconsistent in one or two ways. The orderings in <5> and <6> are inconsistent in two respects. The ordering of the S and the Comp is phrasal before non-phrasal, but this is at odds with the ordering of the S' and the N, and also with the ordering of the S' and the A. A similar situation occurs with respect to <11> and <12>: one inconsistency each between the ordering of the Comp and the S on the one hand, and that of the S' and the N, or that of the S' and the A on the other. As for <7>, <8>, <9>, and <10>, there is only one inconsistency between the internal ordering of the S' and the ordering of the S' and either the A or the N. Alternatively, the ordering of the whole S' and either the N or the A can instead be taken to be basic, but it will have no bearing on the general point being made here except that those with two inconsistencies will have only one inconsistency, whereas those with one inconsistency will end up with one or two inconsistencies—depending on which of two, the N or the A, forms the basic template with the S'. (The N and the A are both non-phrasal; the BDT has nothing to say about their relative ordering.) The frequencies of occurrence in the last column in Table 13.3 indicate that the BDT does not make good quantitative predictions about the ordering possibilities, particularly the last eight. The BDT also fails to make a correct distinction between the orderings in <5> and <6>, and the ones in <11> and <12>. Both groups are characterized by two

inconsistencies, but there is a marked distributional difference between them. The EIC Theory, however, can make correct predictions about the relative frequencies of the twelve orderings, as can be seen from comparison of the second and last columns in Table 13.3. With the possible exception of <10>, which is reported to be only attested as a marked variant in languages such as Chinese, the EIC ratios correlate remarkably well with the reported frequencies of occurrence. This clearly is one of the advantages that the EIC Theory has over previous studies of word order: the ability to make predictions about relative frequencies of occurrence among different ordering possibilities.

6. RECENT DEVELOPMENTS IN PROCESSING-BASED WORD ORDER TYPOLOGY

Hawkins (2004), building on his 1994 work, has recently put forward a far-reaching theory of word order—far-reaching in the sense that it is used to explain not only word order but also non-word order properties (Hawkins, this volume; Song 2009). Realizing that language processing involves more than recognizing internal syntactic structures or ICs, he proposes that syntactic, semantic, and even pragmatic properties or relations should also be taken into account in the understanding of word order properties. Consider the well-known relationships between OV/VO and RelN/NRel (e.g. Dryer 1991, 2005i), as in:

(41)   a. OV & NRel ∨ RelN
       b. VO & NRel ∨ *RelN

Relative clauses are found to be either prenominal (= RelN) or postnominal (= NRel) in OV languages, but only NRel is attested in VO languages, the only known exception being Chinese (hence * before RelN in (41b)). In terms of the EIC Theory, the co-occurrences of VO and NRel, and OV and RelN (i.e. O = NRel or RelN) are the most optimal. The non-occurrence of VO and RelN can thus be imputed to its non-optimal EIC ratio. The same should apply to the permutation of OV and NRel, but this is widely attested (Dryer 1991: 455). In his earlier work, Hawkins (1994: 324–8) explains this unexpected occurrence by arguing that some OV languages may have the option of switching from the most optimal RelN to the non-optimal NRel in order to avoid misassigning part of the Rel to the main clause (i.e. as the object of the main verb). Said differently, there are certain dependencies between the N and the V (case, theta-role, etc.) that need to be immediately attended to in online processing. While it was presented in Hawkins (1994:

324–8) as a localized explanation for the widely attested NRel in OV languages, in Hawkins (2004) this concept of dependency has evolved, on a par with the PEIC, into a processing principle, namely, the Maximize Online Processing Principle (or MaOP). The basic thrust of this new principle is that the human processor prefers to maximize the set of syntactic, semantic, and other properties that are assignable to each item X (e.g. dependencies between the V and the O) as X is processed. The difference between competing orders and structures will thus be understood also as a function of the number of misassigned (or unassigned) properties. Furthermore, the PEIC is now subsumed under a more general principle of Minimize Domains (or MiD)—more general because it is now employed to explain not just word order but also non-word order properties.

MiD and MaOP work in two ways: they either reinforce or militate against each other (cf. Haiman, this volume). For example, in the case of VO & NRel ∨ *RelN, the choice of NRel for VO is motivated by both MiD and MaOP. The V and the N are adjacent to each other (thus satisfying MiD), and other syntactic/semantic relations holding between the N and the V are also assigned without mishap or delay (thus meeting the needs of MaOP). This also explains why the other option, RelN, is not viable for VO. In the case of OV & NRel ∨ RelN, the two principles come into conflict. In OV languages with RelN, MiD is satisfied because the N and the V abut on each other. However, this permutation does not meet the requirements of MaOP, because the NP within the Rel is misassigned to the main instead of relative clause (because language is processed 'from left to right'). In OV languages with NRel, this misassignment is averted, with the N immediately identified as part of the main clause, but at a cost, i.e. failing to comply with MiD, because the N and the V are separated by the Rel. To wit, unlike VO, OV wins one thing but loses the other, which explains why both RelN and NRel are common in OV languages.

The existence of MaOP in addition to MiD has implications for the concept of CRD used in Hawkins (1994): these principles now have a domain each. For MiD, CRD is replaced by Phrasal Combination Domain, which is essentially the re-labelling of CRD. MaOP is associated with Lexical Domain, which consists of the smallest possible sequence of terminal elements on the basis of which the human processor assigns a lexically listed property to a lexical item (also see Song 2009). Moreover, in order for the combined effect of MiD and MaOP to be computed for a given order or structure (e.g. which of the two principles is the stronger in a given order or structure?), Hawkins (2004: 119–23) proposes a simple yet sophisticated metric, or what he calls the Total Domain Differential. This and other metrics are then taken 'to provide a partial solution' to Newmeyer's (1998) criticism of multiple constraint theories, including Hawkins's own, especially in relation to the relative strengths of principles (Hawkins 2004: 13–14, 272).

Hawkins's (2004) revised theory has far-reaching implications for linguistic theory. This is captured in his Performance–Grammar Correspondence Hypothesis, which reads in part:

(42)   Grammars have conventionalized syntactic structures in proportion to their
       degree of preference in performance.

To understand word order, one must thus understand how processing works in grammar. This is in stark contrast with the standard generative view that word order 'is part of the phonological component' (Chomsky 1995b: 413). Word order is not phonology, but is instead part of grammar, which is predictably determined by the way humans process language. Moreover, Hawkins (2004) has demonstrated that non-word order properties (e.g. filler-gap dependencies, the Accessibility Hierarchy in relativization) are also susceptible to similar processing-based explanations. The inescapable conclusion is that competence is conventionalized performance. This vitiates the dichotomy between competence and performance, strongly upheld in the generative tradition (cf. Newmeyer 2005).

7. CLOSING REMARKS

Most word order studies have of late revealed a strong inclination towards processing as a major avenue of explanation. Future word order typology—along the lines of Hawkins (1994, 2004)—will increasingly be processing-based and tested not only against cross-linguistic data (e.g. Dryer 1992) but also against corpus and experimental data, as the time has arrived for evidence in word order typology to be independently verifiable.[9] Processing-based word order research, however, relies heavily on limited corpus and experimental data from an extremely small number of languages. (This, given the logistics involved in collecting such data, is understandable or even acceptable at the present stage of investigation.) Nonetheless, there is the need to test processing-based predictions against corpus and experimental data from more

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[9] Reference should also be made to a recent surge of interest in areal word order typology. Space limitations, however, preclude discussion of areal word order typology (see Koptjevskaya-Tamm, this volume). For instance, Dryer (2005c) has shown that NA order is overwhelmingly the dominant order in Africa, extending into southwest Europe and the Middle East. NA order is also dominant in a large area extending from northeast India through Southeast Asia well into the Pacific, including New Guinea and Australia. This order is also common in the eastern half of the US and in South America. AN order is attested in much of Europe and Asia, except in southwest Europe, the Middle East, and Southeast Asia. Moreover, Dryer (2005i: 391) has discovered that OV and RelN languages are very common in much of Asia, and outside this area they are not common, to the extent that 'much of the rest of the world differs from Asia in this respect'; that is, OV languages outside Asia are much more commonly NRel. He also points out that VO languages that are NRel are the norm, with VO order with RelN confined to mainland China and Taiwan. Interested readers are invited to consult Haspelmath, Dryer, Gil, and Comrie (2005) for the global distributions of various other word order properties and correlations (and also non-word order properties).

diverse—both genetically and typologically—languages than has been hitherto possible. Moreover, processing-based theories of word order are very much in their infancy. Future word order typology thus promises to be robust in two areas: the refinement of processing-based theories and the testing of these theories against cross-linguistically valid corpus and experimental data. This truly is the hallmark of an evolving scientific endeavour.

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CHAPTER 14

WORD CLASSES

WALTER BISANG

1. INTRODUCTION

Word classes or parts of speech have formed an integral part of grammar since the Greek/Latin tradition. Dionysios Thrax (217–145 BC) presents and defines no fewer than eight parts of speech (Greek *mérē lógou* [part:NOM:PL speech:GEN:SG]) in his 'art of grammar' (Greek *téxnē grammatikḗ*), the first grammar written and compiled in the occident (for more information, cf. Robins 1964: 9–44, Lallot 1998).

Terms such as 'noun' or 'verb', which are found in almost any recent linguistic theory as well as in any descriptive grammar, are rooted in this tradition. Given the ubiquity of these terms, it is a fundamental task of linguistics to analyse them and to define them in a way that fits into our present-day knowledge about the range of cross-linguistic variation. This is the aim of a number of typologists whose approaches will be introduced in the course of this chapter. As will be seen, this is work in progress. There is no final solution appearing on the horizon.

Most approaches to word classes somehow start with a statement on the inadequacy of purely semantic or notional definitions, like 'nouns denote objects', 'verbs denote actions', or 'adjectives denote properties/qualities'. It is easy to see that a noun like *movement* does not refer to an object and thus disproves the above semantic definition. Even Dionysios Thrax did not base his definitions exclusively on semantics. As can be seen from his definition of the noun, he also integrates criteria associated with morphological form, like case, and other morphologically expressed grammatical categories:

The noun is a part of speech with case denoting a physical body or an activity (a physical body like 'stone', an activity like 'education') [. . .] it takes the consequential attributes

(= categories) of gender, type (primary or derived), form (simple or derived), number, and case. (Dionysios Thrax; my translation [W.B.], based on Lallot 1998: 50–51, 127–30, Robins 1964: 33–5)

In the course of time, other criteria were added to the definition of word classes. The present discussion is based on the following four prerequisites for distinguishing word classes (cf. Sasse 1993b: 196–201):

(1) Prerequisites for distinguishing word classes
  • semantic criteria;
  • pragmatic criteria/criteria of discourse function;
  • formal criteria;
  • distinction between lexical and syntactic levels of analysis.

The first three prerequisites mentioned in this section—i.e. semantic, pragmatic, and formal criteria—are generally agreed on in one way or another by contemporary linguists. This does not apply to the methodological distinction between the lexical (paradigmatic) and the syntactic (syntagmatic) levels of analysis. As will be seen in this chapter, the debate on the existence of a noun/verb distinction in Iroquoian languages (Sasse 1993a, 1993b vs. Mithun 2000), in Nootkan (Swadesh 1938, Jacobsen 1979), or in Tagalog (Himmelmann 1987, 2005) can only be understood if the lexical and the syntactic levels are clearly distinguished. The consistent application of the fourth prerequisite even reveals a new typological distinction between noun/verb languages and type/token languages (see Broschart 1997 on Tongan as a type/token language).

The present chapter will be structured as follows. After the introduction of the four prerequisites in section 2, the most important approaches to word classes based on the first three prerequisites will be discussed in section 3 (Schachter, Hengeveld, Croft). Since Croft (1991, 2000b, 2001) developed the most systematic and thorough theory, it will be presented in some more detail in 3.3. Section 4 will deal with the distinction between content words and function words. Section 5 will take up the discussion of the universal status of the noun/verb distinction by integrating the fourth prerequisite. The languages discussed will be Classical Nahuatl (5.2), Late Archaic Chinese (5.3), and Tongan (5.4). Section 6 will deal with adjectives; section 7, with adverbs. Finally, this chapter will end with a short conclusion in section 8.

Since it is the intention of this chapter to focus on criteria that are cross-linguistically valid for distinguishing word classes, it does not discuss the whole list of word classes presented in the literature. Thus, it concentrates on the open word classes of nouns, verbs, adjectives, and adverbs. Nevertheless, a list of some more word classes is presented for the sake of completeness and as a conclusion of this section. Most of these classes are closed classes; that is, they only have a closed number of members.

- pronouns (personal, possessive, reflexive, reciprocal, demonstrative, relative, interrogative, indefinite);
- articles;
- adpositions;
- conjunctions;
- numerals;
- classifiers (with their different subtypes as discussed in Aikhenvald 2000);
- ideophones (Voeltz and Kilian-Hatz 2001);
- interjections.

2. PREREQUISITES FOR THE DISTINCTION OF WORD CLASSES

2.1 Semantic criteria

Most approaches to word classes are based on semantic criteria like object, property, or action (e.g. Croft 1991, 2000b, 2001; cf. 3.3). Sasse (1993a) makes a distinction between 'thing-like concepts' and 'event-like concepts'.

Langacker (1987) is probably the most elaborate study that tries to provide a notional description of nouns and verbs. His definition of the noun is based on the concept of the REGION, i.e. 'a set of interconnected entities' (Langacker 1987: 62). A noun designates a region and is thus characterized as being static and holistic. The concept of BOUNDED is based on whether 'there is a limit to the set of participating entities' (Langacker 1987: 62) and is used to distinguish count nouns from mass nouns. Thus, '[a] COUNT NOUN designates a region that is bounded within the scope of predication in its primary domain', while '[a] MASS NOUN designates a region that is NOT specifically bounded within the scope of predication in its primary domain' (Langacker 1987: 63). Verbs are described as processes which are mentally analysed across their different states through time:

A verb is [. . .] 'a temporal' predication in the sense of following a situation, state by state, as it evolves through conceived time; its 'dynamic' character reflects the successive transformations which derive each component state from its predecessor. (Langacker 1987: 74)

In spite of its thoroughness, Langacker's (1987) notional approach is problematic for at least two reasons (also cf. Sasse 1993a: 649). It does not provide a discovery procedure for parts of speech identification. Arguments that are exclusively based on semantics cannot show why a particular limited set of classes is cross-linguistically universal.

Finally, there is a fundamental problem that applies to all the semantic criteria discussed so far. As Wierzbicka (2000) pointed out, they are all too general to match word classes across languages. One cannot just take any action-denoting lexical item for establishing cross-linguistic word classes, because the concept expressed by that item may not be lexicalized universally. It is for that reason that the cross-linguistic definition of word classes must be based on 'genuinely universal lexical prototypes' (Wierzbicka 2000: 288). Wierzbicka (2000) suggests the following prototypes that are based on empirical cross-linguistic investigation within her project on Natural Semantic Metalanguage (NSM): Nouns: PEOPLE, THINGS; verbs: DO, HAPPEN (verbal prototypes) and SEE, HEAR, SAY, MOVE (other lexical universals); adjectives: BIG and SMALL, secondarily GOOD and BAD; etc. for other word classes.

As will be seen, none of the approaches presented in section 3 reflects Wierzbicka's (2000) point. The only other approach which incorporates the requirement of using universally lexicalized concepts is that of Dixon (1977, 2004). He presents the following semantic types (printed in capitals) that are always associated with nouns or verbs, respectively (for adjectives, see section 6):

(2)   Semantic types associated with nouns and verbs (Dixon 2004: 3)

   a. Linked with nouns: semantic types with concrete reference: HUMANS, body and other PARTS, FLORA, FAUNA, CELESTIAL, ENVIRONMENT, ARTEFACTS

   b. Linked with verbs: MOTION, REST, AFFECT, GIVING, ATTENTION, SPEAKING.

2.2 Pragmatic criteria: criteria of discourse function

Independently verifiable semantic properties as identified in 2.1 may not be the ultimate factor that determines the distinction between nominal and verbal structures. In Hopper and Thompson's (1984, 1985) approach, these properties are related to discourse function. Thus, 'the semantic facts [. . .] which are characteristic features of prototypical N's and V's are [. . .] derivative of (and perhaps even secondary to) their discourse roles' (Hopper and Thompson 1984: 708).

The prototypical discourse function of nouns is 'to introduce participants and "props" and deploy them' (Hopper and Thompson 1984: 710). In such a context, the crucial properties of nouns with high categoriality are continuity of identity and importance in the subsequent discourse. These properties are described as 'referential' by DuBois (1980) and Givón (1981). Hopper and Thompson (1984: 711) prefer the term 'manipulable' to avoid the 'strong logical/semantic connotations for many linguists'. The low categorial status of non-manipulable nouns can be seen from cases in which the noun does not refer to specific entities (nominal incorporation, noun compounding, predicate nominals) or from cases whose referents are not important for the subsequent discourse (anaphora, body parts).

The prototypical discourse function of verbs is to 'assert the occurrence of an event' (Hopper and Thompson 1984: 708). A prototypical verb can be seen as an answer to the question 'What happened?' (p. 726). Verbs that do not express that function in a given context 'tend not to manifest the morphosyntactic trappings of prototypical V's in that language' (p. 726). Contexts in which verbs show reduced categoriality are stativity (predicative adjectives, attribution, existential clauses, copula clauses), irrealis, negation, serial verbs, compound verbs, and dependent clauses.

On a more general level, Hopper and Thompson (1985: 151) formulate their iconicity principle: 'the more a form refers to a discrete discourse event, the more distinct will be its linguistic form from neighbouring forms, both paradigmatically and syntagmatically.' Ultimately, it seems that Hopper and Thompson's (1984, 1985) account of nouns and verbs can be associated with the discourse-pragmatic categories of topic vs. comment.

2.3 Formal criteria

Formal differences in the way in which semantic or pragmatic properties are expressed in a language are crucial for determining its word classes. The relevance of morphology was recognized long ago for the classical languages. Thus, the role of inflectional and derivational morphology is indisputable. Beyond morphology, word class distinction crucially depends on syntactic distribution. Both levels of formal expression are subsumed under Croft's (1991: 58, 2000b, 2001) term of 'function-indicating morphosyntax'. Probably, the most elaborate account of formal criteria is the list of 'part-of-speech-differentiating properties' presented by Anward, Moravcsik, and Stassen (1997: 173–7). Apart from morphological and syntactic differentiation defined in terms of word-internal (compatibility with certain morphemes) vs. word-external (compatibility with other words) distribution, Anward et al. (1997) also pay attention to phonological form. Phonological form applies if distinct word classes take phonologically different forms whose structure cannot be characterized in a general way (e.g. English *speech* vs. *speak* or *die* vs. *death*) or if the lexemes within each class have different phonological properties (e.g. nouns are monosyllabic, verbs are disyllabic) (Anward et al. 1997: 172).

2.4 Distinction between the lexical and the syntactic level of analysis

Sasse (1993a, 1993b) and Broschart (1997) discuss the confusion of the lexical (paradigmatic) and the syntactic (syntagmatic) levels as a problem for an adequate distinction of word classes. As Sasse (1993a: 647) points out, 'This confusion ultimately results from the erroneous belief that languages universally display a

perfect X:XP match (where X is a "lexical", XP a "phrasal" category).' The fact that such a perfect match is the case in many European languages—such as German, French, or English—does not exclude the existence of languages in which syntactic categories, such as TP or DP, are defined without any reference to lexical classes, such as V or N (cf. 5.1, 5.2, and 5.4).

3. APPROACHES TO WORD CLASSES

3.1 Schachter (1985)

Schachter's (1985) presentation is written for practical purposes: it is a guideline for fieldworkers and is thus well-suited to set the stage for the discussion of word classes. It is widely quoted in subsequent papers dealing with word classes.

After a short reference to the inadequacy of purely semantic criteria, Schachter (1985) points out three primary grammatical criteria for distinguishing word classes:

- a word's distribution;
- its range of syntactic functions;
- morphological or syntactic categories for which it is specifiable.

From a simple sentence, like the one in (3), one can see that *boys* and *girls* share the same distribution in English, while *like* follows a different pattern.

(3)   English (Schachter 1985: 4)
    a. Boys like girls.
    b. Girls like boys.
    c. *Like boys girls.

The same pattern also shows up if the three words in (3) are analysed in terms of the remaining two grammatical criteria (see Table 14.1).

Table 14.1. Grammatical properties of *boys, girls, like*

	boys	like	girls
Range of syntactic functions	Argument	Predicate	Argument
Occurrence with morphosyntactic categories	Number	Number/Tense	Number

Although word classes set up on the basis of the above grammatical criteria are often language-particular, it is possible to label them and to compare them cross-linguistically on the basis of semantic criteria:

[O]nce the words of a language have been assigned to parts-of-speech classes on grammatical grounds and it is found that one of these classes includes the preponderance of words that are the names of persons, places, and things, then it is perfectly reasonable to call this class the class of nouns, and to compare the class so named with the similarly named classes of other languages. (Schachter 1985: 4)

Although Schachter (1985) provides an excellent survey, some of its basic tenets are not unproblematic. Croft (2000b: 67) points out that Schachter's semantic heuristic for labelling form classes of words is 'no substitute for a sound methodology and theory'. The distributional criterion produces an enormous number of classes but does not provide any help for distinguishing word classes from minor syntactic categories (Croft 2000b: 82).

3.2 Hengeveld (1992)

Hengeveld (1992) looks at word classes from the perspective of Functional Grammar (Dik 1997). His definition is based on four different functions (predicative, term [= referring expression], head, modifier) and on the morphosyntactic markedness of the expression formats involved. Markedness is discussed in terms of whether it is necessary 'to take further measures', i.e. whether the obligatory presence of additional morphemes is required in a particular function:

(4)   Definitions of word classes in Hengeveld (1992: 58)
A *verbal* predicate is a predicate which, without further measures being taken, has a predicative use *only*.
A *nominal* predicate is a predicate which, without further measures being taken, can be used as the head of a term.
An *adjectival* predicate is a predicate which, without further measures being taken, can be used as a modifier of a nominal head.
An *adverbial* predicate is a predicate which, without further measures being taken, can be used as a modifier of a non-nominal head.

In Hengeveld's (1992) view, there are many instances in which languages lack word class distinctions. This is the case if 'no further measures' need to be taken for one and the same word in two or more functions. Lack of word class distinction can show up in two different types, called 'flexible' and 'rigid' by Hengeveld (1992). In the flexible type, there is no overt morphosyntax that expresses the two or more functions involved. Hengeveld (1992: 66) describes Tongan as 'an extremely flexible language' (see 5.4 for an alternative view). In the following example, the word *si'i* occurs in the functions of a predicate (5a), of a term (5b), and of a modifier (5c):

(5)   Tongan (Tchekhoff 1981: 4, Hengeveld 1992: 66; cf. Croft 2000b: 70, 2001: 68)

a. na'e   si'i   'a   e   akó
PST   small   ABS   ART   school
'The school was small.'

b. 'i   'ene   si'í
in   POSS.3SG   childhood
'in his/her childhood'

c. na'e   ako   'a   e   tamasi'i   si'i   iate   au.
PST   study   ABS   ART   child   small   LOC   1.SG
'The little child studied at my home.'

In the rigid type, there is overt morphosyntax, but that morphosyntax is identical for two or more semantic classes (e.g. objects, actions, properties). In the following frequently cited Chinese example, action-denoting (6a) and property-denoting (6b) words are used with the same morphosyntactic marker of modification (*de*):

(6)   Chinese (Schachter 1985: 18, Hengeveld 1992: 63, Croft 2000b: 69, 2001: 67)

a. liǎojiě   de   nǚháizi
understand   MOD   girl
'a girl who understands'

b. piàoliang   de   nǚháizi
beautiful   MOD   girl
'a beautiful girl'

Finally, there is a third type of expression format called 'specialized', in which each word class has its own morphosyntax. English, with its four word classes of nouns, verbs, adjectives, and adverbs, is supposed to belong to this class.

3.3 Croft (1991, 2000b, 2001)

Croft (1991, 2000b, 2001) criticizes current approaches to word classes from two perspectives, which he calls 'lumping' and 'splitting'. Lumping approaches claim that there are languages that lack certain word classes by subsuming them under one major class. Splitting approaches are based on a detailed use of distributional analyses, which ultimately produce an almost unlimited number of potential word classes which can hardly be generalized into major word classes.

Lumping can be successful only by 'ignoring important empirical facts and distinctions within particular languages' (Croft 2000b: 69). Hengeveld (1992), who is a paradigm case of the lumping approach in Croft's view, fails to notice important different meanings of lexical roots in different functions. This can be illustrated by

another look at (5) on Tongan *si'i*, which shifts from its general meaning of 'small' in (5a) to the rather specific meaning of 'childhood' in (5b). Similarly, the interpretations of *ako* in its referential meaning of 'school' (5a) and in its predicative meaning of 'study' (5c) are too language-specific to be derived from a mere change of syntactic position (Croft 2000b: 71, 2001: 68). Thus, the meaning of English *school* in (7) is not equal to the meaning of Tongan *ako* in predicative use (5c).

(7)   English (Croft 2000b: 71, 2001: 69)
      We schooled him in proper manners.

In addition to problems with meaning, lumping approaches overlook small syntactic categories. Hengeveld (1992) describes Tuscarora, an Iroquoian language like the one described by Sasse (1993a, b) (cf. 5.1), as a maximally rigid language that only consists of verbs. But even if Hengeveld (1992: 67) acknowledges the existence of 'a reduced number of true nouns' in that language, he chooses to neglect that fact.

Distributional analysis does not only produce the effect of splitting by revealing 'a myriad of classes' (Croft 2000b: 82, 2001: 83), it does not even produce atomic primitives that may be used to build up syntactic models. This can be seen from Uehara (1998: 98–9, 103–15), who shows that individual Japanese words can have different distributional properties depending on individual speakers. Thus, even at the level of individual lexical items, category membership is not necessarily clear-cut (Croft 2000b: 81).

On a more general level, distributional analysis has to face two more problems. One of them is that structural items (Croft is talking about constructions in this context) that can be used for setting up word class distinctions in one language may not exist in another language. One example is the existence of articles. If there are no articles in a language, that distributional criterion cannot be used in that language. The same applies to languages which lack inflection for number, gender, and case. Even if there are relevant constructions for word class distinction in a language, they 'give wildly different distributions and hence wildly different categories from those in English' (Croft 2001: 30). Croft (2001: 30) quotes the example of Makah (Noot-kan, American Pacific Northwest) from Jacobsen (1979) in which lexical items of almost any semantic class can be inflected for agreement, aspect, and mood, which are important criteria for distinguishing word classes in English. In Makah, the above inflectional marking occurs with words denoting actions (8a), objects (8b), properties (8c), and with what we would call adverbs in English (8d):

(8)   Makah (Jacobsen 1979: 110–11; from Croft 2001: 30)
      a. k'upšil   baʔas   ʔuˑyuq
         point.MOM.IND.3 house   OBJ
         'He's pointing at the house.'
      b. babałdis
         white.man.IND.1SG
         'I'm a white man.'

      c. ʔiˑʔiˑxʷʔi
         big.IND.3
         'He's big.'
      d. huˑʔaxis   haʔukʷap
         still.IND.1SG   eat.CAUS
         'I'm still feeding him.'

To avoid the problems of lumping and splitting, Croft (1991, 2000b, 2001) develops his own construction-based universal-typological theory. While most approaches take word classes to be language specific, Croft (2000b: 65, 2001: 63) takes a diametrically opposed view:

1.   Noun, verb and adjective are not categories of particular languages.
2.   But noun, verb and adjective are language universals—i.e. there are typological prototypes [. . .] which should be called noun, verb and adjective.

Croft's theory is based on three constructions that are used for the expression of the pragmatic (communicative) functions of predication, reference, and modification. Predication is defined as 'what the speaker intends to *say about* what he is talking about (the referent)' (Croft 1991: 52). The function of reference 'is to get the hearer to identify an entity as what the speaker is talking about' (Croft 1991: 52). Modification is defined as an 'accessory function to reference and predication', because it is either a more specific instrument for identification in the case of restrictive modification or an instrument that provides a secondary comment in the case of unrestrictive modification (Croft 1991: 52).

The above three pragmatic functions are combined with the three semantic classes of object, property, and action. These functions constitute a conceptual space, with the pragmatic functions forming the horizontal dimension and the semantic classes forming the vertical dimension in Table 14.2. Word classes manifest themselves within that conceptual space by markedness patterns of function-indicating morphosyntax, i.e. by a morphosyntax that overtly encodes the three pragmatic functions of reference, modification, and predication. On the basis of his own definition of markedness (Croft 2003a: 87–101, 110–21), there are the following unmarked combinations of pragmatic function and semantic class that universally constitute word classes (Croft 2000b: 88):

      nouns   reference to an object
      adjective modification by a property
      verb   predication of an action

Thus, object-denoting lexemes, like *house* in English, tend to be relatively less marked in an object-reference construction (construction names are in italics in Table 14.2) than in an object-modifier construction (PPs on nouns: *of the house*) or in an object-predication construction (copula: *is a house*). The same can be said for

Table 14.2. Croft's conceptual space for parts of speech and function–indicating morphosyntax (adapted from Croft 1991: 53, 67, 2000b: 89, 2001: 88, 92)

	Reference	Modification	Predication
Objects	*Object reference:* UNMARKED NOUNS	*Object modifier:* genitive, adjecti-valizations, PP's on nouns	*Object predication:* predicate nominals, copulas
Properties	*Property reference:* de-adjectival nouns	*Property modifier:* UNMARKED ADJECTIVES	*Property predication:* predicate adjectives, copulas
Actions	*Action reference:* action nominals, complements, infinitives, gerunds	*Action modifier:* participles, relative clauses	*Action predication:* UNMARKED VERBS

the property-modifier construction and for the action-predication construction in comparison to the other constructions located on the same line in Table 14.2.

What is crucial for the understanding of the above conceptual space is that in Croft's (2000b: 89) typological markedness concept, 'the structural coding criterion specifies only that the marked member is encoded by *at least as many* morphemes as the unmarked member'. We are thus dealing with an implicational universal which only excludes cases in which an unmarked member is expressed by more morphemes than a marked member. Equal marking and zero-marking across neighbouring members is possible.

Croft's approach integrates Hopper and Thompson's approach (1984, 1985; cf. 5.1) in a more systematic way: 'The pragmatic functions are in fact the foundation for the three-way distinction of the traditional major parts of speech' (Croft 2000b: 87). Pragmatic functions (reference, modification, predication) provide the framework for distinguishing the major word classes, and they motivate morphosyntactic patterns.

4. CONTENT WORDS VS. FUNCTION WORDS

On the basis of their meaning, word classes can be divided into content words (words with clear semantic content that denote objects, properties, actions, etc.; also called autosemantica) and function words (words marking grammatical functions; also called synsemantica). Hockett (1966: 21) and a number of other linguists

assume that the difference between denotational and non-denotational words is universal: 'Every human language has some elements that denote nothing but that make a difference in the denotation of the composite forms in which they occur.' Even linguists who argue that there are languages with no noun/verb distinction, like Sasse (1993a; cf. 5.1), agree that there are at least these two word classes. The same distinction is also discussed in linguistic traditions outside of the West. In traditional Chinese philology, words are divided into *shící* 'full words' and *xūcí* 'empty words'.

There is not always a clear-cut distinction between the two classes. This is due to the fact that many function words diachronically developed from content words and thus are the result of grammaticalization.

The distinction between content words and function words is not identical to the distinction between open and closed word classes. The opposition of open vs. closed merely concerns the question of whether class membership is limited or not. As we will see in section 6, there are languages in which content words, like adjectives, belong to a closed set.

5. THE NOUN/VERB DISTINCTION AND BEYOND

5.1 Beyond Croft's theory

Croft's theory (1991, 2000b, 2001) cannot fully integrate the whole typological discussion on word class systems. Approaches developed by linguists like Broschart (1991, 1997), Launey (1994), Himmelmann (1991), and Sasse (1993a, 1993b) go beyond Croft's model for two reasons.

1. Individual constructions alone do not provide a sufficient criterion for distinguishing word classes. '[I]t is the whole (more or less standardized) paradigm of constructions which defines the word classes concerned' (Broschart 1997: 150).
2. Croft's approach is based on his Radical Construction Grammar. Since this theory rejects universal categories and relations (due to problems with distributional analysis) and takes constructions as the basic primitive units of syntactic representation (Croft 2001: 46), the fourth methodological prerequisite of distinguishing between lexical and syntactic levels of analysis is problematic: there are no general syntactic categories onto which lexical items can be mapped.

The first problem can be illustrated by looking again at example (8) from Makah. Croft (2000b: 86) rightly states that linguists who argued against the existence of

word classes in Makah did not discover anything about word classes, and 'they discovered typological patterns about the relationship between the predication construction and the semantic classes of lexical items that fit into the predication construction' (Croft 2000b: 86). This statement is adequate as long as one can more or less assume that a language has the whole range of constructions as we find them in Table 14.2. From looking at the data in Jacobsen (1979), this seems to be more or less the case in Makah. There are predication constructions as in (8a), but there seem to be other constructions as well. Problems arise if there are differences in the 'paradigm of constructions' as a whole (cf. above, point 1). What happens if cross-linguistic morphological comparison reveals that a language only uses constructions whose formal properties correspond to those of predication or those of reference in other languages? This is what Sasse (1993a, 1993b) wants to show for Iroquoian languages in general and for Cayuga in particular. In his view, object-denoting lexemes occur with the same morphological pattern of person and aspect marking as lexemes denoting transitive actions. If this were true, Cayuga would only use predication constructions. Even what is expressed by reference constructions in most languages of the world must be expressed by a predicate construction in Cayuga. As was shown by Mithun (2000), this analysis is inadequate for Iroquoian languages. There clearly are different morphological patterns that prove the existence of a noun/verb distinction. In spite of this, Mithun's (2000) proof that Sasse's (1993a, 1993b) analysis does not work in Iroquoian is no proof against the general existence of such a system. In fact, there is a consistent analysis of Classical Nahuatl by Launey (1994), who tries to show that this language only uses predication constructions and is thus 'omnipredicative' in his terminology. However, omnipredicativity does not imply lack of noun/verb distinction. As will be seen in 5.2, omnipredicativity does not exclude the existence of a noun/verb distinction—object-denoting and action-denoting lexemes follow different morphological patterns in some cases. For Sasse's (1993a, 1993b) analysis of Iroquoian, this means that even if these languages were omnipredicative, the conclusion that they lack noun/verb distinction is illicit.

Apart from omnipredicativity, there is also a second theoretical option in which a language only uses constructions whose formal properties are those of reference. In Himmelmann's (1987, 2005) description, Tagalog falls into that category. Tagalog sentences are constructed according to the pattern of nominal copula sentences. It seems that there are also at least some differences in morphosyntactic behaviour between action-denoting lexemes and reference-denoting lexemes. Due to lack of space, this second option will not be further discussed here (for more information, see the above references and Sasse's 1993a: 655 excellent summary).

The discussion of the first problem was important for the understanding of arguments against the existence of the noun/verb distinction in some languages, but it did not contribute to its complete disproof. The second problem, concerning the lack of a theoretical basis for describing the interaction between syntactic

categories and lexical items, may have more serious consequences. Before getting into this, a more general remark concerning Croft's (2001) Radical Construction Grammar is needed. It cannot be the aim of this chapter to evaluate different theories against each other. Since formal approaches to word classes as well as most functional approaches operate with syntactic categories, it is necessary to integrate their perspective in a chapter like this. In fact, it should be possible to assimilate (but not to transfer fully, of course) Croft's (1991, 2000b, 2001) conceptual space and its markedness patterns to theories that assume syntactic categories such as N and V if one looks at the markedness of the lexemes occurring in the N-slot or in the V-slot under the pragmato-semantic situations described in Table 14.2.

The reason why the methodological distinction between the lexical and the syntactic levels matters has to do with the fact that most theories about word classes take for granted a one-to-one correlation between lexical categories and syntactic categories. There are, however, languages in which it is reasonable to assume that lexical items are not necessarily preclassified for syntactic categories. As will be argued below, this seems to be the case in Late Archaic Chinese (5.3) and in Tongan (5.4). In Late Archaic Chinese, the assignment of lexical items to the syntactic categories of N and V depends on pragmatic inferences. Thus, the noun/verb distinction is relevant, even if it is only at the level of syntactic categories (Bisang 2008). In Tongan, the noun/verb distinction seems to be of secondary importance, even at the level of syntactic categories (Broschart 1997). Thus, Tongan is not a noun/verb language.

5.2 Omnipredicativity in Classical Nahuatl

Classical Nahuatl is a Uto-Aztecan language that was spoken in Mexico and its periphery at the time of the conquest of America by Spain. Its data basis (see Launey 1994: 17–20) thus consists of written documents. From a superficial look at a constructed example of a simple sentence in (9), it looks as if Nahuatl represents a straightforward structural type with a nominal subject and a verbal predicate:

(9)   Launey (1994: 29)
       chōca   in   piltōntli
       cry   LNK   the.child
       'The child cries.'

A closer look at the morphological paradigms for person marking on action-denoting lexemes and on object-denoting lexemes in Table 14.3 reveals that a different analysis is more adequate. Since the person markers for intransitive arguments (S) and for active arguments (A) of transitive predicates are identical to the person markers (S) for predication constructions with object-denoting

lexemes, the content words in (9) can be analysed differently: *chōca* has a third person zero-prefix, as in *ø-chōca* 's/he cries'; *piltōntli* can be analysed analogously as *ø-piltōntli* 's/he is a child'. Thus, (9) consists of the two predications 'S/he cries' and 'S/he is a child'. The function of *in* will be discussed below.

Similarly, we may analyse examples like (10) as consisting of three predications (10′):

(10) Launey (1994: 37)
  ø-qui-cua   in   *piltōntli*   in   nacatl
  3SG.A-3SG.O-eat   LNK   child   LNK   meat
  'The child eats the meat.'

(10′) ø$_i$-qui$_j$-cua   in   ø$_i$-*piltōntli*   in   ø$_j$-nacatl

  ⌣   ⌣   ⌣

  'S/he eats it.'   'It is a child.'   'It is meat.'

The above omnipredicative analysis is corroborated by a number of facts, such as the following:

1. There is free word order; that is, the individual predications are arranged according to their function in information structure. Arguments are freely omittable.
2. There are examples in which markers of first and second person occur twice:

(11) Classical Nahuatl (Launey 1994: 72)
  n-ameech-tzàtzilia   in   an-tlamacaz-quê
  1.SG.A-2.PL.O-implore   LNK   2.PL.S-high.priest.PL
  'I implore you – who are high priests!'

Table 14.3. Person agreement markers on action-denoting lexemes and on object-denoting lexemes (adapted from Launey 1994: 10–11)

	Action-denoting lexemes			Object-denoting lexemes	
	S/A	O	Reflexive	S	Possessive
1.SG	*n(i)-*	*-neech-*	*-n(o)-*	*n(i)-*	*-n(o)-*
2.SG	*t(i)-/x(i)-*	*-mitz-*	*-m(o)-*	*t(i)-*	*-m(o)-*
3.SG	*ø-*	*-c-/-qu(i)-*	*-m(o)-*	*ø-*	*-ii-*
1.PL	*t(i)-*	*-teech-*	*-t(o)-*	*t(i)-*	*-t(o)-*
2.PL	*aM-/x(i)-*	*-ameech-*	*-m(o)-*	*aM-*	*-am(o)-*
3.PL	*ø-*	*-quiM-*	*-m(o)-*	*ø-*	*-iiM*

3. In copular constructions, the person prefixes occur twice:

(12) Classical Nahuatl (Launey 1994: 54)
  a ni-tiicitl   ni-ye-z
    1.SG-doctor   1.SG-be-FUT
    'I'll be a doctor.'

  b ti-tiicitl   ti-ye-z
    2.SG-doctor   2.SG-be-FUT
    'You'll be a doctor.'

4. A word like *piltōntli* cannot be used to call for a child. There are special vocative forms.

The word *in* (glossed as LNK for 'linker') is analysed by Launey (1994: 122–32) as a 'pivot' that links two predications. Since it is generally used as a demonstrative or as a relative marker, these functions can be used simultaneously on one instantiation of *in* in predicate linking if it is the demonstrative argument of one predication and the relative marker of the other. In example (9), *in* is thus a demonstrative in the argument position of 'cry' (*ø-chōca in* 'That one/he/she cries') and the relative marker of the second predicate 'be a child' (*in piltōntli* 'the one who is a child'). A literal translation of (9) may thus look as follows: 'That one cries, the one who is a child'.

The omnipredicative character of Classical Nahuatl does not exclude the existence of the noun/verb distinction. There are a number of properties which we only find with action-denoting lexemes (= verbs):

1. Only action-denoting lexemes can be marked for aspect.
2. Object-denoting lexemes (= nouns) differ from action-denoting lexemes with regard to their referential structure. They have only one relation (S-argument) plus a possessor argument (see Table 14.3, last column). Lexemes denoting transitive actions can have an additional secondary argument (O in Table 14.3).
3. It is possible to derive nouns from action-denoting morphological bases (nominalization).

5.3 No correlation between lexicon and syntax: Late Archaic Chinese

Late Archaic Chinese refers to the Chinese of the period between the 5th and the 3rd centuries BC. It is the language in which the classical texts of Confucius, Mencius, Laozi, Zhuangzi, etc. are written. A much more detailed discussion on word classes in this language can be found in Bisang (2008).

In Late Archaic Chinese, the argument-structure construction is characterized by the following distribution of noun-slots (DP) and verb-slots (V) (S stands for intransitive argument; A and O, for actor and patient in transitive contexts):

(13) Argument-structure constructions
    a. Intransitive: DPS   V   (DPS)
    b. Transitive: DPA   V   DPO

To illustrate the lack of syntactic preclassification in the lexicon, I will concentrate on the V-slot, which can take event-denoting lexemes (stative and dynamic events) as well as object-denoting lexemes. In both cases, the meaning can be derived regularly from the construction to which the V-slot belongs plus the semantics of the lexeme. Thus, the situation differs from English, in which the semantics of nouns in the verb position are much more diverse (for an excellent description of the verbal use of nouns, see Clark and Clark 1979). For person-denoting lexemes (PDL), the rule is as follows (14b. ii):

(14) Semantics of person-denoting lexemes in the V-slot

    a. In intransitive argument-structure constructions:
        (i) DPS behaves like a PDL; DPS is a PDL.
        (ii) DPS becomes a PDL.
    b. In transitive argument-structure constructions:
        (i) DPA CAUSE DPO to be/behave like a PDL.
        (ii) DPA CONSIDER NPO to be/behave like a PDL.

Example (15) illustrates the use of a person-denoting lexeme in a transitive V-slot:

(15) PDL in a transitive argument-structure construction (Mencius 5B)
    wú   yú   Yàn Bān yě, zé   yǒu   zhī   yǐ
    I   PREP Yan Ban be thus V.friend OBJ.3 PRF
    'What I am to Yan Ban, I treat him/consider him as a friend.'

As I try to show in Bisang (2008), there are different probabilities for object-denoting lexemes to occur in the V-slot. The probability roughly follows a version of the animacy hierarchy adapted to Late Archaic Chinese:

(16) 1st/2nd person > proper names > human > non-human > abstracts

The higher a lexeme is in the above hierarchy, the less likely is its occurrence in the V-slot. This hierarchy reflects a stereotypical implicature (Levinson 2000a), in the sense that the more a lexeme refers to a concrete item, the more likely is its occurrence in an N-slot. This implicature can be flouted for rhetorical purposes. In the following example, the proper name *Wu Wang* 'King Wu' occurs in the V-slot in the rhetorically marked context of regicide:

(17) Rhetorically marked use of a proper name in the V-slot (Zuo, Ding 10)
    Gōng Ruò yuè: ěr   yù   Wú wáng wǒ hū?
    Gong Ruo say you want Wu king I   Q
    'Gong Ruo said: "Do you want to deal with me as the King of Wu was dealt with?"' [King Wu was murdered. Pragmatic inference: 'Do you want to kill me?']

5.4 No correlation between lexicon and syntax: Tongan as a type/token language

In Broschart's (1997) analysis of Tongan (Austronesian: Central-Eastern Malayo-Polynesian: Oceanic: Polynesian), the lexicon does not preclassify content words for syntactic categories. Thus, object-denoting lexemes (*fefine* 'woman') and action-denoting lexemes (*lele* 'run') can both occur with tense marking as well as with the article *e*.

(18) Tongan (Broschart 1997: 134)
    a. na'e lele e   kau   fefiné
        PST run ART PL.HUM woman
        'The women were running.'
    b. na'e **fefine** kotoa e   kau   lelé
        PST woman all   ART PL.HUM run
        'The ones running were all female.'

Morphology in Tongan is again not associated with syntactic categories. The existence of different morphemes provides evidence for the existence of lexical 'paradigms' (Broschart 1997: 143), in the sense of sets of lexemes that can be combined with certain morphemes, but these paradigms cannot be used for mapping into syntax. The morpheme -*Canga* (marker of domain; C stands for 'consonant') can be suffixed to action-denoting lexemes (*pule* 'govern' → *pule'anga* 'government'), to property-denoting lexemes (*motu'a* 'old' → *motu'a'anga* 'reason for having aged'), and to object-denoting lexemes (*api* 'home' → *apit'anga* 'homestead'). In spite of this, *pule'anga* as a whole can still take a position belonging to the TAM domain:

(19) Tongan (Broschart 1997: 145)
    'oku 'ikai ke   pule'anga
    PRS NEG SBJ government
    'It does not belong to the government.' (lit. 'It is not that it government-s.')

Object-denoting and action-denoting lexemes can be combined with TAM markers (cf. *na'e* for 'past' in (18)) or articles (cf. *e* in (18)). If one assumes that TAM syntagms are IPs and article syntagms are DPs, Tongan must be analysed as a language that lacks noun/verb distinction. Such a configuration is generally incompatible with

formal theories. Broschart (1997) solves this paradox in the following way. Languages with noun/verb distinction are characterized by a close correlation between syntactic and lexical categories. Tongan is not a noun/verb language; it is a type/token language, and there is no need of any co-variation of syntactic and lexical categories in such a language. In Broschart's (1997) view, there are two basic types of languages:

[T]here are languages which tend to emphasize the similarity of tense- and article-marked constructions (such as Tongan), and others which tend to emphasize the difference between tense-constructions and constructions which do not contain tense etc. [...] This is to say that the major distinction in Tongan is between non-referential lexical 'types' which are neither tense-marked nor article-marked and referential phrasal 'tokens' which are either tense- or article-marked. (Broschart 1997: 156)

In a slightly more formal way, the difference between noun/verb languages, like English or Latin, and Tongan is based on the hierarchical position of two fundamental opposition pairs, i.e. [±predicable] and [±referential]. A typical noun/verb language 'DOMINANTLY distinguishes between items which are markedly predicable and those which are not', while Tongan 'DOMINANTLY draws a distinction between items which are markedly referential and those which are not' (Broschart 1997: 157). Thus, noun/verb languages are characterized by [±predicable] > [±referential], while Tongan is the other way round, that is, [±referential] > [±predicable]. A type/token language first makes a distinction between referential phrasal tokens and non-referential lexical types. Then, the token will be subdivided into TAM phrases (IPs) and article phrases (DPs). This distinction is crucial in noun/verb languages, whose dominant opposition pair is that of predicable (TAM) vs. non-predicable (article). Given the secondary importance of [±predicable], IPs and DPs may exist independently of N and V.

If the analysis of Late Archaic Chinese in 5.3 is correct, there are languages with DPs (and maybe IPs) in which lexical items are not strictly correlated to syntactic categories. This does not weaken Broschart's (1997) analysis; it only shows that the two types of noun/verb languages and type/token languages do not necessarily depend on the existence of a correlation between lexical and syntactic categories.

If Broschart's (1997) analysis of Tongan is correct, this shows that Croft's (1991, 2000b, 2001) conceptual space does not cover all the concepts that are involved in the distinction of word classes.

6. ADJECTIVES

The status of the adjective as a separate word class in cross-linguistic comparison is described by Dixon (1977, 1982), Schachter (1985), Bhat (1994), and Dixon and Aikhenvald (2004). The basic criteria for distinguishing adjectives from other word

classes have been presented in section 3. In terms of Croft (cf. 3.3), adjectives can be defined as property-denoting lexemes in the function of modification. In addition, adjectives are often specified for degree; hence, the traditional distinctions between positive, comparative, and superlative.

The aim of this section is to summarize Dixon's (1977) seminal approach to adjectives. The advantage of his approach is that he distinguishes different semantic types (cf. Wierzbicka 2000, as presented in 2.1), which reveal hierarchical relations. There are languages with large, medium-sized, and small adjective classes and languages with no adjectives. The semantic types involved can be arranged in a hierarchy which interacts with the size of the adjective class and with the expression format for property-denoting words in languages with no adjectives or with small adjective classes.

There are four core semantic types which are associated with large and with small adjective classes: DIMENSION ('big', 'small', ...), AGE ('new', 'young', 'old', ...), VALUE ('good', 'bad', ...), and COLOUR. Three more semantic types typically occur with medium-sized and large adjective classes: PHYSICAL PROPERTY ('hard', 'soft', ...), HUMAN PROPENSITY ('jealous', 'happy', ...), and SPEED ('fast', 'quick', ...). A last set of semantic types only occurs in large adjective classes in some languages: DIFFICULTY, SIMILARITY, QUALIFICATION, QUANTIFICATION, POSITION, and CARDINAL NUMBERS. Igbo has a small adjective class consisting of antonymic pairs from each core semantic type: DIMENSION (úkwu 'large', ñtà 'small'), AGE (ǫ́hurú̩ 'new', ócyè 'old'), VALUE (ǫ́ma 'good', ǫ́jǫ́ 'bad'), and COLOUR (ojii 'black/dark', ǫ́ca 'white/light').

In languages with no adjectives, the semantic types are expressed either by verbs (cf. 'adjectival-verb languages', like Chinese, in Schachter 1985) or by nouns (cf. 'adjectival-noun languages', like Quechua, in Schachter 1985). The same strategies are also applied in languages with small adjective classes. Dixon (1977, 2004: 4) points out certain tendencies in languages with small adjective classes. If PHYSICAL PROPENSITY terms are not in the adjective class, they are generally in the verb class. HUMAN PROPENSITY terms may be in either class.

7. ADVERBS

Many languages have a fourth class of full words (in addition to nouns, verbs, and adjectives) which are called adverbs. The problem with this class is that it is much more heterogeneous than the other word classes in terms of its function and in terms of its formal expression. In most languages, there is no morphological marking or different marking for different sub-classes of adverbs. The definition suggested by the Latin term *ad-verbium* ('what is added to the verb', from Greek

epirrhēma with the same meaning) is certainly too narrow, because adverbs do not only modify verbs/predicates. Given the vastness of the field, Schachter's (1985: 20) definition of adverbs as 'modifiers of constituents other than nouns' can still be seen as a good approximation, even though some languages marginally allow certain adverbs with nouns (cf. English *during his stay here*). This definition can be refined considerably by integrating the following three sources for the heterogeneity of adverbs mentioned by Sasse (1993a: 665): differences in scope, differences with regard to possible heads, and differences in meaning.

Scope: Semantically, adverbs can operate on different layers. On the basis of Functional Grammar (Dik 1997), Ramat and Ricca (1998) distinguish four layers: predicate, state of affairs (event), propositional content, and speech act. Table 14.4 provides some English examples for each layer (adapted from Ramat and Ricca 1998: 192).

Adverbs also have different syntactic scope. In terms of generative approaches, they may refer to V, to the VP, to vP (if one adopts the existence of VP shells), etc. The question to what extent the semantic scope and the syntactic scope are mutually dependent is controversial and will not be addressed in this chapter. A lot of data with a detailed semantic and syntactic analysis can be found in formal syntax. Cinque's (1999) more syntax-oriented and Ernst's (2002) more semantics-oriented approaches provide good insights.

Possible heads: Apart from modifying verbs, adverbs can modify adjectivals (*extremely* clever) or other adverbs (*He speaks rather slowly*).

Meaning: Traditionally, adverbs are sub-classified into four semantic groups: local, temporal, modal or manner, and causal.

Table 14.4. Semantic scope-based types of adverbs

Predicate adverbs		*quickly*
Event adverbs:	Objective modality	*obligatorily, necessarily*
	Temporal setting	*yesterday, often, rarely*
	Spatial setting	*here*
Propositional adverbs	Modal adverbs	*probably, certainly, allegedly, evidently, hopefully*
	Event-oriented evaluatives	*unfortunately, surprisingly*
	Participant-oriented evaluatives	*cleverly, wisely, kindly*
Speech-act adverbs	Speech act-oriented	*briefly*
	Speaker/Hearer-oriented	*frankly, seriously, confidentially*

8. CONCLUSION

The definition of word classes integrates all the central elements that make language structure, and it integrates a whole paradigm of constructions.

Word class definition combines cognitive or semantic criteria (object, property, action) with criteria of pragmatics or discourse (reference, modification, predication; topic and comment) and with morphosyntactic expression formats. In addition, word classes are at the crossroads between the lexicon and syntax. Analyses that only integrate some of these four prerequisites for distinguishing word classes (cf. (1)) run the risk of missing important typological options of word class distinctions (cf. 5.1). Of particular importance is the methodological distinction between the lexical and the syntactic levels of analysis. If this distinction is neglected, it is impossible to discover systems such as the ones represented by Late Archaic Chinese (5.3) and Tongan (5.4), in which there is no one-to-one correlation between lexical and syntactic categories, a property that is against general assumptions in most linguistic theories.

Analyses of word class systems that only look at the properties of words in an individual construction may provide interesting insights into the behaviour of lexical items representing different semantic classes within that construction, but they cannot say very much about word classes in general. Thus, the fact that a language is omnipredicative does not in principle exclude the possibility that it has word classes (see Launey 1994 on Classical Nahuatl in 5.2).

According to a recent paper by Evans and Osada (2005) on Mundari (Dravidian), the claim that a language lacks a noun/verb distinction must meet the following three criteria:

(i) Compositionality: The semantic differences of a given lexeme in different syntactic positions (e.g. argument or predicate) must be fully attributable to the functions of these positions (Evans and Osada 2005: 367).
(ii) Bidirectionality: It is not sufficient to say that X can be used in the function of Y; it is also necessary that Y can take the function of X (Evans and Osada 2005: 375). Thus, if an object-denoting lexeme can take the V-position, it should also be possible for an action-denoting lexeme to occur in the N-position (this seems in fact to be true for Late Archaic Chinese; see Bisang 2008 for some examples).
(iii) Exhaustiveness: The lack of a noun/verb distinction needs to hold for all the relevant words of the lexicon. It is not sufficient to find a few lexical items which happen to be able to occur in the V-position and in the N-position.

These methodological criteria nicely complement the four structural prerequisites mentioned above, and they seem to work with Late Archaic Chinese (5.3) as well as with Tongan (5.4), although more research will be needed for the details.

FURTHER READING

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CHAPTER 15

....

CASE-MARKING TYPOLOGY

....

BEATRICE PRIMUS

1. MEANS OF EXPRESSION AND GENERAL FUNCTIONS OF CASES

....

In its core sense and with reference to its basic general function, case is a category of marking dependent noun phrases for the type of relationship they bear to their heads (cf. Blake 2001a: 1, Butt 2006: 4). As the Latin examples in (1a, b, c) show, at the phrasal level, cases may be used on the dependent of an adpositional, nominal, or adjectival head:

(1)   Latin

    a. ad   urb-em
       at   town- SG.ACC
       'at town'

    b. victoria   Roman-orum
       victory   Romans-PL.GEN
       'the victory of the Romans'

    c. avidus   glori-ae
       thirsty   glory-SG.GEN
       'thirsty for glory'

At the clausal level, the inflected verb is the head. Its dependents are classified into valency-bound arguments and valency-free adjuncts (or modifiers), and further sub-classified according to their semantic roles such as agent, patient, or locative. All these types of dependents may be indicated by case, as in the examples (2a, b) from Basque (Saltarelli 1988: 64–5):

(2)   Basque

    a. aita   lan-era   joa-n   d-a
       father[ABS] work-ALL   go-PRF   3ABS-PRS
       'Father has gone to work.'

    b. aita-k   ama-ri   gona   gorri-a   eros-i   d-io
       father-ERG   mother-DAT   skirt[ABS] red-ABS   buy-PRF   3ABS-(PRS)-
                                                                  3DAT-[3ERG]
       'Father bought a red skirt for mother.'

(2a) shows the subject of an intransitive verb (S) in the absolutive case and a directional modifier in the allative. With the ditransitive verb in (2b), the absolutive appears on the patient noun phrase (P), while the agent (A) is coded by the ergative. In addition, a benefactive argument appears in the dative.

The case pattern shown in (2a, b), with S and P coded by the same case (the absolutive) and differently from A, is called ergative. The English translations of (2a, b) show the accusative pattern: S and A are coded alike by the nominative, while P appears in the accusative (see section 3 below).

In traditional grammars oriented towards Classical Greek and Latin, the notion of case refers to inflectional affixes only. In current typological research, however, independent function words, such as adpositions or—more rarely—relator nouns (cf. Blake 2001a: 15–17), as well as phonological means such as tone are also treated as case expressions (cf. Dryer 2005f for an areal overview). Example (3a) shows postpositions, which are the equivalents of the dative and the nominative in Japanese (Shibatani 2001: 319); example (3b) illustrates the preposition *e* for the ergative in Samoan (Mosel 1987: 455):

(3)   Japanese

    a. Sensei   ni   eigo   ga   wakar-u
       teacher   DAT   English   NOM   understand-PRS
       'The teacher understands English.'

    Samoan

    b. Sa   fasi   le   tama   e   le   fafine
       PST   hit   DET   boy   ERG   DET   woman
       'The woman hit the boy.'

The distinction between inflectional and independent expressions of morphological categories including case is of typological relevance: inflection establishes the synthetic type; independent forms yield the analytic type (see Brown's chapter, this volume).

The case expressions discussed so far are associated with dependents and establish dependent-marking (cf. Nichols 1986, 1992). If the expressions for semantic roles are attached to the head, they are classified as head-marking. Head-marking is included in the broadest notion of case. Compare the examples (4a, b, c) from Abkhaz (Hewitt 1979: 51, 103, 116):

(4)   Abkhaz

    a. a-xàc'a   a-pʰ°ǝs   l-y°ǝza   a-š°q'°ǝ̀
       the-man   the-woman   her-friend   the-book
       Ø-lǝ+z-lǝ̀-y-teyt'
       it-her+for-to.her-he-gave
       'The man gave the book to the woman for her friend.'

    b. (sarà)   s-q'ǝnt°'
       I/me   me-from
       'from me'

    c. (sarà)   sǝ-y°nǝ̀
       I/me   my-house
       'my house'

These examples show prefixes attached to a verbal, postpositional, and nominal head in the absence of case expressions on the dependent noun. The verbal prefixes in (4a) distinguish the agent, recipient, benefactive, and patient (the latter by zero realization).

The general function of cases that has been focused on so far is to code the relationship of government between head and dependent. But cases also participate in the relation of concord (or agreement) whenever exponents of the same case category occur on more than one element of the phrase. The distinction between government and concord is particularly relevant for a specific type of compound case-marking that is called *Suffixaufnahme* (cf. Plank 1995, Moravcsik 1995). The typical pattern of *Suffixaufnahme*, which despite its name is not restricted to suffixes, is an attribute noun that carries two distinct cases: one case assigned via government in order to express the attributive dependent function, the other case matching the case of the head noun via concord. Example (5) from Gumbaynggir (Australian) shows the dependent noun *junuy* bearing the ergative, which matches the case of the head noun *ba:ba*, and the genitive, which expresses its attributive function (Moravcsik 1995: 452):

(5)   Gumbaynggir
      ba:ba-gu   junuy-gundi-yu
      father-ERG   child-GEN-ERG
      'the child's father'

Compound case-marking in a more general sense is found in various languages; compare English *from under the table* and Tabasaran *ul-i-n* eye-ERG-GEN 'of the eye', where the expression for the genitive is attached not to the stem but to the ergative form (cf. Blake 2001a: 102–8). By decomposing the compound case expressions of Tabasaran and Tsez, which gained a reputation for having around fifty cases, Comrie and Polinsky (1998) have managed to reduce their number to fourteen or fifteen (depending on dialect) for Tabasaran and eighteen in Tsez.

In the phenomena discussed so far, cases express a relation between syntactically connected elements. But virtually any case may also occur on isolated or dislocated phrases, for example, the *ablativus absolutus* in Latin or the vocative, which is a specific case for detached nouns referring to the addressee, for instance, in Classical Greek, Latin, and Rumanian. Thus, in Rumanian, the vocative noun *Mario* in *Mario, unde mergi?* 'Mary, where are you going?' cannot be replaced by the nominative or citation form *Maria*.

As to the syntactic categories that receive case, the noun is the typical case-bearing category, and accordingly, many traditional grammars use case as a defining criterion for nouns. But cases are sometimes also found on other nominal categories, since they may be transferred from nouns to demonstratives or adjectives via concord. Verbs and adpositions regularly assign case but do not receive it (cf. Blake 2001a: 60). However, if one subsumes head-marking under case, verbs and adpositions may be considered to bear case as well, as shown by the Abkhaz examples in (4a, b) above.

In some languages, case appears on any element that comes first or last within the noun phrase, no matter whether it is a noun, an adjective, or a demonstrative (see Blake 2001a: 99–101). See the examples from Rumanian in (6) and Basque (Saltarelli 1988: 75-7) in (7), which pose a serious problem for the distinction between head and dependent and for the traditional case-based definition of the category noun.

(6) Rumanian

    a. copil-ul-lui   mic
       child-DET-OBL little
       'the little child'

    b. mic-ul-ui   copil
       little-DET-OBL child
       'the little child'

    c. acest-ui   copil mic
       this-OBL   child little
       'this little child'

(7) Basque

    a. amerikar   hiri-a
       American   city-SG.ABS
       'American city'

    b. hiri   amerikar-ra
       city   American-SG.ABS
       'American city'

    c. liburu   berri   hari-ek
       book   new   that-PL.ABS
       'those new books'

The case distribution shown in (6) and (7) is also intriguing for word order typology. If analysed as dependents, the position of the case-marked elements that are not nouns—see (6b, c) and (7b, c)—departs from the basic word order type of the language. Rumanian is basically a head-initial language, but the examples (6b, c) display an adjective–noun and a demonstrative–noun order and not the expected reverse order. In Basque, a basically head-final language, the mirror order adjective–noun and demonstrative–noun is expected but not used if the adjective or demonstrative bears the case expression, as shown in (7b, c). However, the position of all case-marked elements in (6) and (7) is consistent with the word order type of these languages if they are analysed as heads (cf. Radford 1993: 90). Space limitation does not allow for a discussion of the typological correlations between case marking and basic word order. The reader interested in this topic is invited to consult Siewierska (1998c), Hawkins (2002), Dryer (2002a), and Song (2001a: 202–7).

2. CASE HIERARCHY AND HIERARCHY-BASED CONSTRAINTS

The elements of grammatical categories and relations are not equipollent, in general. This also holds for cases, which are organized in a hierarchy that is directly reflected by asymmetries in their form, selection, and grammatical behaviour (see Corbett's chapter, this volume). Most hierarchy-based generalizations in the typological literature rely on the hierarchy of grammatical relations (GRH): subject > direct object > indirect object > other oblique function. However, generalizations based on grammatical relations do not automatically hold for case functions, since

grammatical relations have different manifestations that are often inconsistent with each other (cf. Primus 1999, Croft 2001 for approaches that eliminate them). Therefore, in this section, we will focus on three phenomena that are clearly determined by case functions in many (but not necessarily all) languages: phonological realization, selection, and agreement.

The Case Hierarchy (CH hereafter) in (8) is accepted more or less explicitly by many typologists (cf. Dixon 1994: 57, Blake 2001a: 89–90, Croft 2001: 139–41):

(8)   nominative/absolutive > accusative/ergative > dative > other oblique cases

The alternative terms nominative/absolutive and accusative/ergative are based on the different semantic roles these cases typically encode (see section 3 below).

The alternative terms already suggest that there is no universal CH. Another source of variation is the fact that a language may lack one of the categories involved. Thus, for example, Finnish and other Finno-Ugric languages with the exception of Hungarian do not have a dative. Furthermore, the CH in (8) only holds for cases that are assigned at the clausal level. Nouns, for instance, are more likely to assign cases lower on the hierarchy. This means that for noun governors, the genitive or another lower case is at the top of the selection hierarchy, which is why some linguists rank the genitive above the dative in a more global CH (cf. Blake 2001a: 89–90). Even if each language has its own CH and each phenomenon its own starting point on the CH, hierarchy-based constraints are applicable cross-linguistically if they are reformulated—as in this section—in abstract hierarchical terms, such as A > B, first, second, and third case, or higher vs. lower case (with the highest rank coming first on the left). The value of these variables may vary from language to language.

We start our discussion of case-based phenomena with asymmetries in the phonological realization of cases that are captured by the following violable (or statistical) constraints (see e.g. Greenberg 1963b: Universal 38; Croft 2001: 139–41):

(9)   For any cases A > B on the CH,
       a. if B has a zero-realization, A's realization is also zero;
       b. B's realization is not zero (the lower B is, the stronger the restriction).

The constraints (9a, b) explain a commonly attested constellation in which the first case, the nominative or absolutive, is expressed by the bare nominal stem while all lower cases have an overt expression. They prohibit overt realization of the first case and zero realization of a lower case. This exceptional situation is very rarely found; for instance, in Oromo (Cushitic), Mohave (Yuman), Turkana (Eastern Nilotic), and Nias, an Austronesian ergative language. Evidence for the realization asymmetry between the dative and the accusative is provided by Siewierska (1998c) for 124 European languages. In her database, languages that have zero realization of datives also have zero realization of ergatives or accusatives and zero realization of absolutives or nominatives.

The CH of a language can also be justified by the selection asymmetries in (10a, b):

(10)   For any cases of clausal core arguments ranked as A > B on the CH,
       a. if B is selected, A is also selected;
       b. B is not selected (the lower B is, the stronger the restriction).

The generalizations (10a, b) are implicitly acknowledged by many typologists, at least with respect to the first and second case, and are explicitly formulated in optimality-theoretic terms by Woolford (2001), among others. The implicational constraint (10a) tolerates a lower case if it co-occurs with a higher case, while the absolute constraint (10b) prohibits a lower case altogether.

Taking the dative (the third case) as an example, these constraints yield a three-way typological distinction, depending on which one is violable and which one is inviolable (cf. Woolford 2001). In the first type of languages, the absolute constraint is inviolable: the dative and every lower inflectional case is not selected for clausal arguments, as in English. The inviolability of the absolute constraint unilaterally implies the inviolability of the implicational constraint. This leads to the absence of languages in which the former is inviolable and the latter violable.

Japanese is a representative of the second type: it violates the absolute constraint since it has a dative (cf. the example (3a) above) but never violates the implicational constraint, according to which the dative is never used if the nominative is not selected. This means that the dative is barred with monovalent predicates.

The third type is found in German: both constraints are violated, since the dative is used with mono-, bi-, and trivalent verbs. Nevertheless, the constraints manifest themselves in selection frequency, as demonstrated by the following ratios that are extracted from the valency dictionary of Mater (1971). NOM+ACC+DAT is the almost exclusively used case pattern for trivalent verbs (close to 100%) as opposed to NOM+DAT+GEN and NOM+ACC+GEN, which are only selected by a few lexemes (below 1%). All tri- and bivalent verbs select a nominative, very few of them optionally. As to the second case selected by bivalent verbs, the ratios decline dramatically along the CH: 92.7% of the verbs select the accusative, 7%, the dative, and 0.3%, the genitive. With monovalent verbs, the selection of the dative (or any other oblique case) instead of the nominative is extremely rare (below 1%).

As to the scope of these formal case selection constraints, the question arises whether they also hold for non-basic constructions, such as passives and causatives, or whether they are sensitive to these valency-changing operations (see Kulikov's chapter, this volume). We will argue that the case constraints do not have to be reformulated for non-basic constructions. This means that derived subjects and objects are usually case-marked, as are subjects and objects of basic clauses (cf. Keenan and Dryer 2005: 2–3 for passives).

In passive, the agent argument is demoted to an optional oblique adjunct while one of the other arguments, preferably the patient, is promoted to the nominative

or absolute. Thus, for example, *Peter ate the cake* becomes *The cake was eaten by Peter* or simply *The cake was eaten*. Promotion to the first case guarantees that passive clauses obey the nominative requirement imposed by the selection constraints (10a, b). However, as in the examples (11a, b) from Ute (Uto-Aztecan), there are also non-promotional passives, in which the case of the patient is not promoted to the nominative (Givón 1982: 148):

(11) Ute

    a. Ta'wá-ci   'u   siváatu-ci   'uwaáy   paxá-qa
       man-NOM   the(NOM)   goat-ACC   the(ACC)   kill-ANT
       'The man killed the goat.'

    b. Siváatu-ci   uwaáy   paxá-ta-xa
       goat-ACC   the(ACC)   kill-PASS-ANT
       'The goat was killed.'

The effect of the nominative requirement is demonstrated by the extraordinary status of non-promotional passives, since languages having only this type of passive, such as Ute, are extremely rare. In general, languages have promotional passives only (e.g. English and French) or both promotional and non-promotional passives (e.g. North Russian dialects, Dutch, Latin, Classical Greek, Shona (Bantu), and Turkish; see Siewierska 1984: 39 ff., Keenan and Dryer 2005: 17 ff.).

The case selection constraints formulated above also hold for causative constructions. In causative formation, a causer argument is added to the argument structure of the basic predicate, as shown by the Turkish examples in (12) and (13):

(12) Turkish

    a. Hasan   öl-dü
       Hasan[NOM]   die-PST
       'Hasan died.'

    b. Ali   Hasan-ı   öl-dür-dü
       Ali[NOM]   Hasan-ACC   die-CAUS-PST
       'Ali killed Hasan.'

(13) Turkish

    a. müdür   mektub-u   imzala-dı
       director[NOM]   letter-ACC   sign-PST
       'The director signed the letter.'

    b. Ali   mektub-u   müdür-e   imzala-t-tı
       Ali[NOM]   letter-ACC   director-DAT   sign-CAUS-PST
       'Ali made the director sign the letter.'

The new causer receives the nominative, while the case of the causee, which is the subject of the basic predicate, is demoted to a lower case according to a constraint

formulated by Comrie (1976b): demotion goes down the GRH to the highest free position. This means that if the basic verb has only a nominative argument (cf. (12a)), the causee appears as a direct object in the accusative (cf. (12b)); if the basic verb selects a nominative and an accusative argument (cf. (13a)), the causee appears as an indirect object in the dative (cf. (13b)), and so forth down to lower positions on the GRH. This type of demotion can be explained on the basis of the implicational case constraint (10a) in its strictest interpretation: demotion to the next free position on the CH guarantees that all higher cases must also be realized.

As well-documented in the typological literature, the demotion pattern of Turkish is not the only attested option for causatives (see Song 1996). But other recurrent properties of causatives may also be explained by general argument selection constraints that are not sensitive to valency-changing operations (see Song 1996).

Let us finish our overview of case-based grammatical phenomena with a discussion of predicate–argument agreement. The CH also serves as a basis for the following violable (or statistical) constraints on agreement, which were originally formulated in terms of the GRH (cf. Moravcsik 1978a, Lehmann 1988):

(14)   For any clausal core arguments whose cases are ranked as A > B on the CH,

    a. If the clausal predicate agrees with B-arguments, it also agrees with A-arguments;

    b. The clausal predicate does not agree with B-arguments (the lower B is, the stronger the restriction).

Note that we consider only case-based agreement in which each case function has its specific agreement marker (cf. Primus 1999: ch. 6, Croft 2001: ch. 4).

The constraints (14a, b) allow for a typological variation that can be summarized as follows: in the first type of languages, agreement is restricted to arguments bearing the first case. This is the nominative in nominative languages, such as German or Russian, and the absolutive in ergative languages, such as Avar, Kurdish, and Kuikuro (Cariban). This type of agreement is illustrated by the Avar example (15), in which agreement is confined to the absolutive argument of class 2 (C2) (cf. Charachidzé 1981: 144):

(15) Avar

    y-osana   yas   di-cca
    C2-took   girl(NOM.C2)   I-ERG
    'I took the girl.'

The second constellation is agreement with two arguments in the first and second case. These case functions are the nominative and accusative in languages such as Hungarian and Mordvin (Finno-Ugric). In ergative languages, such as West

Greenlandic (Eskimo) and K'iche' (Mayan), this type of agreement involves the absolutive and ergative argument.

In the third type, the predicate agrees with (at least) three case arguments. This type of agreement characterizes the nominative languages Swahili, Kinyarwanda (both Bantu), Maltese, and Arabic. Ergative languages of this type are Abkhaz, Abaza, and Basque. Basque and Abkhaz were illustrated in (2a, b) and (4a) above. Abkhaz and Abaza are exclusively head-marking languages with no overt case distinctions on arguments. The functional similarity between head-marking and agreement is that they are excluded for modifiers, whereas dependent-marking may include modifiers.

Languages in which agreement is confined to accusative arguments of transitive verbs—such as Barai (Papua New Guinea), Roviana (New Georgia, Solomon Islands), and Kiribatese (Micronesia)—provide counterexamples to the implicational constraint (14a). A plausible alternative analysis is offered for the Micronesian languages by Harrison (1978), who assumes that this pattern encodes the transitivity of the predicate.

We conclude this section with a brief overview of influential approaches that offer an explanation for the CH and the constraints discussed above (see Malchukov and Spencer 2009). Jakobson's work (1936) has paved the way for markedness approaches in morphology. He explains the CH nominative > accusative > dative by semantic considerations: the more marked case is lower on the CH and has a semantic value that is not indicated by the less marked higher case. A further elaboration of Jakobson's assumptions is Mayerthaler's (1981: 25) principle of constructional iconism that ties functional to formal markedness as follows: an element that is semantically more marked by a semantic specification lacking in the unmarked element is also formally more marked. According to Mayerthaler, this principle explains the realization asymmetry between the nominative and oblique cases (cf. (9) above).

Optimality Theory (OT) is the most recent markedness-based approach. The basic assumption of OT is that constraints are ranked in a hierarchy which determines whether a constraint is inviolable—i.e. undominated—or violable—i.e. dominated by an antagonist constraint. In this way, violability is regulated by constraint interaction. Woolford (2001) captures the selection constraint formulated informally in (10b) above by a fixed ranking of violable constraints: *DAT≫ *ACC ≫ *NOM. This ranking will prohibit the selection of the dative first, unless *DAT is dominated by a constraint that requires the dative, and so forth with every lower constraint.

The merits of OT are the rehabilitation of violable rules (constraints) in theoretical linguistics and the explanation of typological variation by constraint ranking. One weakness of OT is the lack of functional, i.e. metagrammatical explanations for constraint rankings (cf. Haspelmath 1999b). Thus, Woolford (2001) treats the CH as an epiphenomenon of the fixed ranking *DAT ≫ *ACC ≫ *NOM,

neglecting the fact that the CH is obviously the more basic metagrammatical assumption, which explains the fixed ranking of several families of case constraints, including phonological realization, selection, and agreement. Another problem is the fact that ranked constraints only allow for one pattern to win the competition, all losers being equally ungrammatical. Finer-grained statistical asymmetries that were documented above for the case patterns of German cannot be captured. These weaknesses hold for standard OT, which is closer to the generative approach of Noam Chomsky, but there are alternative OT accounts that accommodate frequency asymmetries (see Bresnan and Nikitina 2003) and functional explanations (see Bresnan and Aissen 2002).

Another line of explanation is grammaticalization (see Lehmann 1988, 1998). The basic assumption of this type of approach is that case functions are aligned on a scale of grammaticalization (GS) that is equivalent to the CH given above in (8) for core argument functions: the first case function—the absolutive or nominative—is the most grammaticalized one, while less grammaticalized, semantic cases are lower on the CH. From Lehmann's six parameters of grammaticalization, we select phonological attrition and condensation as pertinent to our discussion. Attrition explains the phonological realization asymmetry discussed above by the general claim that more grammaticalized elements—for example, cases in higher positions on the CH—have a simpler phonological form than less grammaticalized elements—for example, lower-ranking cases. Condensation means that more grammaticalized elements—for example, the nominative or absolutive function—have fewer selection restrictions than less grammaticalized elements, which explains the selection asymmetries discussed above. The agreement asymmetries discussed above are also explained on the basis of the GS (Lehmann 1988: 64).

In sum, markedness and grammaticalization approaches share a number of common assumptions and are able to explain case-based asymmetries by generalizations that are much wider in scope. However, some approaches make the questionable assumption that higher—i.e. grammaticalized or unmarked—cases are intrinsically underspecified for semantic oppositions. This assumption is falsified by strong semantic constraints for the first two cases of the CH (cf. (17) below). The situation is better captured in OT by constraint ranking: semantic underspecification of higher cases arises only when the formal case selection constraints dominate the functional ones (cf. section 3 below).

The widespread structuralist assumption is that language structure is based on an idealized abstract system (langue or linguistic competence) while language use (or performance) is secondary. The last few decades (see Bybee and Hopper 2001, Croft 2001, Haspelmath 2006 quoted below) have witnessed the rise of several influential performance-based approaches in linguistics defending the opposed assumption that grammars have conventionalized syntactic expressions and structures in proportion to their degree of preference in performance. Instead of an abstract notion of markedness, some usage-based approaches take frequency as the

basic explanans (cf. Bybee and Hopper 2001, Croft 2001, Haspelmath 2006). The asymmetries in the overt realization of cases are explained by the generalization that more frequent words tend to be shorter than infrequent ones. Selection asymmetries are captured by the general observation that unmarked members are more frequent than marked members. As to the frequency asymmetries themselves, they are assumed to follow from more general considerations. Thus, for Croft (2001: 142), frequency asymmetries in the usage of cases result from the fact that all verbs require a nominative (or absolutive) argument, but only transitive verbs also have an accusative (or ergative). On closer inspection, this consideration follows from the case selection constraints formulated in (10a, b) above, suggesting that frequency asymmetries are explained by case selection constraints and the CH and not the other way around. This means that frequency by itself does not suffice unless it is supplemented with general principles of performance.

Such principles have been formulated by Hawkins (2002, 2004; see also Hawkins's chapter, this volume). They can be reduced to the slogan: express the most with the least and express it earliest (Hawkins 2004: 25). Hawkins introduces a relational efficiency concept that is more complex than the concept of economy. Efficiency increases with the maximization of the ratio between the amount of retrieved information and the complexity of linguistic expressions that have to be processed in order to access that information. In simpler terms, this means: the more you express and the less complex the forms that encode what you express, the better. This kind of explanation can be demonstrated for the CH and CH-based constraints by two scenarios. In scenario X, cases show consistent asymmetries. In scenario Y, all cases have equally complex forms, and any case and combination of cases may be selected and targeted by case-based rules. Performance is more efficient in situation X, particularly because it enables a coalition of favourable conditions: the case with the simplest form is obligatorily selected, occurs first in linear order, and is the first target in case-based rules. This coalition of factors leads to an optimal efficiency in performance, since a maximum of information is retrieved from a minimum of processed form and structure. The rationale of the CH is to guarantee a coalition of conditions that enhances efficiency in performance.

3. SEMANTIC FUNCTIONS OF CASES

The first section of this chapter offered an overview of the general functions of cases in which it was established that their main role is to express head–dependent relationships. The most complex relational network arises at the clausal level, where predicates may select a varying number and different types of dependents. As a consequence, relational typology is mainly concerned with the different ways

the core arguments of the predicate are case-marked for their semantic function (cf. Bickel's chapter, this volume).

Approaches treating semantic functions as cluster concepts manage to cope with typological variation without losing track of cross-linguistic generalizations. Closely related influential approaches of this kind are Role and Reference Grammar (cf. Van Valin and LaPolla 1997), the transitivity concept of Hopper and Thompson (1980), and Dowty's (1991) Proto-Role approach. These approaches share three basic assumptions. First, category membership is a matter of degree, since one element may accumulate a higher number of properties than another element falling within the same concept. This means that one argument may be more agentive than another. Second, category membership is not necessarily disjoint, and accordingly, an argument may have semantic features that are distributed over two concepts. Third, semantic decomposition helps to reduce the inventory of superordinate concepts dramatically without neglecting finer-grained distinctions. Dowty's account, which needs only Proto-Agent and Proto-Patient as superordinate concepts, will be taken as a theoretical basis for the following discussion.

Dowty (1991: 572) defines Proto-Agent and Proto-Patient by properties that are uncontroversial in the linguistic community. The following properties characterize the Proto-Agent role: the participant does a volitional act and intends this to be the kind of act named by the predicate (volition); it is sentient of or perceives another participant or its own state or action (sentience); it causes an event or change of state in another participant (causation); it is physically active or moving (movement); it exists independently of the event named by the predicate (independence).

The list of properties for the Proto-Patient role is the following: the participant undergoes a change of state, is causally affected, is stationary relative to another participant, and does not exist independently of the event or does not exist at all. Finally, the participant is incrementally affected in such a way that the completion of a telic action entails that it is totally affected. Thus, for example, *the wagon* is incrementally and totally affected in *load the wagon with hay*, but not in *load hay onto the wagon*.

The above lists of properties are preliminary for Dowty: properties can be added or deleted without changing the logic of the functional principle which links grammatical relations to semantic roles. This principle is stated by Dowty as follows (1991: 576): the argument for which the predicate entails the greatest number of Proto-Agent properties will be lexicalized as the subject of the predicate; the argument having the greatest number of Proto-Patient entailments will be lexicalized as the direct object.

We will illustrate Dowty's assumption that cases are sensitive to the number of consistent Proto-Role properties an argument accumulates by referring to a typological pattern in which the argument of one class of intransitive verbs is coded like the agent of transitive verbs (A) and the argument of another class of intransitive verbs is coded like the patient of transitive verbs (P). This pattern is called *active* or *split*

intransitive. It is illustrated in (16) by examples from Guaraní (Gregores and Suárez 1967: 110, 131):

(16)   Guaraní

   a. a-ma.apo
      1SG.A-work
      'I work.'

   b. še-manuʔa
      1SG.P-remember
      'I remember.'

   c. ai-pete
      1SG.A-hit
      'I hit him.'

   d. še-pete
      1SG.P-hit
      'He hits me.'

Verbs that select only one core argument use different head-markers for this argument. The verbal A-prefix in (16a) is an allomorph of the head-marker used for the first person agent of the transitive verb in (16c). The P-prefix in (16b) is the same as that for the first person patient of the transitive verb in (16d). The semantic analysis of the distribution of A- and P-prefixes (cf. Primus 1999: 97–100) is summarized in Table 15.1. This shows that split intransitivity may be more sensitive to the number of Proto-Agent properties an argument accumulates than to the distinction between Proto-Agent and Proto-Patient. Arguments with the lowest number of Proto-Agent properties, which are selected by verbs of class (i) such as *porã* 'be beautiful, right' and *marete* 'be powerful, strong', are head-marked like the patients of transitive verbs, i.e. by a P-prefix. The semantic parallelism between class (i) arguments and patients is not patienthood but the lack of agentive properties. Arguments with the highest number of Proto-Agent properties, which are selected by verbs of class (iv) such as *gwata* 'walk' and *koroi* 'scold', are marked like the agents of transitive verbs, i.e. by an A-prefix. Arguments with an intermediate status show a greater variation. The sentience verbs of class (ii), such as *akãraku* 'be enthusiastic, exalted' and *asi* 'be sick, feel pain', slightly prefer a P-prefix, while class (iii) does not show any preference for one of the two prefixes at all: *kerai* 'talk in one's sleep' and *kurusu* 'shrink', for example, select a P-prefix, but *ahoga* 'drown' and *gwe* 'disappear, go out' opt for an A-prefix. Table 15.1 also shows that split intransitivity is a lexical phenomenon, as there are exceptional lexemes even in the most regular classes, (i) and (iv).

Semantic accounts of split intransitivity in other languages, which are in many respects compatible with the analysis proposed above for Guaraní, are offered, among others, by Van Valin (1990), Dowty (1991), Mithun (1991), and Primus (1999: ch. 4).

Table 15.1. Guaraní: semantic profile of split intransitivity

Proto-Agent properties	Total	A-prefix	P-prefix
(i) independence	198	22 (11%)	176 (89%)
(ii) independence, sentience	29	6 (21%)	23 (79%)
(iii) independence, movement (sentience)	53	30 (57%)	23 (43%)
(iv) independence, sentience, movement causation (volition)	92	89 (97%)	3 (3%)

A typological distinction that is independent of and may co-occur with split intransitivity is that between ergative and accusative constructions (see e.g. Plank 1979, Dixon 1994, Manning 1996, Kibrik 1997). Since it is not accounted for by Dowty's argument linking principle given above, we offer the following revised version in terms of case in its broadest sense (cf. Primus 1999: 61):

(17)   The greater the number of Proto-Agent properties an argument accumulates, the more likely it is coded by:
   a. the first case (accusative construction), or alternatively by
   b. the second case (ergative construction).

   The greater the number of Proto-Patient properties an argument accumulates, the more likely it is coded by:
   a'. the second case (accusative construction), or alternatively by
   b'. the first case (ergative construction).

The alternatives (17a, a') vs. (17b, b') capture the typological accusative/ergative distinction. The ergative pattern was illustrated above by the examples from Basque in (2a, b), Samoan in (3b), Abkhaz in (4a), and Avar in (15). The accusative construction was illustrated by their English translations and by the Turkish examples in (12) and (13) above.

As shown in the Basque examples, the first case (the absolutive), which is reserved for the patient of (di)transitive clauses, is also used for the sole argument of intransitive clauses. However, the generalization of the absolutive (or the nominative) in intransitive clauses does not hold for languages with split intransitivity. This can be accounted for by constraint interaction: ergative and accusative constructions may co-occur with split intransitivity if the role-semantic constraints are undominated, in which event cases are selected according to their Proto-Role properties in both transitive and intransitive clauses, as shown for Guaraní above. If the formal constraints requiring the first case dominate the role-semantic constraints, split intransitivity is blocked, and every clause has an argument in the first case.

Besides the typological distinctions between ergative, accusative, and split-intransitive case patterns, there is much more typological variation due to role-semantic specifications. Only Proto-Agents with a high number of agentive properties and Proto-Patients with a high number of patient-like properties are more consistently coded within the limits imposed by the ergative/accusative distinction. Arguments with a smaller number of consistent role properties are less restricted with respect to the case they bear, which leads to considerable cross-linguistic and language-internal variation with respect to their case-coding. These generally acknowledged observations are accounted for by the role-semantic case constraints in (17) above. Experiencers of cognition or sentience verbs are arguments with a smaller number of consistent Proto-Agent properties and may be coded canonically like agents proper or non-canonically as in the Japanese example (3a) above and in the following example from Imbambura Quechua (Cole 1982: 108): *Juzita* (ACC) *rupan* 'José feels hot' (cf. Verma and Mohanan 1990, Aikhenvald, Dixon, and Onishi 2001, Bhaskararao and Subbarao 2004).

Recipients of verbs of giving also have a small number of consistent role properties, which explains their cross-linguistic and language-internal coding variation. Three patterns, which can be reduced to two constructions, are more commonly attested (cf. Dryer 1986, Croft 2001, Haspelmath 2005a). These patterns occur in English, as shown in (18a, b, c):

(18) a. *Mary gave the apple to the child.* $R \neq A, P$
      b. *Mary gave the child the apple.* $R = P$ or $R = P_{tr} \neq P_{ditr}$
      c. *Mary supplied the child with apples.* $R = P_{tr} \neq P_{ditr}$

The first example (18a) illustrates the indirect object construction: the case of the recipient (R) is different from and lower on the CH than that of the agent (A) and patient (P). This pattern is typologically skewed in favour of dependent-marking, the dative being the typical case for the recipient, as in Basque, Turkish, and German.

The second example (18b) shows the double-object construction, which is preferred in languages or constructions that have no dependent-markers for R and P, such as English, Swedish, and Kinyarwanda (Bantu).

In the third primary-object pattern (cf. (18c)), the recipient receives the case reserved for the patient of monotransitive verbs (P_{tr}), while the patient of the ditransitive verb (P_{ditr}) is expressed differently. The double-object pattern is subsumed by Croft (2001: 145) under the primary-object construction on the basis of the behavioural asymmetry between recipient and patient: in many respects, the recipient is treated as the patient of monotransitive verbs. The primary-object pattern is rarely attested as a lexical default if there is an overt case distinction between R and P (see Primus 2006 for a functional explanation). It is more common in head-marking languages, such as Motuna (Papua New Guinea), or in the absence of case distinctions (cf. (18b) in English).

What is apparently never found as a lexical default is a construction in which the recipient is coded like the agent ($R = A$), yielding a double-nominative, double-ergative, or simple recipient-nominative pattern. Recipients in the nominative only occur with isolated verbs; for example, *The child got the apple from Mary.*

The patterns that were discussed above are determined by role-semantic properties, but other semantic distinctions affect case selection. These are often subsumed under a cluster concept of transitivity (cf. Hopper and Thompson 1980, Kittilä's chapter, this volume) and include, among others, nominal categories (person, animacy, and definiteness), clause type (subordinate vs. main clause), polarity (negative vs. affirmative), and verbal time, aspect, or mood. The nominal categories may be aligned on the following hierarchy (NH): 1st person > 2nd person > 3rd person > person name or kin term > human > animate > inanimate. At least four types of phenomena are determined by such semantic factors: NH-driven marking, including direct and inverse marking; differential object or subject marking; morphological split ergativity; and case syncretism.

The first three phenomena can be illustrated by the situation found in Tupí-Guaraní languages. As shown in (16c, d) for Guaraní, there is only one head-marking slot for transitive verbs. The choice of the prefix category is jointly determined by semantic roles and the person hierarchy 1st > 2nd > 3rd. The argument with the highest rank on the person hierarchy determines the prefix category according to its Proto-Role. If it is a Proto-Agent, it takes an A-prefix (cf. (16c) above and (19a, b) below); if it is a Proto-Patient, it takes a P-prefix (cf. (16d)). In some respects, this situation is similar to the distinction between direct and indirect marking that is found in a few other head-marking languages such as Plains Cree (Algonquian). The 'direct' markers are only used if the Proto-Agent is higher on the NH or more topical than the Proto-Patient. Otherwise, a different 'indirect' marking is used (cf. Givón 1994a).

An additional variation is obtained in Guaraní with respect to patient marking (cf. Bossong 1985b). Guaraní has no overt cases on nominals or free pronouns. Postpositions are used for modifiers and for arguments that are not cross-referenced on the verb. However, the postposition *pe* and, depending on the person category, cross-referencing are used for patient-like arguments if they are definite and animate, yielding a differential patient marking, as shown in (19a, b) (cf. Gregores and Suárez 1967: 136):

(19)   Guaraní

       a. a-heša   ne-roga
          1SG.A-see   2 SG- house
          'I see your house.'

       b. a-heša   ne-ru   pe
          1SG.A-see   2SG- father POSTP
          'I see your father.'

This kind of variation is found in many other languages, and is well documented for the Romance and Iranian languages (see Lazard 2001, Aissen 2003).

The third type of variation that may be determined by the semantic functions mentioned above is morphological split ergativity (see Silverstein 1976, Dixon 1994: ch. 4). For example, many Tupí-Guaraní languages, such as Tupinamba and Kamaiura, restrict the split-intransitive pattern to main clauses and the ergative pattern to subordinate clauses. This means that in subordinate clauses the P-prefix, which marks the patient-like argument of transitive verbs, is used for the sole argument of all intransitive verbs (see Jensen 1990).

The last type of variation that needs to be mentioned in connection with the semantic factors under discussion is case syncretism, which is the neutralization of overt case distinctions in certain categories or subcategories (cf. Iggesen 2005). In many languages, there is a clear asymmetry between pronouns and other nominal categories such as nouns, adjectives, or determiners. Thus, for instance, English has lost the inflectional case distinctions at the clausal level for nouns, adjectives, and determiners. They have only persisted for personal pronouns (e.g. *he* vs. *him*).

4. SUMMARY

This chapter has revealed that from a typological perspective, cases are formally quite disparate elements, a distinction of broader typological relevance existing between inflectional affixes that characterize the synthetic type and free forms that establish the analytic type. The locus of the expression for case in its broadest sense varies along the typological distinction between head- and dependent-marking. At the clausal level, this means that the semantic function of arguments and modifiers may be expressed on the dependents themselves or on the verbal head. The primary general function of cases is to express head–dependent relations, but cases also participate in concord and may also occur on isolated or dislocated phrases.

The elements of a case system may show consistent realization, selection, and grammatical asymmetries that are captured by violable (or statistical) hierarchy-based constraints. Consistent asymmetries motivate the postulation of a Case Hierarchy (CH): A > B in abstract terms. The constellation that was argued to optimize language performance is the following: the lower case B is not zero-marked without the higher case A being zero-marked as well; B is not selected unless A is selected; and B is not a target of grammatical rules such as agreement unless A is also a target. The CH of a language has been argued to guarantee such coalitions of asymmetries. Alternative explanations resort to markedness or

grammaticalization: cases in higher positions on the CH are less marked and more grammaticized than cases which are lower on the CH.

The discussion of the semantic function of cases focused on split-intransitive, ergative, and accusative patterns, which are well documented and extensively discussed in the typological literature. These patterns are based on different types of linking semantic roles to cases for the core arguments of the clause. Split intransitivity and the enhanced variation of coding for arguments that are not volitional agents or strongly affected patients are best accounted for by semantic approaches that treat semantic functions as cluster concepts. The semantic functions of cases are not confined to role semantics in the narrower sense. Case selection is also sensitive to a number of further semantic factors that include person, definiteness, animacy, clause type, tense, aspect, and mood.

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CHAPTER 16

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PERSON MARKING

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ANNA SIEWIERSKA

1. INTRODUCTION

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Traditionally, the grammatical category of person embraces the discourse role of speaker, referred to as the first person; the discourse role of hearer, referred to as the second person; and the other, i.e. the non-speaker and non-hearer, referred to as the third person. The vast majority of the languages of the world have a closed set of expressions for the identification of these three discourse roles. The expressions in question, which are commonly called personal pronouns, will be referred to here as person markers or person forms.

The person markers found in languages differ widely in regard to their morphophonological realization, syntactic function, discourse function, internal semantic structure, and referential potential. With respect to morphophonological realization, they may appear as independent words, so-called weak forms, clitics, affixes, or even only covertly as zero forms. As far as syntactic function is concerned, they may be available for all argument and adjunct functions, for just some subtype of argument functions, or even only as single-word responses to questions. In terms of discourse function, they may be unrestricted, or restricted to topics or alternatively only to constituents bearing special discourse prominence or emphasis. As for internal semantic structure, they may encode person alone or, more commonly, person and number or both of these as well as some subset of the grammatical categories of case, inclusivity, gender, and honorificity and less often tense, aspect, mood, and polarity. Finally, with regard to referential potential, some person forms are unrestricted and can be used even non-specifically, generically,

and be construed as bound variables; others are necessarily human and/or definite, while yet others have only limited or even no referential potential at all. Since space precludes providing a comprehensive account of the full range of variation exhibited by person markers, in this chapter I will concentrate on variation in morphophonological form and syntactic function.

The chapter is structured as follows. Section 2 sets the stage for the discussion by taking a closer look at the category person itself and in particular at the status of the third person as a member of this category. Section 3 provides an overview of the different morphophonological realizations of person markers. Section 4 considers how the distinction between independent and dependent person forms relates to what is typically considered to be the primary grammatical function of the two types of forms, namely, their role as pronouns and as agreement markers. In section 5, we will have a look at how the different types of person markers are distributed cross-linguistically relative to syntactic function. And finally, in section 6, we will consider issues relating to morphological alignment.

2. THE CATEGORY OF PERSON
AND ITS COMPOSITION

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It is generally recognized that the first and second person differ fundamentally from the third. In the words of Lyons (1977: 638), 'there is a fundamental, and ineradicable, difference between the first and second person [pronouns], on the one hand, and the third person [pronouns] on the other'. This difference does not merely lie in the fact that the referents of the first and, normally, second person forms are necessarily human and thus literally persons while those of third person forms may refer to human, non-human, and even inanimate entities (at least in many languages). Rather, what distinguishes the two sets of person forms is the deictic nature of the first and second person as compared to the essentially anaphoric character of the third person. Thus, each instance of the first or second person de facto identifies a unique speaker or a unique hearer corresponding to the utterer and hearer of the utterance featuring the first and second person forms, respectively. By contrast, the referential interpretation of a third person form is dependent not on the extralinguistic context (who is uttering the utterance to whom) but on the linguistic context of utterance, typically the preceding discourse, less often the following discourse. Accordingly, the discourse roles of speaker and hearer are regularly referred to only by person markers, while reference to a third person can be achieved via any lexical expression. The markers of the first and second person are therefore special in a way that the markers of the third person are not.

The above differences between the first and second person, on the one hand, and the third, on the other, have led many linguists, most notably Benveniste (1971: 198, 221), to proclaim the third person a non-person. As the elimination of the third person from the category person would have radical consequences for the current discussion, let us take a closer look at the desirability of adopting this position.

2.1 Only two persons

For Benveniste, the anaphoric, as opposed to deictic, nature of the third person constituted the sole rationale for eliminating the third person from the category person. His followers, however, have sought additional justification for this move in differences in the cross-linguistic distribution of the first and second person as opposed to the third, and in differences in their phonological and morphosyntactic properties. The most important distributional fact relating to the distinction between the speech act participants and the third person is that while all languages which have grammaticalized the category of person have person markers for the first and second person, many lack such markers for the third person. In such languages, demonstratives are used in lieu of third person markers (e.g. Basque, Comanche, Kawaiisu, Lavukaleve, Mapuche, Maricopa, Tiriyo, Yurukare) or, more rarely, full nominal expressions such as 'male' or even a zero form, the absence of an overt expression being interpreted as denoting third person, are used. The absence of special markers for the third person in some languages is undoubtedly consistent with the claim that the third person is a non-person. But this fact can also be accommodated within the traditional three-person approach, particularly under a prototype view of category structure (Rosch 1978, Lakoff 1987; see van der Auwera and Gast, this volume). If the third person is considered to be a more peripheral member of the category person than the first and the second, we may expect there to be less pressure on languages to develop special forms for the expression of this more peripheral member than for the two central members. And this is indeed so. Nonetheless, most languages do develop special markers for the third person. This inconvenient fact is circumvented by advocates of the two-person approach by highlighting the distinct properties of the third person as compared to the first and second person forms. As is well known, the first and second person often pattern together with respect to a host of phenomena, ranging from phonetic substance and structure, through various types of inflectional properties, to morphological status and order. For example, we see in (1), which is from Jino, a Tibeto-Burman language of China, that the third person clearly differs phonetically from the first and second.

(1)   Jino (Hongkai 1996: 5)

1SG	$\eta\mathfrak{I}^{42}$	1INCL	$nu^{55}\ vu^{33}$
2SG	$n\mathfrak{I}^{42}$	1EXCL	$na^{55}\ vu^{33}$
3SG	kha^{42}	2PL	$ni^{55}\ vu^{33}$
		3PL	$zo^{42}\ hma^{55}$

Furthermore, whereas the plural for the first and second person is formed with the suffix $-vu^{33}$, with the third person, the suffix $-hma^{55}$ is used. To give another example, in Rumanian the first and second person are differentiated for three cases: the direct, accusative, and dative/genitive. The third person, in contrast, exhibits just a two-way contrast.

(2)   Rumanian (Beyrer, Bochmann, and Bronsert 1987: 108, 112)

	DIR	ACC	DAT/GEN
1SG	eu	mine	mie
2SG	tu	tine	ţie
3SG M	el		lui
3SG F	ea		ei

Needless to say, each type of difference which sets the third person apart from the first and second can be matched by instances in which the three persons are treated in an identical way. A particularly telling example which combines phonetic similarities between the three persons, identical number marking, and case-marking is that of the person forms in (3) from Suena, a Papuan language of the Binanderean family.

(3)   Suena (Wilson 1974: 15–16)

	DIR	DAT	GEN
1SG	na	namore	naso
2SG	ni	nimore	niṣo
3SG	nu	numore	nuso
1DU EXCL	nato	namoreto	nasoto
1DU INCL	nage	namorege	nasoge
2DU	nito	nimoreto	nisoto
3DU	nuto	numoreto	nusoto
1PL EXCL	nakare	namorekare	nasokare
1PL INCL	nakai	namorekai	nasokai
2PL	nikare	nimorekare	nisokare
3PL	nukare	numorekare	nusokare

Sets of person markers such as these suggest that any analysis which eliminates the third person from the category of person faces the problem of accounting for the obvious commonalities in form and behaviour that the three persons actually display in so many languages.

2.2 Two-person vs. three-person languages

An interesting attempt to reconcile the existence of both asymmetries and symmetries in the forms and properties of first and second person markers as compared to third person markers found cross-linguistically has been recently proposed by Bhat

(2004: 132–50). Bhat suggests that the status of the third person may constitute an important typological parameter which may allow us to divide languages into two-person and three-person languages. The primary diagnostic for this typology that Bhat proposes is whether the forms of the third person display formal identity or affinity (are synchronically or diachronically related) with the demonstrative. Languages in which this is so are termed two-person languages; languages in which this is not the case are termed three-person languages. His investigation of a sample of 225 of the world's languages suggests that both types of languages are common, with two-person languages being somewhat more common than three-person ones; the relevant figures being 126 (56%) vs. 99 (44%).

While one cannot but sympathize with Bhat in his attempt to breach the stalemate induced by the across-the-board denial of the personhood of the third person by scholars such as Benveniste, the validity of the typology that he proposes is far from clear. First of all, there are problems with his basic diagnostic, i.e. the relationship between the third person form and the demonstrative. As he himself admits, the identity in form or affinity between the two is much more often partial than complete in that it holds only for one of the demonstratives (often the remote or distal one) or one of the realizations of the third person.[1] Secondly, the proposed correlates of the typology are rather restricted. The main one suggested by Bhat is the presence of gender, which he associates with demonstratives and thus two-person systems. Although nearly 80% of the languages in his sample which display gender in the third person forms are two-person ones, gender is a feature of only 62 of the 225 languages in his sample. Finally, it remains to be established whether and to what extent the proposed typology correlates with the presence vs. absence of asymmetries in phonological form and morphosyntactic properties between the first and second person as compared to the third discussed earlier. Other things being equal, one would expect asymmetries involving the first and second person, on the one hand, and the third person, on the other, to be more common in two-person languages than in three-person ones. One would also expect statistical differences to exist between two-person and three-person languages in relation to asymmetries involving other constellations of the three persons. In particular, two-person languages should not, or only extremely rarely, exhibit an asymmetry involving 1 & 3 vs. 2 or 1 vs. 2 & 3.[2] Two instances of the former asymmetry are illustrated in (4) from Zaozou, a Tibeto-Burman Lolish language, in which the plural suffix is -pe^{55} for the first and third person but -te^{13} for the second.

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[1] Of the 126 languages classified by Bhat as 2-person languages, only 41% display complete overlap between the third person and the demonstrative.

[2] According to Helmbrecht (1996b), asymmetries involving 1 & 3 vs. 2 are considerably less frequent than those involving 1 vs. 2 & 3. The same holds for homophonies within person paradigms, a topic discussed at length in Cysouw (2003a). Neither homophony should be a feature of 2-person languages.

(4)   Zaozou (Bradley 1993: 195)

		1INCL	$?a^1pe^{55}$
1SG	no^{55}	1EXCL	$no^{55}pe^{55}$
2SG	ηau^{31}	2SG	$nu^{55}te^{13}$
3SG	tu^{35}	3PL	$tu^{55}pe^{55}$

Furthermore, it is only the second person that undergoes a stem change in the plural, while the first and third persons do not. Interestingly enough, Zaozou qualifies as a two-person language in terms of Bhat's typology.

The elaboration of a potential distinction between two-person and three-person languages is a considerable advance over the elimination of the third person from the category person altogether. But whether it is the right step is not clear. The traditional view of the category person may prove yet to be the optimal one. Under the traditional view of personhood, the category person comprises three persons, albeit of unequal status. The three persons are seen as hierarchically ranked, though not uniquely. As has been long recognized, the ranking of the three persons depends on the cross-cutting parameter (see Croft 2003a: 161). Typically, the first and second person are grouped together and juxtaposed with the third either at the top or bottom of the person hierarchy. But interactions between any combination of persons may occur.

Since we do not yet know which typology is correct, in the remainder of the discussion all three persons will be considered.

3. MORPHOPHONOLOGICAL FORM

Given the impoverished semantics of person markers and the fact that the range of syntactic and discourse functions that they fulfil cross-linguistically must essentially be the same, the major parameter responsible for the cross-linguistic variation in person markers is morphophonological form. In terms of their formal realization, person markers may be divided into independent and dependent forms. We will begin the discussion with the former.

3.1 Independent forms

Contrary to what might be expected, what constitutes an independent person form or its terminological equivalent—such as free, full, cardinal, focal, strong, long, and disjunctive—is not uncontroversial. Typically, what is meant by an independent/free/full, etc. person form is a person marker which constitutes a separate word

and may take primary words stress, such as the English *I, me, you, she,* and *they.* Word status in turn is associated with properties such as the ability to be involved in coordinations, the possibility of being deleted under appropriate discourse conditions, and the possibility of being modified by another word (see e.g. Zwicky 1985, Dixon and Aikhenvald 2002). Most languages have at least one paradigm of person forms which qualifies as independent in the above sense, and many languages have several.

The languages which have been suggested as lacking independent person forms are of two types. To the first type belong languages such as Thai, Vietnamese, and Japanese, in which the expressions used to indicate the three persons do not necessarily constitute a closed class and include proper names, kin terms, and various relational terms—'master', 'servant', 'hair of the head', etc. Such languages are often seen as lacking the category person altogether. Under an alternative analysis, the languages in question are regarded as having person forms but ones differing in categorial status from those found in most languages in being nouns rather than pronouns or, for those who adopt a scalar approach to morphosyntactic categories (see e.g. Sugamoto 1989), as belonging to the nominal end of the pronominality scale. The second type of languages which are sometimes seen as lacking independent person forms are languages in which the words used to denote the three persons do not contain person roots. The relevant words consist of a generic pronominal root, typically invariant across all person number categories, with person affixes attached. Etymologically, the generic pronominal root is often the word for person, body, self or the verb 'to be' or 'exist'. In most of the languages of the relevant type—such as Cayuvava, Gundungurra, Hua, Mundari, Warekena, or Warnman—the generic root and person marker combination function as a semantic unit. There is thus no reason why the languages in question should be treated as lacking independent expression of the category person. Nonetheless, there are some exceptional cases, most notably among the Salishan languages, which are less easy to dismiss. For example, the so-called emphatic forms in North Straits Salish are very much like predicates with person inflection rather than independent person forms. According to Jelinek (1998), they display various properties of predicates, including clause-initial position, the possibility of occurring with clitic subjects and object suffixes, and the possibility of appearing with a determiner in a determiner phrase. Crucially, the 'emphatic' forms are treated syntactically as third person. We see in (5) that, instead of the second person agreement suffix *-oŋəs,* we have the *-Ø* form used for agreement with third persons.

(5)   Northern Straits Salish (Jelinek 1998: 340)
    leŋ-t-Ø=sən   cə   nəkw
    see-TR-3-1SG   DET   be:2SG
    'I saw you.' (lit. 'I saw the one that was you.')

North Straits Salish may thus well be a language which is best seen as lacking independent person forms.

3.2 Dependent forms

Dependent person forms—also referred to as reduced, bound, defective, deficient, or conjunctive—typically cannot be stressed (though some may receive contrastive stress), are often phonologically reduced relative to the independent forms, and either morphologically dependent on another element in the utterance or at least restricted in distribution relative to the independent forms. In terms of their formal realization, dependent person markers may be divided on the basis of their decreasing morphological independence and phonological substance into the four types presented in (6).

(6)   weak forms > clitics > affixes > zero

The term 'weak form' is variously employed in the literature. I use it here in the sense of Bresnan (2001), that is, for unstressed person markers which are unattached either phonologically or morphologically to any other constituent and which differ from independent forms both phonologically and in terms of syntactic distribution. An example of such forms is given in (7) from the Oceanic language Woleaian. (See also the examples in (15) below from Kiribatese.)

(7)   Woleaian (Sohn 1975: 150, 151, 145)
    a.   (Gaang)   i   ta   weri- Ø
         I   1SG   not   see-3SG
         'I did not see it.'
    b.   (Gaami)   gai   lag
         you:PL   2PL   go
         'You(pl.) go!'
    c.   Yaremat   laal   ye   be   mas
         man   that   3SG   FUT   die
         'That man will die.'

The use of the term 'clitic' also varies. My use of the term here corresponds, by and large, to what Zwicky (1985) calls special clitics, that is, forms phonologically attached to a word or stem which are not just reduced full forms but rather separate allomorphs of full forms displaying their own morphosyntactic and morphophonological properties. Clitics are notoriously difficult to distinguish from affixes, which are also phonologically attached to a word. Some scholars distinguish the two in terms of the degree of phonological integration of the relevant stem to which the forms are attached. I, however, will take as definitive of the clitic, as

opposed to affix status of a person form, its ability to attach to multiple hosts or, to put it differently, its ability to attach to phrases or syntactic positions as opposed to specific stems. Clitic person markers in the sense described above tend to occur in one of the locations specified in (8), which is taken from Anderson (1993: 74).

(8) a. initial clitics (e.g., as in Marubo)
     b. final clitics (e.g., as in Trumai)
     c. second-position clitics (e.g., as in Pitjantjatjara)
     d. penultimate-position clitics (e.g., as in Nganhcara)
     e. pre-head clitics (e.g., as in Bawm)
     f. post-head clitics (e.g., as in Chalcatongo Mixtec)

An example of arguably one of the most common clitic positions for argument person markers—namely, initial position in the VP—is given in (9) from Marubo, a Panoan language spoken in a border region between Brazil and Peru.

(9) Marubo (Romankevicius Costa 1998: 66)

    a. 'Wan-tun   an='pani-Ø   tu'raš-a-ka
       he-ERG   3SG-net-ABS   tear-AUX-IM.PST
       'He has torn the net.'

    b. Ia- Ø   ɨn=wi'ša-i-ki
       I:ABS   1SG-write-PRES
       'I am writing.'

Note that the clitic may procliticise not only to the verb (9b) but also to the direct object (9a).

In contrast to clitics, affixes attach to stems or words, typically of a given morphosyntactic category, rather than to locations or phrases. Affixes denoting person span the whole range of possible affixes; they may be prefixes, suffixes, circumfixes, and even infixes, though the last are very rare. An example of a person infix is provided in (10) from Au, a Papuan language of the Torricelli phylum, in which infixes are found with three out of five classes of transitive verbs.

(10) Au (Scorza 1985: 226)

     w-ɨn-w-atɨn   weise
     3SG.F-hunt-3SG.F-hunts   grasshoppers
     'She hunts grasshoppers.'

Even rarer than person infixes is person marking via stem suppletion. Such marking of person is exemplified in (11) on the basis of the Mexican language Mazatec (San Jeronimo Tecoatl dialect), in which most verbs have two stems, one used with first-person singular and third-person subjects and the other used with all other subjects.

(11) Mazatec (Agee and Marlett 1987: 60–1)

	1SG & 3	2SG, 1PL, 2PL
see	kocehe	cicehe
talk	čha	nokhosa
give	cha	ʔevi
take	ʔva	čʔa

Yet another type of rare person marking is via tone. While not strictly speaking affixal, it is grouped here with affixal marking as it typically does have a segmental component.

The final type of dependent marking of person is via a zero form, where by zero I mean a phonologically null form open to any person interpretation, depending on the context.[3] The relevant type of zero is illustrated in (12) on the basis of Japanese, in which zero person forms occur regularly in declarative and interrogative clauses, both finite and non-finite, main and subordinate, and as subjects and non-subjects.

(12) Japanese (Yamamoto 1999: 80)

    '[. . .] asoko   ja   rokusuppo   Ø   hanashi mo   deki
                there   at   property   (we)   talk   ACC   can
                nai   shi, Ø   sangai   no   ongakukissa o   Ø
                NEG   and   (I)   third:floor   CONN   music.café   ACC   her
                oshie-toita   no'
                show-PFV   CONN

    'But it's too noisy to talk there and (I) told (her) about the coffee shop on the third floor instead.' (Yukiko Mishima, *Hyaku-man Yen Senbei*, trans. Edward G. Seidensticker)

Dependent person forms, in contrast to independent person forms, are not a feature of all or virtually all languages. Nonetheless, the statistical data currently available suggest that they are to be found in the vast majority of languages, in around 80%. The indeterminacy which surrounds the issue stems from the fact that most of the statistical data relate solely to overt forms and to realizations of arguments of verbal predicates and not of non-verbal predicates, possessed nouns, or adpositions.

The verbal bias is arguably less distorting than the concentration on overt person forms, since cross-linguistic investigations such as those of Nichols (1992) and Siewierska (2004) suggest that it is only very rarely that a language exhibits dependent person forms on possessed nouns and/or adpositions but not verbs. Zero forms, in comparison, are somewhat more difficult to detect, particularly if they are used less persuasively than in, for example, Japanese.

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[3] The term 'zero person marker' in the above sense needs to be distinguished both from the use of the term in Chomskyan theory—that is, for an empty syntactic position accompanying person inflection on the verb in so-called pro-drop or null-subject languages—and from a paradigmatic zero—that is, the zero exponent of a paradigm.

Most of the languages which lack overt dependent person markers are concentrated in South and Southeast Asia, the Caucuses, and West Africa. There are also pockets in Western Europe (Swedish, Norwegian, Danish, and to a large extent English), Australia (Diyari, Dyirbal, Jiwaili, Margany, Uradhi, Yidiny), North America (the Pomo languages, Wappo, Wikchamni, Yaqui, Zuni), and South America (Bribri, Guaymi, Tunebo [all Chibchan], and also Epena Pedee, Shipibo-Conibo, Xokleng). Southeast Asia, however, is a hotbed of zero person forms. To what extent such person forms occur in some of the less well-studied languages lacking overt dependent forms remains to be established.

The distinctions between independent and dependent person forms and within the latter, though presented above as discrete, are much better viewed as a continuum. In diachronic terms, the reduction in phonological substance and morphological independence, as we proceed from left to right in (6), is typically viewed as defining a grammaticalization cline. This cline also has a functional dimension to which we now turn.

4. GRAMMATICAL FUNCTION

In the broadest terms, person forms are seen to perform two primary grammatical functions. The first is that of pronouns; the second, of agreement markers. In their pronominal function, person forms are referential expressions, 'substitutes' for nouns, and are thus expected to realize the same syntactic argument and adjunct functions that lexical categories do. As agreement markers, person forms essentially restate or replicate the person and typically also the number and/or gender features of their controllers but are not referential expressions in their own right. They have an association with core argument functions but are not arguments themselves. The pronominal function is primarily realized by independent person forms, although it may also be realized by any of the dependent forms, be it not for all argument and adjunct positions. The agreement function is characteristic of affixes. It may, nonetheless, be also fulfilled by weak forms and clitics, though not zeroes, in the sense of the term used here. Thus, both the pronominal and agreement functions of person forms can be realized by the same range of morphophonological types, that is, weak forms, clitics, and affixes. It is therefore not altogether surprising that the status of these person forms in individual languages has been the subject of much controversy.

From the point of view of function, the pronoun vs. agreement marker distinction is actually much less categorical than is often assumed. In fact, many scholars maintain that it is not possible to make a principled distinction between the two. The rationale for the distinction lies rather in more general assumptions about the nature of clause structure. Most current theoretical frameworks assume some version

of functional bi-uniqueness which requires each syntactic argument to be expressed only once within a given clause. Accordingly, an independent person form (or a lexical NP) and the corresponding dependent person marker occurring in the same clause cannot both be realizations of the same syntactic argument. One must be an argument and the other, an agreement marker. Alternatively, the two may be viewed as not belonging to the same clause: one being a clausal argument; the other, an extra-clausal constituent in some type of adjunct or appositional relationship to the clause as a whole or just to the argument in question. The first analysis, which I will refer to as the agreement analysis, is the traditional one posited for clauses such as (13) in well-known languages such as Polish, Italian, or, for that matter, English.

(13) Polish
Ja   pójd-ę   z   tobą
I:NOM   go-FUT-1SG   with   you:INS
'I will go with you.'

The first-person independent form *ja* is here treated as the realization of the subject argument of the verb, which in turn agrees with the subject in person and number. This is evinced on the verb by the suffix -*ę*, the agreement marker. The second analysis—which following its most prominent adherent, Jelinek (1984, 1998), I will refer to as the pronominal argument analysis—is posited for clauses such as (14) in so-called head-marking languages such as the Siouan language Lakhota.

(14) Lakhota
Miyé   mathó   ki   Ø-wa-kté
I   bear   the   3SG-1SG-kill
'I killed the bear.'

In (14), the first-person singular affix *wa*- and the third-person singular affix Ø- are treated as the realizations of the subject and object arguments, respectively, and the corresponding independent forms *miyé* and *mathó* are treated as being adjuncts comparable to English left-dislocated topics or appositional NPs (e.g., *I, your mother, am telling you*). Significantly, despite claims to the contrary, the dependent person forms in the two types of languages need not differ fundamentally from each other. For example, both may have referential value, as evidenced by the fact that they may occur without the corresponding free forms. Furthermore, at least in some pronominal argument languages, third-person affixes are not necessarily definite and referential but, just like agreement markers in languages such as Polish, can receive a non-specific or generic interpretation (see, e.g., Evans 2002).

In contrast to the above, in theories of grammar which do not adhere to the principle of there being only one syntactic argument per semantic referent in a clause, the necessity of making a categorical distinction between pronouns and agreement markers does not arise. Both the independent and dependent person

forms can be treated as the realizations of the same argument. Both may be viewed as person forms with referential value, though differing morphophonologically and also potentially in other respects. One version of such an analysis, referred to as the double indexation analysis, has been developed by Barlow (1988) and subsequently taken up by Croft (2001: 238–9) in his Radical Construction Grammar and also Siewierska and Bakker (2005) in the context of Functional Grammar. The double indexation analysis takes as its point of departure the claim that what are typically considered to be anaphoric relationships between linguistic expressions, be they lexical ones or person forms, are better conceived as involving a co-reference relationship between the form in question and a discourse referent present in a discourse representation. A discourse referent is a conceptual entity the representation of which in discourse is seen to depend on a range of factors: the amount of pragmatic knowledge between the speaker and addressee, the discourse situation, the information load, and also morphosyntactic constraints relevant to the language in question. Crucially, however, a given discourse referent can have multiple indexes within a construction, and the respective indexes may offer different perspectives on the referent (i.e., express different features). The major advantage of this double indexation analysis over purely morphosyntactic accounts of agreement is that it does away with the necessity of compartmentalizing languages and/or constructions into agreement and pronominal argument ones. All person forms are seen to refer. This is not to deny that the status of independent and dependent person forms, as well as of the various types of dependent person forms in languages, may differ. To the contrary. What we are likely to find is that the cross-linguistic differences are far more varied and subtle than those captured by the pronoun vs. agreement marker distinction.

In view of the above, in what follows we will continue to use the terms person marker and person form, rather than pronoun or agreement marker.

5. THE ARGUMENT PROMINENCE HIERARCHY

Since person markers are primarily associated with referents who are human, it comes as no surprise that they favour syntactic functions which typically express human roles, that is, agents, experiencers, recipients, beneficiaries, and possessors. At the clause level, such roles are characteristic of arguments as opposed to adjuncts and among the arguments favour subjects over objects in the case of agents and experiencers, and objects over obliques in the case of recipients and beneficiaries. As argued by DuBois (1987) and documented in the literature by data from many languages, person markers also clearly favour transitive subjects over

intransitive ones.[4] At the NP level, person forms are prototypical possessors. While these distributional preferences appear to hold for all types of person markers, there are interesting differences with respect to morphophonological form that are worth considering.

5.1 Argument positions and independent person forms

It has not been the custom to comment on the syntactic function of independent person forms; the assumption being that such forms are usually open to the same range of syntactic functions as are lexical categories. Yet though this is indeed often so, it need not be. There are languages in which independent person forms are used only as single word responses to questions. For all other functions, dependent forms are used. According to Miller (1965: 174), this is the case in Acoma, a Keresan language of New Mexico, which has only two independent person markers, namely, *šinumé, hinumé* 'I' and *hisumé* 'you'. In the Arawakan language Wari (Everett and Kern 1997: 303), spoken in the Rondonia region of Brazil, there is a full paradigm of independent person markers, but they too are never used as verbal arguments. The first- and second-person forms occur only as single word responses to questions. The third-person forms are used as adnominal emphatics, that is, similarly to the English reflexive emphatics found in clauses such as *The queen herself will come*, or as emphatic left-dislocated topics (with or without an accompanying nominal), in which case they are followed by a relative clause.

In quite a few other languages, independent person markers are used at least as arguments of some non-verbal predicates and/or in co-ordinations. Stassen's (1997) analysis of intransitive predications suggests that of the four classes of intransitive predicates—event, property, class, and locational—the ones most likely to require the subject to be expressed by an independent person form are class and/or locational predicates; the least likely, event predicates. In line with this observation, we see that in the Oceanic language Kiribatese, an independent person form is used as the subject of a class predicate in (15a), while the subjects of the property predicate in (15b) and an event predicate in (15c) are rendered by weak forms.

(15)   Kiribatese (Groves, Groves, and Jacobs 1985: 104, 106, 86)

    a. Ngala   te   teretitenti
       he   the   president
       'He is the president.'

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[4] Dahl (2000) argues that the A position indeed favours person markers but particularly those of the first and second person, and attributes this to animacy rather than an underlyingly ergative organization of discourse. He suggests that the S and P do not pattern together in this respect, the S being much more often realized by person forms than the P.

b. Kam[5]   baba
   2SG   stupid
   'You are stupid.'

c. E   noora-i'
   3SG   see-1SG
   'He saw me.'

It is of interest to note that there are no independent person forms in Kiribatese for direct objects. As (15c) suggests, direct objects are expressed by person suffixes, as are also complements of prepositions. Other languages which have independent forms for at least some types of subjects but not for objects are Anejom, Au, Canela Kraho, Gapun, Geez, Malak Malak, Maranguku, Palikur, Salinan, and Sumerian. I am not aware of any languages manifesting the converse situation, that is, the possibility of expressing objects by independent person forms but not subjects. Even in languages in which the normal expression of a subject is by a dependent person marker, there tend to be special independent forms which may be used at least with nonverbal predicates or for purposes of emphasis, as in Wari, mentioned above.

5.2 Argument prominence and dependent person forms

Whereas independent person forms are not typically associated with restrictions relating to syntactic function, dependent person forms are. The cross-linguistic distribution of overt dependent person forms conforms to the predicate hierarchy in (16), being most common with predicates and least common with adpositions.

(16)   predicates > possessed nouns > adpositions

In the vast majority of languages, the presence of overt dependent person markers on adpositions entails the presence of such markers on nouns, and the presence of dependent person marking on nouns entails the presence of such marking on predicates.[6] The major class of exceptions to this are languages with overt dependent person marking on possessed nouns but not on predicates, such as Burmese, Kokborok, Meithei, Kayah Li, Koh Lakka, Paiwan, South Eastern Pomo, and Yessan Mayo. Considerably less frequent are languages which have dependent person marking on adpositions but not on possessed nouns such as Bari, Chacobo, and Fur. These exceptions do not, however, undermine the hierarchy in (16) as a statistical universal.

Dependent person marking on possessed nouns strongly favours inalienable as opposed to alienable possession. Among inalienable nouns, a tendency may be discerned for dependent person markers to favour the semantic classes of nouns on

[5] The independent form of the 2SG is *ngkoe.*
[6] Statistical data in support of the predicate hierarchy are provided by Nichols (1992: 85–6) and Siewierska (2004: 127–8).

the left of the hierarchy in (17), which is taken from Nichols (1988: 572), as compared to those on the right.

(17)   The inalienability hierarchy
       body parts and/or kinship terms > part-whole > spatial relations > culturally basic possessed items > other

In contrast to dependent person forms on predicates and on possessed nouns, those co-occurring with adpositions have not yet been systematically investigated. Therefore, little can be said about the nature of the adpositions or of their complements that favour dependent as opposed to independent person marking.

As has already been suggested above, among predicates, overt dependent person forms favour event predicates over property, locational, and class ones, and property predicates over the latter two. Recall the use of weak person forms with event and property predicates in Kiribatese but independent person forms with class predicates illustrated earlier in (15).

With event predicates, more possibilities of person expression arise. The distribution of dependent person marking, including zero forms, with event predicates tends to conform to the hierarchy in (18).

(18)   subject > object1 > object2 > oblique

The subject in (18) is to be understood as corresponding to the A; object1, to the P of a monotransitive clause and whatever argument (T or R) of a ditransitive clause that receives the same treatment as the P; object2, to the other ditransitive object; and oblique, to any argument associated with a specific semantic role which is not realized by the subject or object functions. Statistical data supporting (18), taken from Siewierska (2004: 43), are presented in Table 16.1.

The data reveal that the vast majority of languages have some form of dependent person marking for subjects and just over two thirds have dependent person markers for object1. In the case of object2, however, there is a drastic reduction of dependent markers and a similar radical reduction for obliques. This suggests that dependent person markers tend to be available just for two of the verb's arguments.

Table 16.1. Dependent pronominals (as a group) and argument prominence

	Subject N=402	Object1 N=402	Object2 N=375	Oblique[a] N=332
No. of languages	330	247	55	20
%	82	67	15	6

[a] The figures pertaining to obliques are only of NP constituents, not adpositional ones.

It is not only with respect to cross-linguistic frequency that the distribution of dependent person markers conforms to the hierarchy of argument prominence in (18). With few exceptions, the same holds within languages. The availability of dependent person markers for a syntactic function lower on the argument prominence hierarchy entails the availability of dependent person markers for syntactic functions higher on the argument prominence hierarchy. In other words, if a language allows a dependent person marker, say a clitic, to be used for object2, it also allows some type of dependent person marker—be it zero, affix, clitic, or weak form—to be used for both object1 and subject.

The major groups of exceptions to this pattern of distribution come from languages which have bound or clitic forms for object1 but no dependent subject forms. These languages include Ani, Barai, Bimoba, Gilyak, Karo-Batak, Noon, Panyjima, and Sema. Interestingly enough, in all these languages, the dependent object forms are quite restricted. For example, in the Australian language Panyjima (Dench 1991: 159), they are found only with the first-person patient or recipient/ benefactive. In Sema (Sreedhar 1980: 81–2), a Tibetan language, they occur only in the first- and second-person singular. And in the Papuan language Barai (Olson 1975: 475–6), the object suffixes occur only with some verbs.

If we order the four types of dependent markers in terms of the increase in phonological substance and/or morphological independence, that is, with zero on the left-hand side and weak form on the right, it is also possible to discern a relationship between argument prominence and the distribution within a language of each of the four types of dependent person markers. In the vast majority of languages (89%), more phonologically reduced and/or morphologically dependent forms are used for arguments higher on the argument prominence hierarchy than those for lower on the hierarchy. Among the languages which exhibit distributions counter to the argument prominence hierarchy, the first group of exceptions involves languages which allow for zero objects but not subjects, as is the case in Chamorro, Finnish, Kewa, Palauan, and Imbabura Quechua. As one would expect, all the languages in question have affixal subjects.

Another distributional pattern which runs counter to the argument prominence hierarchy is the existence of affixal objects but weak forms for subjects. As discussed in Song (1994), this pattern is particularly frequent among the languages of Micronesia. It is found, for example, in Kiribatese (see (15), given earlier), Kusaiean, Ponapean, Tigak, Woleaian, and Yapese. And finally, there are languages that have affixal objects but clitic subjects. Such is the case in Burunge, Halkomelem, Kutenai, Mundari, Lower Umpqua, and South-eastern Tepehuan.

The strong tendency for dependent person markers to favour syntactic functions high on the argument prominence hierarchy begs for a word of explanation. A promising account is suggested by the relationship between morphosyntactic encoding and the cognitive accessibility of a referent in the memory store of the addressee posited by various scholars within the functional-cognitive paradigm,

and most fully articulated by Givón (1983) and Ariel (1990). The notion of cognitive accessibility is associated with the properties on the left-hand side of the hierarchies in (19) as opposed to those on the right.

(19)   a. speaker > addressee > non-participant (third person)
      b. subject > object > other
      c. high physical salience > low physical salience
      d. topic > non-topic
      e. human > animate > inanimate
      f. repeated reference > few previous references > first mention
      g. no intervening/competing referents > many intervening/competing referents

Accessibility, in turn, is viewed as having a direct bearing on formal encoding: the more accessible the referent, the less coding is required. Thus, since dependent person markers involve less encoding than independent ones, the expectation is that they should be characteristic of syntactic functions which tend to realize highly accessible referents. And as we have seen, this is indeed so. Dependent person markers are less frequent as one goes down the argument prominence hierarchy, being most common with subjects and least common with obliques. Moreover, accessibility also leads us to expect that the more attenuated dependent person markers should favour the syntactic functions which encode the most accessible referents. Language-internally, this means that no more attenuated dependent person marker should realize an argument higher on the argument prominence hierarchy than any less attenuated dependent marker. Accordingly, there should be no languages, for example, with weak subject forms but clitic object ones or clitic subject forms but bound object ones, etc. Again, while there are languages in which the dependent person markers that they possess are distributed counter to this expectation, in the overwhelming majority, the distribution of dependent person markers is fully in line with accessibility.

6. MORPHOSYNTACTIC ALIGNMENT

The term 'alignment', when used in regard to core syntactic arguments, denotes how they are organized relative to each other. In the case of intransitive and monotransitive clauses, the patterns of identification—which involve the S (intransitive subject), A (Agent), and P (Patient)—are seen to fall into the following alignment types: neutral, accusative, ergative, active, tripartite, and hierarchical (see Primus, this volume).[7] The criteria for the identification of alignment may be morphological, behavioural, or semantic. Here we will concentrate on the morphological.

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[7] For reasons of space, the discussion will be confined to patterns of monotransitive alignment. Differences in the distribution of person forms relating to ditransitive alignment are discussed in Haspelmath (2005a and b) and Siewierska (2003, 2004: 57–63, 168).

The determination of the patterns of alignment is a prerequisite to the establishment of grammatical functions in a language, one of the central topics of syntactic research (see Bickel, this volume). In the case of person forms, what has aroused most interest is the differences in alignment between independent and dependent person forms and differences relative to person. Both have featured prominently in discussions of possible language types and possible paths of diachronic change both in the typological literature and in the generative.

6.1 Alignment and different types of person forms

In relation to monotransitive alignment, the differences between independent and dependent person forms worthy of comment involve neutral, accusative, ergative, and active alignment. Hierarchical alignment is a feature solely of dependent forms, and tripartite is too rare to warrant separate discussion.

The most striking difference concerns neutral alignment, which in the case of independent forms means the lack of phonological distinctiveness of the forms in question and in the case of dependent ones, absence of any forms altogether. My own statistical data (Siewierska 2004: 53) suggest that neutral alignment with independent person forms is at least twice as common as with dependent forms; the relevant figures for the languages in my sample being 43% vs. 19%. This disparity in neutral alignment is in part an artefact of how neutral alignment is defined with the two types of person forms. If one accepts the accessibility explanation for the existence of dependent person markers briefly outlined in 5.2, the relative infrequency of neutral alignment of dependent forms is hardly surprising. In this context, one might rather seek an explanation for the absence rather than the presence of dependent person markers. As for the relatively high incidence of neutral alignment with independent person markers, one line of explanation is that the absence of morphological differentiation may be compensated for by word order. Another line of explanation ties the neutral alignment of independent person forms to their low frequency of use, particularly in so-called head-marking languages. If independent person forms are rare, coding for syntactic function is a rather low priority, particularly when corresponding dependent person forms indicate the relevant distinctions. And indeed, many of the languages which display neutral alignment of independent person forms are head-marking ones, which qualify as exhibiting a preference for dependent as opposed to independent person forms. These include Abkhaz, Ainu, Barbareno Chumash, Lakhota, Mohawk, Navajo, Papago, Squamish, Tiwi, Wichita, and Yimas. A more theory-specific explanation for the relative frequency of neutral alignment of independent person forms (and also lexical NPs) in head-marking languages tied to the pronominal-argument view of these languages outlined earlier in section 4 attributes the lack of case marking to their extra-clausal or non-argumental status.

The claim is that if they are not governed by the verb, they may be expected to lack case marking typical of verbal arguments.

Also considerable is the difference between independent and dependent forms with respect to accusative alignment. Although accusative alignment is dominant with both, it is especially favoured in dependent forms. Of the dependent person markers in my sample, 71% exhibit accusative alignment, as compared to 43% of the independent forms. In the functional-typological literature, the higher incidence of accusative alignment among dependent rather than independent person forms is typically seen to be a consequence of the diachronic development of dependent forms. Dependent person forms generally arise from independent ones. If one accepts the accessibility scenario outlined in 5.2, then the forms of the A and S are likely to receive attenuated encoding well before the forms of the P do. This will automatically produce accusative alignment if the source forms align accusatively or neutrally. However, even if the independent A and S forms are distinct—that is, pattern ergatively—the resulting system will be not ergative but rather potentially tripartite (with the S and A differing from each other but no dependent form yet for the P). In such a system, the marking of the A is likely to extend to the S, as has happened in some dialects of the Dagestanian language Tabasaran (Harris and Campbell 1995: 249), or vice versa. In either case, again an accusative system will result.

As suggested by the above, independent and dependent person forms also differ with respect to ergative alignment, which is significantly more common in independent person forms than in dependent ones. In my sample, 11% of the independent person forms display ergative alignment, whereas only 4% of the dependent forms do. Typically, the ergative alignment of independent person forms coexists with the accusative alignment of dependent ones. This pattern is particularly common in Australia, where it is found in, for example, Djaru, Malak Malak, Murinypatya, Ngalakan, Ngandi, Nyangumarta, Pintupi, Rembarnga, Warnman, Walpiri, Walmathari, and Yulbaridja. Languages from other geographical areas exhibiting the same phenomenon include Byansi, Copainala Zoque, Hua, Ingush, the Kubachi dialect of Dargva (in certain tenses), Tauya, and Una. This discrepancy in the frequency of ergative alignment with independent and dependent person forms may be traced to the difficulty of ergative dependent forms arising. As sketched above, even ergatively aligned independent person forms are unlikely to lead to ergatively aligned dependent ones, due to the fact that the forms to emerge first will be the A and S ones and not those for the P and S. In fact, the only widely accepted source of ergative alignment of dependent person forms is the reanalysis of passive constructions as ergative in languages with pre-existing accusatively aligned dependent person markers.[8] Such a reanalysis involves reinterpreting the passive S as a P and the agent of the passive as a transitive A. The fact that there are

[8] For a critique of an alternative source of ergative marking suggested by Givón (1994b), namely, the reanalysis of the inverse, see Siewierska (1998b).

languages which display ergative alignment of dependent person forms suggests that such reanalyses do occur, though the motivation for them remains rather elusive (see Givón 1994a). Interestingly, the dependent marking of the A often shows signs of it having emerged later than the dependent marking of the S and P. This is what one would expect, given that passive agents tend not to be expressed by person forms, let alone dependent person forms.

Contrary to what is often claimed, the converse split—that is, accusative alignment of independent person forms and ergative of dependent—is also to be found. However, the ergativity of the dependent forms tends to be manifested only with certain person number combinations or in certain tenses or aspects. For instance, in Sumerian (Thomsen 1984: 69), the ergative alignment of bound person forms is found only in the 'hermit' conjugation and only in the first and second person. In the third person, the alignment is tripartite. Other languages manifesting ergative alignment of at least some dependent person forms and accusative of independent are Badjiri, Hittite, Munduruku, Narinjari, Sahapatin, and Wangaybuwan. Typically, however, ergatively aligned dependent person forms coexist with neutral (e.g., Abkhaz, Jakaltec, Konjo, Nadëb, Sierra Popoluca) or ergative (e.g., Basque, Cavineña, Makuchi, Pari, Trumai, Yupik) independent ones.

Arguably, the biggest difference between independent and dependent person forms in regard to alignment concerns active alignment. Active alignment with independent person markers is extremely rare. The only such instances that I am aware of are in the Pomo languages of California (Central Pomo and Eastern Pomo), in several dialects of the Kartvelian language Laz, and in Batsbi, Imonda, Tsou, and Lhasa Tibetan. By contrast, with dependent person markers, active alignment is relatively common. It is especially frequent in North America (e.g., Acoma, Haida, Koasati, Lakhota, Oneida, Tlingit, Wichita, Yuchi) and South America (e.g., Apurina, Ika, Marubo, Warekena, Yagua) but also attested in New Guinea (e.g., Kewa, Naisoi, Yava), Southeast Asia, and Oceania (e.g., Acehnese, Bukiyip, Larike, Semelai). The explanation for this difference in the distribution of active alignment may be seen to lie in the nature of the semantic distinctions which tend to underlie this form of marking. Mithun (1991) has shown that active alignment tends to be dependent on a variety of semantic parameters, such as control, instigation, affect, and aspect, associated with the lexical categorization of verbs. It should therefore be favoured by markers which are bound or otherwise attached to the verb. And this is indeed so. Interestingly enough, the languages which have active alignment with independent person markers do not have dependent ones bound to the verb.

6.2 Alignment and person

Given the central status of the speech act participants within the category of person and the exclusion of the third person either altogether, as advocated by Benveniste, or

just in some languages, as hypothesized by Bhat, we may expect the major splits in alignment according to person to involve the first and second person as compared to the third. And indeed, this is so, though it must be emphasized that splits in alignment based purely on person are very much the exception rather than the norm.

The 1 & 2 vs. 3 splits in the main follow the person hierarchy, as interpreted by Silverstein (1976), Comrie (1978), and Blake (1987); that is, the first and second person favour accusative alignment and disfavour ergative. Thus, the patterns in (20) are much more common than those in (21).

(20) 1 & 2   3
    a. accusative   neutral
    b. accusative   ergative
    c. neutral   ergative

(21) 1 & 2   3
    a. neutral   accusative
    b. ergative   accusative
    c. ergative   neutral

The first of the patterns in (20) among independent person forms is found in languages such as Huave, Tepehuan, and the Tibeto-Burman languages Hani and Zaiwa. In the case of dependent person forms, it may be suggestive of an emergent dependent person system. Such is the case in various East Caucasian languages, such as Hunzib, the Zakatal' dialect of Avar, the Megeb dialect of Dargva, and some of the Lak dialects (see Helmbrecht 1996b). More commonly, it involves paradigmatic zeroes for the S, A, and P in the third-person singular, as, for example, in Ika, Nambiquara, and South-eastern Tepehuan, or in both the third-person singular and non-singular, as, for example, in Kutenai, Kwaza, and Walpiri. Pattern (20b), with first and second person exhibiting accusative alignment and third person ergative in independent person markers, is found in the Australian language Yuwaalaraay and in dependent person markers in Washo and several Salishan languages (e.g., Lillooet Salish, Northern Straits Salish) as well as in another Australian language Ngiyambaa. Pattern (20c) occurs in the independent person forms of many East Caucasian languages, such as Lak, Godoberi, and Tsakhur. In these languages, the third person corresponds to the demonstrative. The pattern is also found in the independent forms of Chamling, Washo, Yupik, and Greenlandic. The only instances of pattern (20c) with dependent person forms that I am aware of is in the Brazilian language Trumai (Guirardello 1999: 256), in which a person clitic is used for the S and P if there is no corresponding lexical NP or independent person form present.

Turning to the patterns which counter the expectations of the person hierarchy, all are extremely rare. Pattern (21a) in the case of dependent forms is familiar from English, where in the present tense the absence of any dependent forms in the first and second person contrasts with the presence of -s in the third-person singular. In

independent forms, the presence of accusative alignment solely in the third person occurs in the Chadic language Koh (22) and in Korya Chiini, a Songhay language spoken in Mali.

(22)   Koh (Glidden 1985: 240, 242, 250)

a. mi   zool   ro
   1SG   go.FTV   PFV
   'I'm leaving.'

b. mi   ddan   mbih
   1SG   draw   water
   'I draw water.'

c. ka   koo   mi   koo
   3SG   red   1SG   know.FTV
   'He knows me.'

d. ka   koo   ni   koo
   3SG   red   3SG   know.FTV
   'He knows him.'

Pattern (21b) in the strict sense, with both the first and second person aligned ergatively, does not appear to be attested. There are, however, languages in which the first person manifests ergative alignment coupled with traces of accusative alignment in the third person. According to Bickel (2000), this is the case in the Tibeto-Burman Kiranti languages Hayu, Yamphu, and Belhare. The split concerns the dependent person markers. The following examples are from Yamphu, where the first-person S/P suffix is -ŋa and the A suffix is -ŋ.

(23)   Yamphu (Rutgers 1998: 116)

a. ram-ʔi-ŋa
   walk-NPST-1SG
   'I walk.'

b. khaŋ-ʔin-ŋa
   see-NPST-1SG
   'He sees me.'

c. khaŋ-ʔin-u-ŋ
   see-NPST-3-1SG
   'I see him.'

There is no overt dependent marking of person for a second- or third-person singular S/A, but a third-person P is marked by u/w, as shown in (22c). The last of the above patterns—that is, ergative alignment solely in the first and/or second person in conjunction with neutral (or tripartite) alignment in the third—has been attested also in the Tibeto-Burman languages. Jacquesson (2001) cites several such

cases among the languages of the Naga group. In Khiamnungan, it is the first person that exhibits ergative alignment while the alignment of the second and third person is neutral. In Chang, ergativity is manifested in both first and second person, but not in third. And in Konyak, the first person is tripartite; the second, ergative.[9]

The other major association between person and alignment is in relation to active alignment. Active alignment favours the first and second person as opposed to the third. Thus quite frequently, the first and second person exhibit active alignment while the third is neutral, as in Koasati, Lakhota, Naisoi, Tutelo, or Wichita. More rarely, the active alignment of the first and second person co-occurs with accusative or ergative in the third, as in Batsbi or Semelai.

No clear associations between person and alignment comparable to that involving accusative and ergative can be discerned in relation to splits involving other combinations of alignments. For instance, combinations of accusative and tripartite alignments or ergative and tripartite may involve the tripartite being displayed by the first and second person, the accusative or ergative by the third, or vice versa. This holds for both independent person forms and dependent ones.

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[9] Another unusual person split is found in the Amazonian language Nadëb (Martins and Martins 1999: 263), in which ergative alignment is found in 2SG, 3SG, & 3PL while the 1SG, 1INCL, 1EXL, and 2PL exhibit neutral alignment.

CHAPTER 17

TRANSITIVITY TYPOLOGY

SEPPO KITTILÄ

1. INTRODUCTION

In many languages (and perhaps covertly in all languages) the transitivity relationship lies at the explanatory core of most grammatical processes. (Hopper and Thompson 1982: 1)

As is clear from the citation above, transitivity is one of the core areas of linguistics (e.g. Lazard 2002: 142). The notion comprises such facets as argument marking and voice. 'Transitivity' can be seen as an umbrella term for these closely related notions. Much research has investigated linguistic transitivity from different perspectives. From this, it also follows that the notion has been defined in numerous ways, depending on the goals pursued and frameworks adopted by different scholars (see Lazard 2002: 151). While this chapter does not intend to elaborate on Hopper and Thompson's claim by showing that most grammatical processes are indeed conditioned by transitivity, it discusses some of the most central facets of transitivity in general. In a nutshell, linguistic transitivity is understood here as the linguistic coding of basic events (understood as events in which a volitionally acting, typically human agent targets its action at a thoroughly affected patient) and the formal and semantic features associated with the coding of this event type.

2. APPROACHES TO TRANSITIVITY

In this section, I briefly discuss some of the definitions linguistic transitivity has been given. These comprise semantic (including functional-typological definitions), formal, and pragmatic (transitivity in discourse) approaches to transitivity. I begin by discussing formal definitions. This is logical, because linguistic transitivity is manifested primarily formally. However, other factors need to be taken into account if we want to achieve a more thorough understanding of the phenomenon. Transitivity has therefore also been defined as focusing on the semantic and pragmatic underpinnings of the notion.

2.1 Formal approaches

Any definition of transitivity that neglects semantic features such as agency and affectedness is labelled here as formal. The neglect of the semantic basis of transitivity means that only the number and the marking of arguments are considered in formal definitions:

Transitivity in natural language is commonly approached in one of two ways. One approach, owing its origin to predicate logic, defines transitivity in terms of the number of noun arguments necessary to make a predicate coherent. A predicate requiring only one such noun argument is termed intransitive and a predicate requiring two or more transitive. This definition is blind to the relationship obtaining between the two arguments, according equal transitive status to English verbs such as *differ, resemble* and *meet* as to the verbs *hit* and *eat*. In a language marking case, no difference in transitive status is accorded to verbs requiring different case patterns, as long as the number of obligatory nouns is the same. (Jacobsen 1985: 89)

For traditional grammar, transitive verbs are those that take a direct object or an object in the accusative: such is the construction of action verbs and assimilates; all the remaining verbs are intransitive. Such a conception is only valid in the case of accusative languages; besides, it does not deal with differences between constructions other than the major construction. (Lazard 1998: 160)

The two approaches to transitivity illustrated above differ according to whether they pose any restrictions on the nature of clauses/verbs considered transitive (Lazard and Jacobsen do not view transitivity primarily as a formal phenomenon, but they simply demonstrate how the notion has been defined). The first definition is based on the number of arguments alone, which has the consequence that verbs such as *differ* and *eat* are accorded the same transitivity status despite the differences in the argument structure of these verbs. Traditional grammar, referred to above by Lazard, defines transitivity in a somewhat more restricted manner, in considering only verbs with a direct object to be transitive. The latter is perhaps the more widely advocated formal

approach to transitivity. The majority of formal approaches to transitivity are based on Indo-European languages, so the notion of direct object naturally becomes crucial to the notion of transitivity. It is also important to note that formal definitions view transitivity as a property of verbs rather than clauses. This does not always yield a comfortable result, because—as is generally known—many (transitive) verbs, such as 'eat' and 'drink', may occur with or without an overtly expressed object (see also Payne 1997: 171). Moreover, formal definitions are strictly binary in nature, considering verbs (or clauses) either transitive or intransitive without intermediate types. Both these features clearly distinguish formal approaches from semantically oriented approaches, which view transitivity as a continuum.

2.2 Semantic approaches

Semantic approaches to transitivity stress semantically defined properties such as agency and affectedness. Their starting point is a semantic definition of what is usually labelled as the prototypical action/event (as in the definitions below). The most influential semantically based definition is probably represented by Hopper and Thompson's (1980: 252) list of transitivity parameters (A and O refer here to the agent and the patient, respectively, of basic transitive events):

	HIGH	LOW
A. PARTICIPANTS	2 or more participants, A and O	1 participant
B. KINESIS	action	non-action
C. ASPECT	telic	atelic
D. PUNCTUALITY	punctual	non-punctual
E. VOLITIONALITY	volitional	non-volitional
F. AFFIRMATION	affirmative	negative
G. MODE	realis	irrealis
H. AGENCY	A high in potency	A low in potency
I. AFFECTEDNESS OF O	O totally affected	O not affected
J. INDIVIDUATION of O	O highly individuated	O non-individuated

Also, Givón's (1995: 76) definition constitutes a typical way of defining the prototypical transitive event:

Semantic definition of transitive event

a. Agent: The prototypical transitive clause involves a volitional, controlling, actively initiating agent who is responsible for the event, thus its salient cause.
b. Patient: The prototypical transitive event involves a non-volitional, inactive, non-controlling patient who registers the event's changes-of-state, thus its salient effect.
c. Verbal modality: The verb of the prototypical transitive clause codes an event that is compact (non-durative), bounded (non-lingering), sequential (non-perfect), and realis (non-hypothetical). The prototype transitive event is thus fast-paced, completed, real, and perceptually and/or cognitively salient. (emphasis original)

The definitions above focus on the semantics of the prototypical transitive event, and they are both based on features of affectedness (of the patient) and the high degree of agency (associated with the agent). The frequent occurrence of these features in semantically based transitivity definitions is not surprising, since changes in these features have consequences for the formal coding of events (see below). Even though both definitions focus primarily on semantics, they do not neglect the formal plane of transitivity. They view the transitive prototype as a meaning content, which is encoded in different ways by different languages. Formal differences in the encoding of events are explained as deviations from the transitive prototype. These can be motivated by a change in any property of the prototype. The changes can also be more or less dramatic, with the result that semantic definitions see transitivity as a scalar phenomenon instead of a binary dichotomy of intransitive and transitive events.

A somewhat different semantic definition of the transitive prototype has been recently proposed by Næss (2003: 97):

MAXIMALLY DISTINGUISHED ARGUMENTS HYPOTHESIS
A prototypically transitive clause is one where the two core arguments are maximally semantically distinct. That is, in terms of certain semantic properties defining the categories of agent and patient, respectively, the transitivity of the clause depends on the distribution of these properties across the two core arguments. When only the agent shows agent-like properties and only the patient shows patient-like properties, the clause is highly transitive; but any deviation from this canonical distribution will give a clause that is reduced in transitivity relative to the prototype. Not only is a clause less transitive if, for example, the agent lacks a typical agent-like feature such as volition, or the patient lacks a patientive feature such as being highly affected; but an agent bearing patient-like features in addition to the agent-like ones, or a patient showing some characteristics typical of agents in addition to the patientive ones, equally causes the clause to deviate from the transitive prototype.

Næss's proposal does have features in common with the semantic definitions discussed earlier. The main difference from the earlier definitions lies in the distribution of the canonical transitivity properties. Næss points out that the mere presence of the relevant properties does not render a clause transitive; in addition, the patient needs to be the only affected participant, while only the agent has agentive characteristics. As a result, events involving an affected agent, for example, receive a less transitive formal treatment (for a detailed discussion of this, see Næss 2003: ch. 2). Like the definitions of Hopper and Thompson and of Givón, Næss views transitivity as a scalar notion.

2.3 Transitivity in discourse

Formal and semantic approaches represent the mainstream approaches to transitivity. There are, however, also scholars who stress the discourse functions of arguments when defining transitivity. Consider:

We have made and supported the claim that Transitivity is a global property of clauses, that it is a continuum along which various points cluster and tend strongly to co-occur, and that the foci of high Transitivity and low Transitivity correlate with the independent discourse notions of foregrounding and backgrounding respectively. The fact that the semantic characteristics of high Transitivity such as perfective Aspect, individuated O, and agentive Subject tend strongly to be grammaticalized in the morphosyntax of natural languages points to the importance of the foregrounding/backgrounding distinction [. . .] (Hopper and Thompson 1980: 294)

> We should constantly remind ourselves that the number of syntactic core arguments depends not on the number of entities involved in the situation referred to, but on the manner in which the situation is conceptualized by the speaker, and that one cannot speak, for example, of a 'transitive action' or 'intransitive action', because the same action may be viewed as 'transitive' or 'intransitive' depending on the point of view. (Wierzbicka 1996: 410)

Even though it is safe to say that Hopper and Thompson are better known for their list of transitivity parameters, we should also bear in mind that they view transitivity as a discourse phenomenon as well. According to Hopper and Thompson, high transitivity correlates with foregrounding, and low transitivity with backgrounding. 'Foregrounding' refers here basically to cases in which the agent of the event is focused on, while 'backgrounding' is the opposite of this. Wierzbicka's approach to transitivity is even more 'radical', since her theory is primarily based on pragmatic properties of clauses, thus abandoning the underlying semantics of the profiled events. This does not produce a very comfortable result, because the semantics of events clearly has consequences for the nature of transitivity alternations manifested at the clause level.

3. FORMAL MANIFESTATION OF TRANSITIVITY
....

As noted above, the number and marking of overt arguments along with features of verb morphology constitute the central formal features of transitivity. It should be noted here that even though the continuum-like nature of transitivity has been recognized since Hopper and Thompson (1980), what follows focuses on illustrating deviations from the transitive prototype. The primary reason for this is that even though the deviations from the transitive prototype (as defined e.g. by Hopper and Thompson and by Givón; see above) can be more or less dramatic semantically, it is considerably harder to find formal evidence for this. Differences in agency represent an illustrative example. There are languages (e.g. Finnish) which distinguish formally between events instigated involuntarily by a human agent and events instigated by an inanimate entity. It is, however, difficult to rank these two according to their transitivity without having to resort to ad hoc criteria. The same applies to differences caused by different transitivity parameters. In other words, is an event with a less affected patient more or less transitive than, or as transitive as, an event involving a less typical agent? These cases, however, all have one thing in common: they are all

deviations from the transitive prototype. As a consequence, I have opted for focusing on deviations (this also applies to the discussion in section 4).

3.1 Changes in the number of arguments

Most scholars working on transitivity agree that only clauses with two overt arguments are considered formally transitive (the arguments may also be realized as cross-referencing affixes in the verb). All languages have verbs which take two arguments and which thus have the ability to be parts of formally transitive clauses. The number of arguments required/permitted by verbs is, however, not invariable, but languages have mechanisms for modifying the valency of verbs and the number of arguments in clauses. These alternations either decrease or increase the valency of verbs by one. We can accordingly speak of detransitivizing and transitivizing alternations, respectively (also see Nichols, Peterson, and Barnes 2004 for a study of transitivizing and detransitivizing languages). Some of the most important transitivity alternations are examined below.

3.1.1 Detransitivizing alternations

Formally signalled processes which decrease the number of overt arguments in clauses are labelled here as detransitivizing alternations. (The label refers to the formal realization of the phenomenon; intransitivization, in turn, is used in a semantic sense in this chapter.) The number of arguments required by verbs thus drops from two to one or from three to two. Labile verbs permitting a free omission of arguments are not discussed below. The most important detransitivizing alternations are represented by passive, antipassive, anticausative, and reflexive. An example of each of these major types is given in (1)–(4):

(1) Finnish

    a. henkilö   rikko-i   esine-en
        person[NOM.SG]   break-3SG.PST   entity-ACC
        'A person broke an entity.'

    b. esine   riko-ttiin
        entity[NOM.SG]   break-PASS.PST
        'An entity was broken.'

    c. esine   rikko-utu-i
        entity[NOM.SG]   break-ANTIC/REFL-3SG.PST
        'The entity broke.'

(2) Hunzib (van den Berg 1995: 110)

    a. oλu-l   bəx   koše
        that.OBL-ERG   grass[5]   mow.PRS
        'Father mows the grass.'

   b. oλu   koše-laa
      that[1] mow-ANTIP.PRS
      'Father is mowing.'

(3) Yidiñ (Dixon 1994: 59 ff.)

   a. waguja-ngu jugi   gunda-l (galba:n-da)
      man-ERG   tree[ABS] cut-PRS   axe-INS
      'The man is cutting a tree (with an axe).'

   b. wagu:ja   gunda-:ji-ŋ   (jugi-:l)   galba:n-da
      man[ABS]   cut-ANTIP-PRS (tree-LOC) axe-INS
      'The man is cutting a tree with an axe.'

(4) Diyari (Austin 1981: 152 ff.)

   a. ŋatu   yinana muduwa-yi
      1SG.A   2SG.O   scratch-PRS
      'I scratch you.'

   b. ŋani   muduwa-tadi-yi
      1SG.S   scratch-REFL-PRS
      'I scratch myself.'

The examples in (a) illustrate the basic transitive clause of the examined languages, while the examples in (b) (and (c)) constitute detransitivized clauses 'derived' from (a). The sentence in (1b) exemplifies the passive of Finnish. The adding of the passive morpheme to the verb removes the agent from verb valency completely. In this regard, the Finnish passive differs from the English passive, which allows an agent adjunct. The sentence in (1c) exemplifies the anticausative alternation, which also eliminates the agent from verb valency. The examples from Hunzib and Yidiñ illustrate instances of the antipassive. Antipassive constitutes the mirror image of passive in that the patient of the basic transitive clause is either demoted in status or eliminated altogether (see Cooreman 1994 for a more detailed survey of antipassives). The agent occurs in the absolutive in antipassive, which is the case of the patient in basic transitive clauses. In Hunzib, antipassive clauses do not allow any reference to the patient, while in Yidiñ, the patient can surface as an adjunct in the antipassive. The reflexive alternation exemplified in (4) also 'derives' a detransitivized clause from a transitive one, because the number of overt arguments decreases.

Above, I have exemplified typical detransitivizing alternations as formally distinct morphosyntactic processes. There are also many languages with polysemous detransitivizing affixes. An example is provided in (5):

(5) Amharic (Amberber 2000: 315 ff.)

   a. t'ərmus-u   bə-lij-ut   tə-səbbərə
      bottle-DEF by-boy-DEF PASS-break.PRF.3M
      'The bottle was broken by the boy.'

---

   b. bər-u   (b'-t'inik'k'ak'e)   tə-kəffətə
      door-DEF (with-care/attention) ANTIC-open.PRF.3M
      'The door opened/was opened (with care).'

   c. Aster t-at't' əbə-čč
      Aster   REFL-wash.PRF-3F
      'Aster washed herself.'

   d. səww-očč-u   irsbərs-aččəw(*-in)   tə-dəbaddəb-u
      person-PL-DEF each.other-POSS.3PL(*-ACC) RECP-hit.RECP.PRF-3PL
      'The people hit each other.'

As can be seen above, the affix $t(\partial)$- is best regarded as a polysemous detransitivizing morpheme which expresses the functions of passive, anticausative, reflexive, and reciprocal. These kinds of affixes are not rare cross-linguistically; especially the polysemy of passive, reflexive, and anticausative is attested frequently (see e.g. Haspelmath 1990: 32). This is unsurprising, because the expressed functions are closely related and the intended reading is usually retrievable from other cues. For example, in (5b), the reading switches from anticausative to passive if an adverb expressing agency is added to the clause. In both these cases, the agent argument is formally backgrounded.

3.1.2 Formally transitivizing alternations

Cross-linguistically, causative and applicative unarguably constitute the most typical transitivizing alternations which increase the valency of verbs (also see Payne 1997: 175–92). Examples are given in (6)–(9):

(6) Kammu (Svantesson 1983: 103 ff.)

   a. tráak   háan
      buffalo   die
      'The buffalo died.'

   b. rwàay p-háan   tráak
      tiger   CAUS-die buffalo
      'The tiger killed the buffalo.'

(7) Bote (Balaram Prasain, p.c.)

   a. bəcca-ī   macho kʰa-ik
      child-ERG   fish   eat-3SG.PST
      'The child ate the fish.'

   b. ama-ī   bəcca-ke   macho kʰw-a-ik
      mother-ERG child-DAT   fish   eat-CAUS-3SG.PST
      'The mother fed the child fish.'

(8) Warembori (Donohue 1999: 9)

   a. make matin-do (nana ipa-yave)
      boy   wash-IND (OBL river-DEF)
      '(The) boy is washing (in the river).'

  b. make matin-na ipa-yave
    boy wash-APPL river-DEF
    '(The) boy is washing in the river.'

(9) Creek (Martin 2000: 390)

  a. cá·ni-t istaha·kocí-n ha·y-ís
    John-NOM doll-OBL make.LGR-IND
    'John is making a doll.'

  b. cá·ni-t cími-n istaha·kocí-n ín-ha·y-ís
    John-NOM Jim-OBL doll-OBL DAT.APPL-make.LGR-IND
    'John is making a doll for Jim.'

Causativization is a process which adds an agent to the verb valency. Kammu and Bote provide instances of canonical causativization: (6b) exemplifies a causative derived from an intransitive clause, while (7b) is an instance of a causativized transitive clause. The introduced agent occupies the subject position in typical cases (e.g. Comrie 1975b: 2). With intransitive verbs, causativization produces a canonical transitive construction. As for originally transitive verbs, the result is a ditransitive construction in which the subject of the 'non-derived' clause usually surfaces as an adjunct (see Song 1996 for a more detailed examination of causativization in general). Causativization represents a rather homogeneous transitivizing device, in that the introduced argument always refers to an agent (or external causer). Applicativization, in turn, can introduce an array of different arguments to verb valency. Examples (8) and (9) only scratch the surface of the phenomenon. What all alternations labelled as applicatives have in common is that the introduced argument is neither an agent nor a (canonical) patient. Applicativization adds arguments referring to instrumentals, beneficiaries, and locatives to the valency of verbs. Languages display massive variation in the number of arguments added via applicativization, in addition to which they also differ according to whether different arguments are introduced with formally distinct affixes or not (see Peterson 2007 for a cross-linguistic survey of applicatives). Examples from Warembori illustrate an applicative derived from an intransitive clause, while in (9), the applicativization produces a derived ditransitive clause.

  Causatives and applicatives are more often than not formally distinct transitivizing devices in languages. This is not surprising, because the alternations in question are clearly semantically distinct (for the same reason, antipassives and passives are kept formally apart in most languages). There are, however, languages in which causatives and applicatives both employ the same affix (see Shibatani and Pardeshi 2002: 116–22 for a more detailed discussion of this syncretism). Consider:

(10) Wolof (Comrie 1985b: 330)

    di naa la toog-al-al   nenne bi
    1SG AUX you seat-CAUS-APPL child the
    'I will make the child sit down for you.'

As shown in (10), the affix -al is used for both causativization and applicativization in Wolof. We are thus here dealing with a polysemous transitivizing suffix. Polysemous transitivizing affixes are clearly outnumbered by polysemous detransitivizing affixes. The reason may be found in the fact that applicative is far from being a universal category.

3.1.3 Transitivity-rearranging alternations

In addition to the cases discussed thus far, there are morphosyntactic processes which only yield changes in the status of clausal constituents without (complete) elimination or introduction of arguments. These are labelled here as transitivity-rearranging alternations. The most typical of these are represented by dative shift, external possession, and incorporation. The first two are promoting devices, while incorporation deprives a core argument of its status as an independent argument. Examples are given in (11)–(13):

(11) Korean (Jae Jung Song, p.c.)

  a. kica-ka   enehakca-eykey chayk-ul ponay-ss-ta
    journo-NOM linguist-to   book-ACC send-PST-IND
    'The journalist sent a/the book to the linguist.'

  b. kica-ka   enehakca-lul chayk-ul ponay-ss-ta
    journo-NOM linguist-ACC book-ACC send-PST-IND
    'The journalist sent the linguist a book.'

(12) Finnish

  a. vanhempi   pes-i   lapse-n käde-t
    parent[NOM.SG] wash-3SG.PST child-GEN hand-PL
    'The parent washed the child's hands.'

  b. vanhempi   pes-i   lapse-lta käde-t
    parent[NOM.SG] wash-3SG.PST child-ABL hand-PL
    'The parent washed the child's hands.'

(13) Chukchi (Comrie 1973: 243)

  a. tumg-e   na-ntəwat-ən kupre-n
    friends-ERG 3SG-set-TR net-ABS
    'The friends set the net.'

  b. tumg- ət kupra-ntəwat-g'at
    friends-ABS net-set-INTR
    'The friends set nets.'

Example (11) illustrates dative shift. Dative shift promotes an (adjunct-like) indirect object to the clause core. In Korean, the promoted indirect object bears accusative marking in (11b), while it occurs in a locative case in (11a) (see the free translations of (11) for dative shift in English). The examples from Finnish illustrate

the alternation type known as external possession. External possession refers to a construction in which a possessive modifier is not a dependent constituent of a NP, but is an external, independent constituent of the clause (Haspelmath 1999a: 109). In (12b), for example, the ablatively marked constituent has replaced the dependent possessive modifier of (12a). External possession alternation thus promotes dependent constituents of phrases (such as possessors in the genitive) into independent constituents of clauses (such as an ablatively coded constituent in Finnish). Incorporation represents the mirror image of external possession, because it turns independent arguments instead into affixes which attach to the verb. In Chukchi, incorporation results in a complete detransitivization, which is manifested in the change in the morpheme signalling the transitivity of clauses.

3.2 Changes in argument marking

This subsection examines changes in argument marking. The number of arguments in clauses remains constant, and only the marking of arguments is affected. Examples are given in (14)–(17):

(14) Lezgian (Haspelmath 1993a: 292)

    a. zamara-di   get'e xa-na
        Zamira-ERG   pot   break-AOR
        'Zamira broke the pot.'

    b. zamara.di-waj get'e xa-na
        Zamira-ADEL   pot   break-AOR
        'Zamira broke the pot accidentally/involuntarily.'

(15) Finnish

    a. Esko Mörkö luk-i   vanha-n   jallu-n
        Esko Mörkö read-3SG.PST old-ACC   Jallu-ACC
        'Esko Mörkö read an/the old Jallu-magazine.'

    b. Esko Mörkö luk-ee   vanho-ja   jallu-ja
        Esko Mörkö read-3SG.PST old-PART.PL Jallu-PART.PL
        'Esko Mörkö is reading (some) old Jallu-magazines.'

(16) Persian (Lazard 1998: 168)

    a. ketâb-ra   xând-am
        book-POSTP   read.PST-1SG
        'I read the book.'

    b. ketâb xând-am
        book   read.PST-1SG
        'I read a/some books.'

(17) Niuean (Seiter 1980: 63)

    a. kua   mohe e   ia   e   timeni
        PRF   sleep ERG   he   ABS   floor
        'He has slept on the floor.' [There is some effect on the patient.]

    b. kua   mohe a   ia   he   fale
        PRF   sleep ABS   he   in   house
        'He has slept in the house.'

In (14), the marking of agent changes; in (15) and (16), the coding of patient varies; and in (17), the marking of both constituents is affected. What is noteworthy here is that I have not labelled these alternations either as transitivizing or detransitivizing; it is not straightforward which of the two constructions in (14)–(17) should be considered basic and which 'derived', since there are no changes in verb morphology (see also Payne 1997: 172 on the intimate relation between verb morphology and transitivity alternations). Alternations in (14)–(17) are, however, conceived of as transitivity alternations, because the attested changes have a clear semantic basis. Moreover, the number of core arguments changes because of the illustrated alternations (irrespective of whether we label these as transitivizing or detransitivizing alternations), which also makes this analysis valid.

3.3 Changes in verb morphology

The last formal type of transitivity alternation examined here is represented by cases in which only the verb morphology is affected. Two examples follow:

(18) Yidiñ (Dixon 1994: 61)

    a. waguja-ŋgu bana   wawa-l
        man-ERG   water[ABS] see-PRS
        'The man sees the water (on purpose, i.e. was looking for it).'

    b. waguja-ŋgu bana   wawa-:ji-ŋ
        man-ERG   water[ABS] see-*ji* (REFL)-PRS
        'The man sees water (accidentally).'

(19) Godoberi (Kibrik 1996: 128)

    a. mak'i-di łeni čibi
        child-ERG water splash.PST
        'The child splashed the water (perhaps involuntarily).'

    b. mak'i-di łeni čib-ali
        child-ERG water splash-CAUS.PST
        'The child splashed the water (purposefully and repeatedly).'

The examples in (18a) and (19a) illustrate the canonical (non-derived) transitive constructions of Yidiɲ and Godoberi, respectively. In both cases, the verb is morphologically unmarked for transitivity. In (18b) and (19b), the verb bears an additional affix. What makes this relevant to the present discussion is the fact that in both (18b) and (19b) the employed affix usually affects verb valency: the reflexive affix -ji- decreases the valency, while the causative affix -al- usually increases it. In (18) and (19), however, the valency along with the argument marking remains unaffected, even though the transitivity of the denoted events has been affected.

It is important to note that the status of (18) and (19) as genuine transitivity alternations is lower than the status of alternations examined previously. Detransitivizing and transitivizing alternations constitute the archetype of transitivity alternations, because only clauses with two (or more) arguments are usually considered transitive. However, not all clauses with two nominal constituents qualify as transitive clauses, which renders it justified to classify changes in verb morphology as transitivity alternations, too. For example, (18) and (19) can be labelled as transitivity alternations only indirectly. They constitute transitivity alternations only because the affix attached to the verbs has evident (de)transitivizing functions elsewhere. Moreover, the introduction of the affix yields a change in the semantic transitivity of clauses in (18) and (19). Purely formally, however, it is less straightforward to ascertain whether we are dealing with transitivity alternations in (18) and (19).

4. A SEMANTICALLY BASED TYPOLOGY OF TRANSITIVITY ALTERNATIONS

In this section, some of the central semantic features affecting the formal transitivity of clauses are examined. A transitivity alternation is defined here as a formal change in the clause structure, which can be explained by a change in the semantic transitivity of the denoted event. Semantic transitivity comprises the properties considered in the definitions of, for example, Hopper and Thompson and Givón (see above). Due to limitations of space, I will only illustrate some guidelines, and the reader should bear in mind that any given language may differ from the illustration below. Moreover, it should be noted that the semantics and form of the examined alternations do not necessarily correlate, which means that one formal change may signal a variety of semantically distinct alternations or that the change may be coded by radically different means in different languages. More

thorough discussions of the examined features are found, for example, in Kittilä (2002) and Næss (2003 and 2007).

The examined transitivity alternations are divided into intransitivizing and transitivizing alternations. The former type comprises alternations which follow from a decrease in the semantic transitivity of events, while the latter constitutes the opposite of this. These macrotypes are further subdivided according to whether the alternations have consequences for the number of participants in events or whether they only affect individual transitivity features. Transitivity alternations may either follow from the inherent semantic transitivity of different events (and consequently the verbs describing them) or they may be motivated independently of verb semantics. The former refers to differences between canonical transitive events and experiencer events (e.g. 'see' and 'love'), which inherently rank low for transitivity (see Verma and Mohanan 1990 for detailed discussions of experiencers). The second alternation type comprises differences between events such as 'a person broke the vase (purposefully)' and 'a person broke the vase (accidentally)'. The examination below focuses on the latter differences, because this renders it possible to examine one feature at a time.

It should also be noted that it is not always easy to decide whether we are dealing with a transitivizing or an intransitivizing alternation. For example, an event such as 'break' is as likely to be instigated by an agent as to occur spontaneously. It is therefore difficult to argue semantically for the more marked nature of either intransitive or transitive breaking. In this section, I have adopted the approach that the linguistically more marked variant of each intransitive/transitive pair is regarded as an alternation 'derived' from the less marked variant (see Haspelmath 1993b and Nichols et al. 2004 for a more detailed examination of this).

4.1 Intransitivizing alternations

4.1.1 Alternations affecting the number of participants

The most important alternations decreasing the number of participants in events are represented by anticausative, reflexive, and resultative. An example of the resultative is given in (20) (examples of anticausative and reflexive are found in (1) and (4)):

(20) Evenki (Nedjalkov and Nedjalkov 1988: 242)

    a. nuŋan   tadū   kalan-me   loko-d'oro-n
       he[NOM]   there   pot-ACC   hang-PRS-3SG
       'He is hanging a pot there.'

    b. tadū   kalan   lokū-ča-d'ara-n
       there   pot[NOM]   hang-STAT-PRS-3SG
       'A pot is hanging (hangs) there.'

Anticausative and resultative both eliminate the agent from a canonical transitive event. The omission is, however, motivated differently. Anticausativization derives an intransitive (unaccusative) verb from an originally transitive one by omitting the agent from the valency of the verb (as such it represents the opposite of causativization). As a result, the described event is seen as occurring spontaneously. The resultative denotes the result of a transitive event. This means that the agent responsible for the result is no longer part of the denoted event and is consequently omitted from the valency of the 'derived' verb. In contrast to the anticausative, the described change-of-state results form a transitive event. The reflexive differs from the anticausative and resultative in that it only affects the number of participants in events. The semantic roles of agent and patient remain part of the affected events. The primary difference from canonical transitive events is that the agent of a reflexive event targets its action at itself instead of an external patient.

4.1.2 Intransitivizing alternations affecting individual transitivity features

In addition to alternations which decrease the number of participants in events, there are alternations which only affect individual transitivity features. As for intransitivizing alternations, this means that the described event deviates from the transitive prototype owing to a decrease in agency or affectedness of the patient, for example. The former is illustrated in (21) and (22), while affectedness is the triggering factor in (23):

(21)   Manipuri (Bhat and Ningomba 1997: 104)

    a. əy-nə   tebəl-də   theŋŋi
       1SG-ERG   table-LOC touched
       'I touched the table (volitionally).'

    b. əy   tebəl-də   theŋŋi
       1SG[NOM] table-LOC touched
       'I touched the table (involuntarily).'

(22)   Sinhala (Gair 1990: 16)

    a. laməya   wælikandak   hæduwa
       child.NOM   sand-hill.INDF make.PST
       'The child makes a sandpile.'

    b. hulangeŋ   wælikandak   hæduna
       wind.INS   sand-hill.INDF make.P.PST
       'A sandpile formed (because of the wind).'

(23)   Waris (Foley 1986: 109)

    a. ti   he-v
       tree   chop-PRS
       'Chop down a tree.'

    b. ti-m   he-the-v
       tree-DAT   chop-INTR-PRS
       'Chop on a tree.'

The examples from Manipuri and Sinhala illustrate two ways in which the agency associated with the instigator of an event may be reduced. The events described in (21a) and (22a) are instigated by a volitional agent. In (21b), the agent causes an event to occur involuntarily. In (22b), the event in question is instigated by an inherently non-agentive entity (usually labelled 'force'), which is unable to act with intent. In both (21b) and (22b), the denoted event is instigated unintentionally, but the rationale behind the lack of agency varies. The examples from Waris illustrate a case in which differences in the degree of affectedness of the patient produce formal differences in the encoding of events. In (23a), the denoted event will be successfully completed, but in (23b), the effects of the event on the patient are less dramatic, whereby the patient is encoded in the dative (also see Tsunoda 1985: 393).

In (23b), the patient is affected in a less dramatic way, because the event is not successfully completed. An event may lack a salient result for other reasons as well. Two slightly different instances of this are examined in (24) and (25):

(24)   Hindi (Mohanan 1994: 70)

    a. raam-ne   ravii-ko   piitaa
       Ram-ERG   Ravi-ACC beat.PFV
       'Ram beat Ravi.'

    b. raam   ravii-ko   piittaa   hai
       Ram[NOM] Ravi-ACC beat.IPFV be.PRS
       'Ram beats Ravi.'

(25)   Russian (Comrie 1985b: 319)

    a. sobaka   kusajet   počtal'ona
       dog[NOM] bite   postman
       'The dog bites the postman.'

    b. sobaka   kusajet-sja
       dog[NOM] bite-REFL
       'The dog bites.'

Examples (24a) and (25a) encode typical transitive events with a salient result. By contrast, the events described in (24b) and (25b) lack an affected patient. Example (24b) describes an ongoing event, which is not yet successfully completed. The patient is thus not completely affected. This is formally manifested in the lack of ergative marking on the agent. Example (25b), in turn, describes an event that the agent habitually partakes in. The event is potentially a canonical

transitive event when it occurs, but in (25b), the event is described as a potential event instead of a concrete one. The patient is thus not referential and not saliently affected.

In (21)–(25), the differences in the formal transitivity of clauses have a clear semantic (or ontological) basis. This means that the described events are distinguishable non-linguistically also. We are, for example, capable of distinguishing successfully completed events from attempted or less successfully completed events. However, similar formal changes may also follow from differences which are best considered pragmatic. Paradigm cases are illustrated by passive and antipassive, in which the non-referential nature of agent or patient (respectively) results in detransitivization. As noted above, passivization and antipassivization may retain the number of participants in events that they describe, but they drastically demote the status of one of the arguments. Another example of a similar difference is illustrated by what has been labelled as Differential Object Marking (or DOM; see (16) from Persian for an example). DOM refers basically to cases in which animate/definite objects are marked differently from inanimate/indefinite ones. This means that, like typical antipassives, objects that are conceived of as less relevant to the overall semantics of the described event are coded less elaborately.

4.2 Semantically transitivizing alternations

Transitivizing alternations to be examined below can also be divided into two types, depending on whether the alternations increase the number of participants in events or affect only individual transitivity features. Transitivizing alternations constitute—as expected—the exact opposite of intransitivizing alternations, in that they increase the transitivity of events.

4.2.1 Participant-increasing alternations

Causativization unarguably constitutes the most frequent participant-increasing alternation cross-linguistically. As shown in (6) and (7), causativization adds an agent or an external causer to verb valency. The prototype of causativization is represented by causativization of intransitive (unaccusative) verbs (such as 'break' or 'melt'). The underlying intransitive event involves a patient, which means that the introduction of an agent produces a canonical transitive event denoted by the basic transitive construction of any language. If a language permits the morphological causativization of any verb, it allows (unaccusative) intransitive verbs to be morphologically causativized (see also Song 1996).

Applicativization constitutes the other cross-linguistically frequent transitivizing mechanism (see (8) and (9) for examples). An array of arguments bearing different semantic roles can be introduced into the clause core via applicativization. These

include benefactive, instrument, location, and comitative (for a more detailed discussion of applicatives, see Peterson 2007). The central semantic difference between applicatives and causatives thus lies in the semantic role borne by the added argument. Another noteworthy difference is that causativization introduces core participants (especially with intransitive verbs), while applicativization enables peripheral participants (such as locatives or instrumentals) to surface as core arguments. The functions of applicativization have to do with the discourse prominence of arguments, and applicativization can thus be thought of as the mirror-image of passive and antipassive. Languages usually have other ways of referring to the participants promoted to the clause core via applicativization, while canonical causativization is not possible without changes in the verb morphology. Moreover, applicativization is far from being a universal category, while all languages have some way of causativizing verbs.

The frequent occurrence of causativization of verbs denoting events such as 'break' and 'melt' is understandable, given the fact that these events may occur spontaneously or may have an external cause. Causativization renders the cause or causer explicit. The other possible way of creating typical transitive events from intransitive events— adding a patient to an intransitive event involving an agent (or a cause)—is less common but not unheard of. Examples are provided in (26) and (27):

(26)   Bella Coola (Davis and Saunders 1997: 64)[1]

    a. puλ'-Ø   ti-ʔimlk-tx   (ʔuɬ-ɬmiɬ)
       come-he   ʔ-man-ʔ   (PREP-us)
       'The man came (towards us).'

    b. puλ'-m-tuɬs   ti-ʔimlk-tx
       come-*m*-he/us ʔ-man-ʔ
       'The man attacked us.'

(27)   Diyari (Austin 1981: 158)

    a. talara   kuda-yi   (ŋaliŋu)
       rain[ABS]   fall-PRS   (1DU.EXCL.LOC)
       'It is raining (on us).'

    b. talara-li   ŋalina   kuda-lka-yi
       rain-ERG   1DU.EXCL.O fall-TR-PRS
       'The rain is pouring on us.'

The examples in (26a) and (27a) denote typical intransitive events without a patient. In (26b) and (27b), the described event can be conceived of as extending to a patient. The denoted event has a salient cause/agent, and it directly affects a patient. The result is thus a canonical transitive event. The alternation type examined above is rather rare

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[1] The prefix *ti-* and suffix-*tx* are not glossed in the original source.

cross-linguistically, and I am not aware of any language in which it would be an independent transitivizing process. The reason may lie in the fact that (unergative) intransitive events are conceived of as only involving an agent, which makes the introduction of a patient rather unnatural.

4.2.2 Transitivizing alternations affecting individual transitivity properties

There are also transitivizing alternations which only affect individual transitivity features. As with detransitivizing alternations, affectedness and agency constitute the central properties here. Consider:

(28)   Motuna (Onishi 2000: 132)

    a. nii   ong-jo   pehkoro   iirong-ohna-na
       1SG   DEM.M-PURP   boy   get.angry-1S.PRS.PROG-F
       'I am angry for the sake of this boy.'

    b. nii   ong   pehkoro   iirong-ee-uhna-na
       1SG   DEM.M   boy   get.angry-APPL-3O.1A.PRS.PROG-F
       'I am angry with this boy.'

(29)   Komi-Zyrjan (Kalinina, Kolomatsky, and Sudobina 2006: 455)

    a. t'aj-ə   n'an'-sə   kol-ys   Tan'a
       this-ACC   bread-ACC leave-PST   Tanja
       'Tanja left this bread here by chance.'

    b. t'aj-ə   n'an'-sə   kol-əd-ys   Tan'a
       this-ACC   bread-ACC leave-CAUS-PST Tanja
       'Tanja deliberately left this bread here (in a shop).'

(30)   Jarawara (Dixon and Aikhenvald 1997: 82)

    a. babeo   hoti-ke   (Yobeto   ehene)
       paper[F]   have.holes-DECL.F   (name[M]   due.to.M)
       The paper has holes (due to Yobeto).'

    b. Yobeto   babeo   na-hoti-ka
       name[M]   paper[F]   CAUS-have.holes-DECL.M
       'Yobeto made holes in the paper.'

In (28b), the change in the clause structure is triggered by affectedness. The use of the applicative implies that the new O is potentially affected by the anger, for example, by being scolded (Onishi 2000: 132). This is not entailed in (28a). In (29) and (30), the illustrated formal changes follow from agency. In Komi-Zyrjan, certain events receive a different formal treatment depending on whether the denoted event is instigated volitionally or not (see Kittilä 2005 for a cross-linguistic examination of similar constructions). Volitional causation is signalled by causativizing the verb, as in (29b). In (30), the formal variation highlights differences

between direct and indirect causation. In (30a), the agent is conceived of as being indirectly responsible for the result of the event, whereas in (30b), the agent is directly responsible for the described change of state. The construction used for direct causation is formally transitive.

4.3 Pure formally motivated alternations

Transitivity alternations triggered by canonical transitivity features such as agency and affectedness unarguably constitute the prototype of transitivity alternations in having consequences for both semantic and formal transitivity of clauses. In addition, there are also cases in which only semantic or formal transitivity of clauses is affected (but not both). The former is probably attested to some extent in all languages, in that all languages allow some less than ideal transitive events to be coded by transitive constructions. Typical examples include verbs of seeing in many languages (e.g. Næss 2003: ch. 10, Verma and Mohanan 1990). Changes that only affect the formal transitivity of clauses are less widely distributed but not nonexistent. Consider:

(31)   Kalkatungu (Blake 1982: 86, 148)

    a. tuka-yu   tuar   it^yayi
       dog-ERG   snake[ABS]   bite
       'The dog bit the snake.'

    b. tuku   (tuar-ku)   it^yayi
       dog[ABS]   (snake-DAT)   bite
       'The dog is biting (the snake).'

    c. nanya   nga-thu   kalpin   thuku-ku   lha-yi-nyin
       saw   1SG-ERG   man[ABS]   dog-DAT   hit-ANTIP-PART
       'I saw the man hitting the dog.'

(32)   Kinyarwanda (Kimenyi 1980: 81)

    a. umugabo   a-ra-andik-a   íbárúwa   n'ííkárámu
       man   he-PRS-write-ASP   letter   with.pen
       'The man is writing a letter with the pen.'

    b. *íkárámu   i-ra-andik-w-a   íbárúwa   n'úmugabo
       pen   it-PRS-write-PASS-ASP   letter   by.man
       'The pen is used to write a letter by the man.'

    c. íkárámu   i-ra-andik-iish-w-a   íbárúwa   n'úmugabo
       pen   it-PRS-write-INS-PASS-ASP   letter   by.man
       'The pen is used to write a letter by the man.'

In (31) and (32), the formal transitivity of clauses is affected without any obvious semantic motivation. In Kalkatungu, argument marking usually follows an absolutive–ergative pattern, as in (31a). Example (31b) illustrates a semantically motivated change in the clause structure. In (31c), the same change in argument marking has no semantic basis. The change is formally conditioned, in that the argument marking of subordinate clauses should be nominative–dative instead of absolutive–ergative. In addition, the verb in (31c) bears antipassive morphology. In Kinyarwanda, applicativization is needed for promoting instruments to the subject of passive. Instrumentals need to be promoted to direct object status before being promoted further to the subject of passive. The applicativization does not have any independent function in (32c); it is merely needed for rendering passivization possible. The affectedness of the patient or the agency associated with the instigator of the event remains unchanged despite the passivization of the verb.

5. SUMMARY

Some central aspects of linguistic transitivity have been examined in this chapter. Different approaches to transitivity were discussed in order to show that transitivity has been defined in a number of ways, depending on the aspect focused on. Features such as agency and affectedness are central to the notion of the basic transitive event, which involves a volitional and controlling agent (the salient cause) and an affected patient (the salient result). Languages tend to encode the basic transitive event in a similar way formally, usually employing either a nominative–accusative or an absolutive–ergative construction, which can consequently be labelled as the basic transitive construction of any language. Languages differ considerably according to how the formal deviations from the transitive prototype are motivated and signalled. The canonical transitivity alternations are represented by cases in which both the semantic and formal transitivity of clauses are affected. In addition, there are changes which do not have a clear semantic basis.

Many studies of linguistic transitivity to date have dealt with voice phenomena (also see Kulikov, this volume). Numerous studies have been devoted to phenomena such as passive and causative (e.g. Shibatani 1976a, 1985, 2002, Comrie and Polinsky 1993). Moreover, there are many studies dealing with argument marking patterns in and across languages (e.g. Dixon 1994). What I am looking forward to most are detailed studies of individual transitivity properties in individual languages. What is also characteristic of most studies dealing with transitivity is their focus on clauses denoting two-participant events. Only recently has there been wider interest in clauses denoting three-participant events. These constructions

may, however, provide us with new insights into transitivity phenomena, and they are thus worth looking into in more detail.

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CHAPTER 18

VOICE TYPOLOGY

LEONID KULIKOV

1. TERMINOLOGY AND BASIC DEFINITIONS

1.1 Historical notes

The category of voice goes back to the ancient Greek grammatical tradition, where it appears under the name διάθεσις (diáthesis) 'disposition'. The formal opposition between two diatheses, ἐνέργεια (enérgeia) 'performance' and πάθος (páthos) 'experience' (later rendered in the Latin grammatical tradition as 'activum' and 'passivum'), amounts to the morphological opposition between two series of verbal inflectional morphemes, known in modern terminology as active and middle (for details, see Andersen 1994a: 125 ff., 1994b); cf., for instance, active: 1SG.PRS. *tí-thê-mi*, 2SG.PRS. *tí-thê-s*, 3SG.PRS. *tí-thê-si*, etc. 'to put' vs. middle: 1SG.PRS. *tí-the-mai*, 2SG.PRS. *tí-the-sai*, 3SG.PRS. *tí-the-tai*, etc. 'to put (for oneself)'. Latin grammarians have adopted the concept of diathesis (with some important modifications) for the opposition between active and passive verbal forms, describing this morphological category in terms of *genera verbi* ('verbal classes') (see Andersen 1994a: 169 ff.). One of the terms used to refer to the active/passive forms, *vox* (*activa/passiva*) '(active/passive) expression', eventually underlies 'voice' and 'voix' in the modern English and French grammatical traditions, where they refer, above

all, to the opposition between the active and passive forms and constructions, as in *Jack builds the house* vs. *The house is built (by Jack)*.

1.2 Diathesis and valency patterns

There are many approaches to the definition and typological description of the category of voice; it is of course impossible to discuss all of them here, however. In what follows, the definitions of 'voice' and related concepts will be given within a slightly simplified version of the framework developed by the Leningrad–St Petersburg Typology Group.[1]

This approach offers a powerful calculus of possible relations between two main levels of representation of the linguistic structure. These include (i) the level of semantic arguments, or semantic roles (Agent, Patient, Experiencer, etc.) and (ii) the level of grammatical relations, or syntactic functions (Subject [S], Direct Object [DO], Indirect Object [IO], Oblique Object [Obl]) (see Bickel, this volume). The first level is determined by the semantic class of the verb. For instance, the role of Experiencer is typically generated by verbs denoting feelings and emotions, such as *see, hear, like*, whilst the role of (a canonical) Patient is normally induced by verbs of destruction, such as *kill, split, break*. In fact, a language rarely needs to distinguish between all minor roles. Most often, only two or three basic oppositions within the complete inventory turn out to be syntactically relevant. This yields a much smaller inventory of main types of participants in a situation, or 'macroroles' (cf. the macroroles of Actor and Undergoer in the framework of Role and Reference Grammar; see Foley and Van Valin 1984 and Bickel, this volume). I will denote such macroroles by means of capital letters X, Y, Z, W.

The level of grammatical relations is responsible for the realization of arguments in the clause. The three main formal means of encoding grammatical relations are case marking, verbal agreement, and word order. Together, these three parameters determine the syntactic structure of the clause. In simple cases, the syntactic functions can be straightforwardly determined in terms of one of these parameters. Thus, the grammatical relations of S, DO, and IO often correspond to the nominative, accusative, and dative, respectively (in nominative–accusative case-marking languages); the clause-initial noun bears the grammatical relation of Subject in many languages; etc.

The most important theoretical concept that is determined in terms of these two levels of representation and enables one to capture the rich variety of voices is that

of diathesis. Diathesis is determined as a pattern of mapping of semantic arguments onto syntactic functions (grammatical relations).[2] The notion of diathesis is closely related to that of verbal valency/valence, which is inherently associated with the set of arguments governed by the verb in question.

An example of a diathesis can be schematically presented as, for instance, 'X : S; Y : DO'; i.e. the first semantic (macro)role X (Actor) is mapped onto the grammatical relation of Subject, while the second semantic (macro)role Y (Undergoer) is mapped onto the grammatical relation of Direct Object.

The pattern where the Actor is mapped onto the Subject and the Undergoer onto the Direct Object is the most common, unmarked way of representing an event and therefore can be regarded as the basic, or neutral, diathesis[3] of a simple transitive verb.[4] This can be illustrated by the Latin and Sanskrit sentences in (1) and (2):

(1)   Latin
      Miles   hostem   occidit
      warrior.NOM   enemy.ACC   kill.PRS.3SG
      'The warrior kills the enemy.'

(2)   Sanskrit
      rājā   r̥kṣam   han-ti
      king.NOM   bear.ACC   kill.PRS.3SG.ACT
      'The king kills the bear.'

Diatheses can be conveniently presented in a tabular form (which I will use hereafter in the present chapter). Thus, the diathesis exemplified by (1) and (2) can be schematized in table (3):

(3)   Basic transitive diathesis

Semantic argument level (role)	X (Actor)	Y (Undergoer)
Syntactic function level (case)	S (NOM)	DO (ACC)
	(*miles, rājā*)	(*hostem, r̥kṣam*)

[2] Using the term 'diathesis' to refer to mapping patterns is a terminological innovation of the Leningrad–St Petersburg Typology Group which is not widely accepted in the typological literature (but cf. e.g. Shibatani 2004: 1146 ff.). It should not be confused with the traditional usage of this term in Greek and, in general, Indo-European scholarship to denote the inflectional verbal category (active/middle type of inflection) and the related functions or meanings (such as active, middle, passive). Other possible terms are 'syntactic pattern', 'valency/valence pattern', and 'construction type'. Compare also the notions of 'valence pattern' and 'argument structure', briefly discussed e.g. by Haspelmath and Müller-Bardey (2004).

[3] For the notion of a basic diathesis (construction type), see Shibatani (2006: 257 ff.) in particular.

[4] Determining the basic diathesis may pose serious difficulties in some languages. This is the case e.g. with voice in Philippine languages; see Shibatani (1988, 2004: 1153–5, 2006: 258 ff.) for details.

Changes in syntactic patterns can readily be described in terms of a modification of diatheses. For instance, the modification of the basic (neutral) transitive diathesis which results in the passive equivalent of a transitive clause typically suggests the following two (partly independent) syntactic phenomena: (i) the promotion of the initial Direct Object to the Subject (= the Subject of the passive construction); and (ii) the demotion of the initial Subject (usually, an Agent). The demotion of the Subject may amount either to its downgrading to an Oblique Object (passive Agent) or to its removal from the structure. This change in diathesis is exemplified by the passive equivalents of (1) and (2) in (4) and (5) and presented in tabular form in (6):

(4)   Latin
      A   milite   hostis   occidi-tur
      by warrior.ABL   enemy.NOM   kill.PRS-3SG.PASS
      'The enemy is (being) killed by the warrior.'

(5)   Sanskrit
      r̥kṣo   rājñā   han-ya-te
      bear.NOM   king.INS   kill-PRS.PASS-3SG.MED
      'The bear is (being) killed by the king.'

(6)   Passive diathesis

X	Y	⇒	X	Y
S	DO		Obl / –	S

In languages where the correspondence between grammatical relations and case-marking is relatively straightforward (see Primus, this volume, and Bickel, this volume), diathesis modification can also be formulated in terms of changes in case-marking. Thus, scheme (7) describes passivization in Sanskrit:

(7)   Passivization in Sanskrit

X	Y	⇒	X	Y
S (NOM)	DO (ACC)		Obl (INS)	S (NOM)

1.3 Diathesis and voice

The category of 'voice' is determined on the basis of the concept of diathesis as follows: voice is a regular encoding of diathesis through verbal morphology.

Thus, many languages of the world encode the above-mentioned passive diathesis by means of a special verbal morpheme, which, accordingly, is interpreted as the marker of the passive voice. In Latin, the passive voice is expressed by means of a special series of endings (passive, or deponent, inflection; cf. 3sg.pass. *-tur* ~ 3sg. act. *-t*); in Sanskrit, by means of the present passive suffix *-ya-* and the middle inflection; in English, by means of the auxiliary verb *be* and past participle.

It is important to note that, in accordance with the definition given in 1.2, a modification in diathesis only suggests changes in the pattern of mapping of semantic arguments onto syntactic functions (i.e. in the valency pattern) but not in the semantics of the sentence. This is only possible in cases where the inventory of semantic roles remains unchanged: i.e. no role is removed from the base structure or added to it. Yet there are some system-related reasons to group together such syntactic alternations (which can be called 'diathesis changes *sensu stricto*'; cf. passive, antipassive, dative shift, and some other diatheses discussed in 2.1) and those which do allow some operations on the set of semantic roles ('diathesis changes *sensu latiore*'; cf. causative and anticausative, benefactive, and other diatheses discussed in sections 2.2 and 2.3). This terminological dilemma will be briefly discussed in section 3.

There is no need to argue that defining diathesis/voice, in general, and passive, in particular, primarily in syntactic terms simplifies the matter in some respects. Along with syntactic parameters, both semantics and morphology play an important role in the definition and adequate description of the passive and other voices. On the one hand, the fact that in many languages the morphemes labelled 'passive' include within the range of their functions non-canonical passive or even non-passive diatheses, such as the reflexive or the anticausative, apparently justifies a more morphologically oriented (form-oriented) definition of voice. In the present chapter, this problem is dealt with in terms of voice/diathesis clusters (as discussed in 3.1). On the other hand, a number of semantic features associated with the passive and other voices (see section 4) clearly show that the semantic aspects of this category should not be disregarded, either. In fact, the linguistic literature exhibits a rich variety of opinions and definitions, depending on whether priority is given to syntax, morphology (form), or semantics (for a survey, see e.g. Kazenin 2001a: 904–10).

An interesting attempt to avoid the shortcomings present in existing approaches has been made in Andersen's (1991, 1994a) semiotic approach. According to Andersen (1991: 27), 'the passive is not the *signatum* of the respective *sign*, but rather [. . .] just one of many *interpretantia* of the *sign*'.[5] The choice of the syntactically oriented approach in the present chapter is largely stipulated by the elaborated character of the diathesis calculus (as developed within the framework

[5] As Andersen (1994a: 295) explains, 'Linguistic *signs* are [. . .] employed in contexts in which they exhibit particular inferred interpretations, i.e. the functional properties or *interpretantia* of the *sign*.'

of the Leningrad–St Petersburg Typology Group), which enables a clear, compact, and comprehensive overview of the phenomena typically grouped under the general label 'voice' and/or 'diathesis'.[6]

1.4 Modification of diathesis without morphological marking: labile verbs

Many diathesis modifications (valency changes) remain unmarked in the verbal form; compare object deletion (8), dative shift (9), and Agent deletion, or anticausative derivation, shown in (10):

(8)   Russian

    a.   Ivan   čitaet   knigu
        'Ivan   is reading   a book.'

    b.   Ivan   čitaet
        'Ivan   is reading.'

(9)   a.   Mary gave John an apple.
    b.   Mary gave an apple to John.

(10)   a.   John opened the door.
     b.   The door opened.

Verbs (verbal forms) that can change their syntactic pattern, or diathesis (e.g. can be used both intransitively and transitively, as in (10)), without any change in their morphology are called 'labile'.[7]

2. CALCULUS OF DIATHESES AND VOICES

The inventory of logically possible diatheses (or possible diathesis/valency changes) can readily be generated by a diathesis calculus. The task of a typologist is to check this inventory against the evidence available from the languages of the world, to

[6] For correspondences and relationships between different frameworks and approaches, see e.g. Haspelmath and Müller-Bardey (2004: 1130 ff.) and Shibatani (2004: 1146 ff.).

[7] The term is borrowed from Caucasian linguistics. Other terms occurring in the literature include 'voice-neutral' (Tchekhoff 1980), 'optionally transitive' (Miller 1993: 179 ff.), and 'ambitransitive' (Dixon 1994). In the English tradition of the last few decades, the intransitive member of pairs like *The door opened: John opened the door* is often termed 'ergative' (cf. Keyser and Roeper 1984); see Dixon (1994: 18–21) for a criticism of this terminological use and Kulikov (1999a, 2003) for a general survey.

study the actually attested diathesis alternations, and to draw theoretical conclusions on the structure and content of the category of voice.

2.1 Diatheses changes which do not affect the inventory of semantic roles: derived diatheses/voices *sensu stricto*

The first major class of diatheses includes those which do not affect the initial inventory of semantic roles. In other words, the derived diathesis preserves all semantic roles which are present in the basic, or neutral, diathesis (corresponding to the base or non-derived structure); even where some of them remain unexpressed, their presence is implied by the meaning of the sentence. To this category belong all diatheses and voices in the strict sense of the word.

2.1.1 *Subject-demoting diatheses: passive*

The most important class of diatheses includes those which suggest the syntactic demotion of the main participant of the situation (realized as the Subject in the initial structure) and its degrading down to an Oblique Object (Obl) or complete removal from the clause. This class consists of passives of various types.[8]

(a) Canonical passive: S-backgrounding and DO-foregrounding

This type of derived diathesis (which also represents a textbook example of diathesis/voice in general) was briefly discussed above (cf. (4)–(7)).

(b) Agentless passive

Probably, all languages that have a canonical passive can also freely omit the passive Agent (*a milite* and *rājñā* in the Latin and Sanskrit examples (4) and (5)), which results in the agentless passive, as shown in scheme (11):

(11)   Agentless passive

X	Y		X	Y
S	DO	⇒	–	S

Next to the languages with canonical ('full') passive—such as English, Latin, or Sanskrit—there are languages that cannot express the Agent in passive sentences. This is the case with Amharic, Latvian, Turkic, and many other languages (see Siewierska 1984: 35). Thus, in Latvian, the genitive of the passive Agent can be used

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[8] There is a rich literature on passives; see e.g. Siewierska (1984), Shibatani (1988), Xrakovskij (1981, 1991), and Andersen (1991).

in noun phrases with passive participles but is virtually impossible with finite passives, as in (12b):

(12)   Latvian

a. darbinieki   cel̦   māju
   workers.NOM   build.PRS.3PL   house.ACC
   'The workers build the house.'

b. māja   tiek   cel-t-a   (*darbinieku)
   house.NOM   be.PRS.3SG   build-PASS.PART-SG.F   (workers.GEN)
   'The house is being built (*by the workers).'

Likewise, in Limbu (Tibeto-Burman), there can be no overtly expressed agent in passive constructions with verbs derived by means of the passivizer (bound verb) -*tɛtmaʔ*, as in (13a, b):

(13)   Limbu (van Driem 1987: 215 ff.)

a. ni-dɛʔl
   see-PASS
   'It is visible. It will be seen.'

b. cirik   pha·k-tɛʔl
   cloth   fold-PASS
   'The cloth is capable of being folded.'

A special subtype of the agentless passive diathesis is the potential passive, which suggests the non-referential status of the Agent ('someone, whoever') and often adds the meaning of habituality; potential passives are typically constructed with manner adverbials such as *well, easily, often*:

(14)   Potential (agentless) passive

X	Y		(X)	Y
S	DO	⇒	–	S

(15)   French

a. Ils   entendent   la   musique
   they   hear.PRS.3PL   the   music
   'They hear the music.'

b. La   musique   s'   entend   bien
   the   music   REFL   hear.PRS.3SG   well
   'The music is well heard.'

(16) Russian

    a. Oni   otkryvajut   dver'
       they.NOM open.PRS.3PL door.ACC
       'They open the door.'

    b. Dver'   otkryvaet-sja   legko
       door.NOM open.PRS.3SG-REFL easily
       'The door opens easily.'

In English, this diathesis change receives no marking in the verbal morphology (recall the labile pattern), yielding a construction called 'middle' by some scholars:

(17) English
    a. John reads the new novel by Stephen King.
    b. The new novel by Stephen King reads well.

(c) Impersonal passive (backgrounding passive without DO-foregrounding)
In some languages, the demotion of the initial Subject is not accompanied by the promotion of the Direct Object (see esp. Comrie 1977, Siewierska 1984: 93 ff.):

(18) Backgrounding passive

X	Y		X	Y
S	DO	⇒	Obl / –	DO

This results in constructions with a Direct Object, where the Subject position remains vacant. This diathesis (traditionally referred to as the 'impersonal passive') can (i) receive the same morphological marking on the verb as the standard (canonical) passive, as in Icelandic (19); (ii) be expressed by a special form, as is the case with the impersonal passive in Polish[9] (20) and in Finnish[10] (21) (which lacks a canonical passive); or (iii) have no special marking in the verbal morphology (so that no voice phenomenon arises), as in Russian (22):

(19) Icelandic
    a. Jòn   gaf   mér   bókin-a
       John.NOM give.PST.3SG I.DAT book-ACC
       'John gave me the book.'

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[9] For a detailed analysis of Polish impersonal passives with the *to/no* participle, see Siewierska (1988: 269 ff.) and Wiemer (forthcoming).

[10] This form is called by some scholars 'indefinite', 'suppressive', or 'subjectless impersonal'; for discussion, see Andersen (1994a: 260–71) and Manninen and Nelson (2004).

    b. Mér   var   gefin   bókin   af Jòn
       I.DAT was give.PART.SG.N book.NOM by John
       'I was given a book by John.'

(20) Polish

    a. Robotnicy   budują   szkołę
       workers.NOM build.PRS.3PL school.ACC
       'The workers build a school.'

    b. Zbudowan-o   szkołę   (robotnikami)
       build:PASS.PART-SG.N school.ACC (workers.INS)
       'A school is built (by the workers).'

(21) Finnish (Manninen and Nelson 2004: 212 ff.)

    a. Diane   tappaa etana-n
       Diane.NOM kill.3SG slug-ACC
       'Diane will kill the slug.'

    b. Etana   tape-taan
       slug.NOM kill-PASS
       'The slug will be killed./They will kill the slug.'

(22) Russian

    a. Burja   povali-l-a   derevo
       storm.NOM knock.over-PST-SG.F tree.ACC
       'The storm knocked over the tree.'

    b. Burej   povali-l-o   derevo
       storm.INS knock.over-PST-SG.N tree.ACC
       'The tree was knocked over by the storm.'

Since such S-backgrounding passives do not suggest DO-foregrounding, they are also possible for intransitive (mono- or bi-valent) verbs (cf. (23)), as in Turkish (24):

(23) Backgrounding passive of non-transitive bivalent verbs

X	Y		X	Y
S	IO / Obl	⇒	–	IO / Obl

(24) Turkish

    a. Hasan otobüs-e bin-di
       Hasan bus-DAT board-PST
       'Hasan boarded the bus.'

    b. Otobüs-e bin-il-di
       bus-DAT board-PASS-PST
       'The bus was boarded.'

Some languages do not tolerate constructions without an overt subject noun. This position is obligatorily occupied by a 'dummy' or empty Subject (symbolized as ∇ in the table below and glossed as *it* in examples (26), (28)–(30); cf. German *es*, French *il*, Dutch *er*):

(25) Impersonal passive with dummy Subject

X	Y		–	X	Y
S	DO	⇒	S =∇	Obl/–	DO

(26) French
Il se   construit   beaucoup de ponts
it REFL build.PRS.3SG a.lot.of   bridges
'They build a lot of bridges.'

A textbook example of a backgrounding passive with a dummy Subject is the Dutch impersonal *er*-passive, schematized in (27), which can degrade the initial Subject down to an Oblique Object (passive Agent), as in (28), or leave it unexpressed, as in (29):

(27) Impersonal passive of intransitive verbs

X		–	X
S	⇒	S =∇	Obl / –

(28) Dutch
a. De   jongens fluiten
   the boys   whistle.PRS.3PL
   'The boys whistle.'

b. Er   wordt   door de   jongens gefloten
   it   PASS.AUX.PRS.3SG   by   the boys   whistle:PASS.PART
   'There is boys' whistling.'

(29) Dutch
a. Jan   danst
   John   dance.PRS.3SG
   'John dances.'

b. Er   wordt   gedanst
   it   PASS.AUX.PRS.3SG   dance.PASS.PART
   'There is dancing./They dance.'

Similar constructions are found in some other Germanic languages, for example, in Swedish:

(30) Swedish
a. Någon   skjut-er   ute
   somebody   shoot-PRS   outside
   'Somebody shoots outside.'

b. Det   skjut-s   ute
   it   shoot-PRS.PASS   outside
   'There is shooting outside.'

(d) Absolute passive

Both the Subject and the Direct Object can be degraded (in particular, left unexpressed), which results in a structure displaying features of both the (canonical) passive (Subject demotion) and the antipassive (Direct Object demotion; see 2.1.2 below):

(31) Absolute passive

X	Y		X	Y
S	DO	⇒	–	–

(32) Welsh
Nid   addolir   yn y   capel
not   worship.PASS.3SG   in this chapel
'There is no service in this chapel.'

(e) Conversive

Next to the diathesis changes discussed in the previous sections and taken by all grammars as standard passives, there are some less common and/or productive syntactic derivations which share some features with the standard passive. Thus, if the semantic distance between the two main arguments, X and Y, is smaller than in the case of the canonical Actor and Undergoer, the initial Subject may degrade less crucially than in canonical passives, thereby becoming an Indirect or Oblique Object of relatively high rank. This results in a 'converse diathesis' (conversive).[11] This is often the case with verbs of perception and emotional

[11] The members of such oppositions are called 'converse terms' or 'converses'. For a lexicographic description of this phenomenon, see e.g. Apresjan (1974: 256–83 [1992: 315–57]) and Cruse (1986: 231 ff.).

states (mental events), constructed with two main arguments, Stimulus and Experiencer.[12]

(33)   Conversive

X	Y		X	Y
S	DO	⇒	IO / Obl	S

(34)   Russian

    a. Grom   ispuga-l-ø   sobaku
       thunder.NOM   frighten-PST-SG.M   dog.ACC
       'The thunder frightened the dog.'

    b. Sobaka   ispuga-l-a-s'   groma
       dog.NOM   frighten-PST-SG.F-REFL   thunder.GEN
       'The dog was frightened by the thunder.'

In some cases, it is even possible that the Stimulus and Experiencer roles switch their syntactic positions, which results in a symmetric conversive; cf. the syntactic relation between English constructions with the verbs *like* and *please* (which can be taken as members of a suppletive pair):

(35)   Symmetric conversive

X	Y		X	Y
S	DO	⇒	DO	S

(36)   English
    a. John likes Mary.
    b. Mary pleases John.

2.1.2 *Object-demoting diatheses: antipassive and de-objective*

The demotion of the initial Direct Object produces an effect opposite to that observed in the canonical passive, hence the term 'antipassive' (cf. (37)). The Direct Object can (i) be degraded down to an Oblique Object, as in (38b) and (39b); or (ii) be entirely removed from the syntactic structure, as in (39c). The latter subtype is also called the 'absolute transitive', 'object suppressive', or 'de-objective':

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[12] For a discussion of verbs denoting mental events, see esp. Croft (1993) and Kemmer (1993: 128 ff.).

(37)   Antipassive

X	Y		X	Y
S	DO	⇒	S	Obl / –

Antipassives of type (i) are particularly common in ergative languages; cf. the examples from Chukchee (Paleo-Siberian) and Dargwa (Caucasus, Nakh-Daghestan):

(38)   Chukchee

    a. 'aaček-a   kimit'-ən   ne-nl'etet-ø-ən
       youth-ERG   load-ABS   3PL.SBJ-carry.away-AOR-3SG.OBJ
       '(The) young men carried away the load.'

    b. aaček-ət   ine-nl'etet-ø-g'et   kimit'-e
       youth-ABS   ANTIP-carry.away-AOR-3PL   load-INS
       '(The) young men carried away a load.'

(39)   Dargwa

    a. Neš-li   gazet-ø   b-uč'-u-li   sari
       mother-ERG   newspaper-ABS   NHUM-read.IPFV-PRS-CVB   be.F
       'The mother is reading a/the newspaper.'

    b. Neš-ø   gazet-li   r-uč'-uli   sari
       mother-ABS   newspaper-ERG   F-read.IPFV-PRS-CVB   be.F
       'The mother is reading a/some newspaper.'

    c. Neš-ø   r-uč'-uli   sari
       mother-ABS   F-read.IPFV-PRS-CVB   be.F
       'The mother is reading.'

In English, absolute transitives do not receive any special verbal marking, thus following labile patterning:

(40)   English
    a. John ate the cake.
    b. John ate.

Finally, we also find instances of the identical marking of the passive and the antipassive (both decreasing the verbal valency); cf. the Russian antipassives in (41) and (42), which receive the same marking (the reflexive suffix -*sja*) as passives (cf. (16)):

(41)   Russian

    a. Petja   brosaet   kamni
       Peter.NOM   throw.PRS.3SG   stones.ACC
       'Peter throws (the) stones.'

b. Petja   brosaet-sja   kamnjami
    Peter.NOM   throw.PRS.3SG-REFL   stones.INS
    'Peter throws stones.' (Lit. 'Peter throws with stones.')

(42) Russian

a. Sobaka   kusaet   devočku
    dog.NOM   bite.PRS.3SG   girl.ACC
    'The dog bites the girl.'

b. Sobaka   kusaet-sja
    dog.NOM   bite.PRS.3SG-REFL
    'The dog bites' (in a habitual context).

A special variety of object deletion is instantiated by noun incorporation.[13] The initial object is incorporated into the verbal form (usually in the form of a stem rather than as an inflected form), thus remaining overtly expressed in the sentence but losing the status of a syntactic argument (object). This phenomenon is well known, in particular, from many Amerindian and Paleo-Siberian (Chukchee, cf. (43)) languages. The incorporating strategy usually indicates the low referential status of the incorporated argument (generic, non-individuated, indefinite, etc.; see esp. V. Nedjalkov 1977, Mithun 1984).

(43) Chukchee

a. ətləγ-e   təkeč'-ən   utkuč'-ək   pela-ø-nen
    father-ERG   bait-ABS   trap-LOC   leave-AOR-3SG.SBJ/3SG.OBJ
    'The father left the bait at the trap.'

b. ətləγ-en   utkuč'-ək   təkeč'ə-pela-ø-g'e
    father-ABS   trap-LOC   bait-leave-AOR-3SG
    'The father left bait at the trap.'

2.1.3 Some derived diatheses and voices of trivalent verbs

(a) Dative shift and dative passive

The diathesis modification promoting the initial Indirect Object to the DO position is known in English grammar as dative shift, schematized in (44) and exemplified in (45b) (for a detailed study of this phenomenon, see Siewierska 1998d). The resulting construction can further be passivized, as in (45c), with the promotion of the new ('dative') Direct Object:

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[13] For syntactic aspects of noun incorporation, see esp. Baker (1988: 81 ff. and *passim*).

(44) Dative shift (and dative passive)

X	Y	Z
S	DO	IO

$\Rightarrow$

X	Y	Z
S	DO$_2$	DO

$\Downarrow$

X	Y	Z
Obl / –	DO$_{(2)}$	S
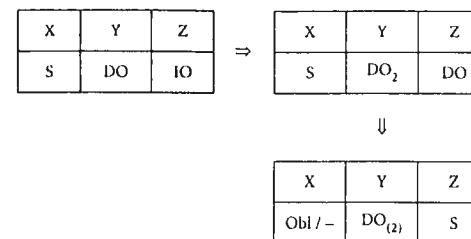
(45) English
a. John gave a book to Mary.
b. John gave Mary a book.
c. Mary was given a book (by John).

(b) 2/3 permutation (locative alternation)

The direct and non-direct (Indirect or Oblique) Objects of some trivalent verbs may switch. This derivation is known as '2/3 permutation' ('2-3 retreat' in Relational Grammar), or 'locative alternation':

(46) 2/3 permutation (locative alternation)

X	Y	Z
S	DO	Obl/IO

$\Rightarrow$

X	Y	Z
S	Obl/IO	DO
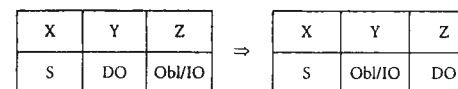
This diathesis modification can remain unmarked in the verbal morphology, as in English (47), but there are some languages, such as Chukchee, which have a special voice marker for it (cf. (48)):

(47) English
a. John sprayed the paint on the wall.
b. John sprayed the wall with paint.

(48) Chukchee

a. ətləγ-e   mətqəmət-ø   kawkaw-ə   kili-ø-nin
    father-ERG   butter-ABS   bread-LOC   spread-AOR-3SG.SBJ/3SG.OBJ
    'The father spread butter on the bread.'

b. ətləγ-e   kawkaw-ø   mətq-e   ena-rkele-ø-nen
    father-ERG   bread-ABS   butter-INS   2/3.PERMUT-spread-AOR-3SG.
                                             SBJ/3SG.OBJ
    'The father spread the bread with butter.'

Subsections 2.2 and 2.3 deal with diatheses and voices in a broader sense of the term, i.e. with the changes in syntactic patterns which suggest some operations on the set of semantic roles and/or do not preserve this set intact.

2.2 Syntactic changes which preserve the inventory of semantic roles but impose certain operations on them ('operational diatheses')

2.2.1 Reflexive

The reflexive can be described in terms of the diatheses calculus as a derivation which encodes the referential identity of the main argument of the initial structure (X) and some other argument; for a detailed study of this derivation, see Geniušienė (1987), König and Gast (2008), and Ryan (2004). The most important type of reflexive, 'canonical reflexive', is the one where the Subject is co-referential with the Direct Object ($John_i$ loves $John_i$ = John loves himself).

Normally, the co-referential Direct Object is not repeated in the sentence but is either (i) replaced by the reflexive pronoun (cf. Eng. *oneself, him-/her-/itself,* German *sich,* etc.), or (ii) removed from the original structure. In the latter case we are dealing with a valency-reducing phenomenon, as shown in (49) and illustrated in (50); the verbal form obligatorily receives special morphological marking (called in some grammars 'reflexive voice'):

(49)   Canonical reflexive

X	Y
S	DO

$\Rightarrow$

X = Y
S

(50)   Russian

    a.   Petja   moet   sobaku
       Peter.NOM   wash.PRS.3SG   dog.ACC
       'Peter washes the dog.'

    b.   Petja   moet-sja
       Peter.NOM   wash.PRS.3SG-REFL
       'Peter washes himself.'

2.2.2 Reciprocal

The reciprocal derivation suggests another logical operation, which can roughly be described as a conjunction of the base proposition with its 'symmetric' equivalent, where two of the arguments switch (i.e. exchange roles); for a detailed study of this

derivation, see V. Nedjalkov (2000, 2004, 2007) and König and Gast (2008). As in the case of the reflexive, the most important and common ('canonical') type is represented by the 'Subject ↔ Direct Object' reciprocal (*John loves Mary and Mary loves John = John and Mary love each other*). As in canonical reflexive constructions, the Direct Object is either (i) replaced by the reciprocal pronoun (cf. English *each other*, German *einander*, etc.), or (ii) removed from the original structure, and this valency change is obligatorily marked in the verbal morphology ('reciprocal voice'). As in the case of the reflexive, we are dealing with a valency-reducing phenomenon, as shown in scheme (51) and illustrated in (52) and (53):

(51)   Canonical reciprocal

X	Y
S	DO

&

Y	X
S	DO

$\Rightarrow$

X & Y
S

(52)   French

    a.   Pierre   a embrassé   Marie (& Marie   a embrassé   Pierre)
       Peter   kiss.PST.3SG Mary   Mary   kiss.PST.3SG Peter
       'Peter kissed Mary.'

    b.   Pierre   et   Marie   se   sont embrassés
       Peter   and Mary   REFL   kiss.PST.3PL
       'Peter and Mary kissed (each other).'

(53)   Russian

    a.   Petja   pocelova-l-ø   Mashu
       Peter.NOM   kiss-PST-SG.M   Mary.ACC
       'Peter kissed Mary.'

    b.   Petja   i   Masha   pocelova-l-i-s'
       Peter.NOM   and   Mary.NOM   kiss-PST-PL-REFL
       'Peter and Mary kissed (each other).'

Diatheses discussed in sections 2.1.1 and 2.1.2 (i.e. the majority of diatheses/voices in the strict sense of the word) and 2.2 ('operational diatheses') decrease the valency of the initial structure. Passives degrade the original Subject; antipassives and operational diatheses demote or remove the Direct Object.

2.3 Syntactic changes which do not preserve the inventory of semantic roles

There are two main types of changes in the inventory of semantic roles: changes that add new argument(s) to the base structure, and changes that delete some

argument(s) from the base structure. These two types generate valency-increasing and valency-decreasing diatheses, respectively.[14]

2.3.1 Valency-increasing derivations

There are three main types of valency-increasing syntactic derivations, depending on which syntactic argument is added to the original structure (shown by the grey-shaded boxes in diathesis schemes below). Adding a new Subject is the salient feature of causatives; adding a Direct Object typically yields an applicative; and adding an Indirect Object results in the benefactive derivation.

(a) Causative and syntactic phenomena in causative constructions

Causatives can be defined as verbs which refer to a causative situation, i.e. to a causal relation between two events, one of which is believed by the speaker to be caused by the other; see, for example, V. Nedjalkov and Sil'nickij (1969b), Shibatani (1976b), Comrie (1976b), Song (1996), and Kulikov (2001). In other words, a causative is a verb or verbal construction meaning 'cause to V_o', 'make V_o' (where V_o stands for the embedded base verb). Thus, the causative derivation adds the meaning 'cause' to the base proposition and a new actor, viz. Causer, to the set of semantic roles. The causer obligatorily takes the Subject position, ousting the initial Subject to a non-Subject (non-S) position. Accordingly, the general diathesis scheme of the causative derivation can be represented as follows:

(54)   Causative (general scheme)

X	[...]	⇒	Causer	X (Causee)	[...]
S	[...]		S	non-S	[...]

The causee, ousted from the Subject position by the causer, is demoted down the hierarchy of grammatical relations (also known as the 'case hierarchy'): Subject > Direct Object > Indirect Object > Oblique Object. One may expect that it occupies the highest (= leftmost) free position, according to the principle labelled by Comrie (1976b) 'paradigm case'. This means that, if the embedded verb is intransitive, transitive, or bitransitive, the causee appears as Direct Object, Indirect Object, or Oblique Object, respectively, as shown in (55)–(57):

(55)   Causative of intransitive

X	⇒	Causer	X (Causee)
S		S	DO

[14] For valency-changing diatheses, see Dixon and Aikhenvald (2000) in particular.

(56)   Causative of transitive

X	Y	⇒	Causer	X (Causee)	Y
S	DO		S	IO	DO

(57)   Causative of bitransitive

X	Y	Z	⇒	Causer	X (Causee)	Y	Z
S	DO	IO		S	Obl	DO	IO

Paradigm cases are provided, in particular, in Romance (e.g. French) and Turkic languages (see Comrie 1976b); cf. the Tuvan (Turkic) examples (58)–(60), taken from Kulikov (2001: 890); the causee is shown in boldface:

(58)   Tuvan

  a. ool   doŋ-gan
      boy   freeze-PST
      'The boy froze.'

  b. ašak   **ool-du**   doŋ-ur-gan
      old.man   boy-ACC   freeze-CAUS-PST
      'The old man made the boy freeze.'

(59)   Tuvan

  a. ašak   ool-du   ette-en
      old.man   boy-ACC   hit-PST
      'The old man hit the boy.'

  b. Bajïr   **ašak-ka**   ool-du   ette-t-ken
      Bajïr   old.man.DAT   boy-ACC   hit-CAUS-PST
      'Bajïr made the old man hit the boy.'

(60)   Tuvan

  a. Bajïr   ool-ga   bižek-ti   ber-gen
      Bajïr   boy-DAT   knife-ACC   give-PST
      'Bajïr gave the knife to the boy.'

  b. ašak   **Bajïr-dan**   ool-ga   bižek-ti   ber-gis-ken
      old.man   Bajïr-ABL   boy-DAT   knife-ACC   give-CAUS-PST
      'The old man made Bajïr give the knife to the boy.'

Probably, no language conforms exactly to what Comrie calls the 'paradigm case' (cf. Song 1996: 160). Exceptions to the paradigm case fall into two main classes: extended demotion and syntactic doubling.

(i) Extended demotion

In some languages, the causee can 'skip' one or more free positions in the hierarchy and hence be demoted more than necessary according to the paradigm case. The most frequent type of extended demotion results in the marking of the causee in the same manner as the Agent in passive constructions, as if causativization applied to the passivized embedded clause. This alternative 'passive marking' competes in some languages with that conforming to the paradigm case; cf. (61b, c):

(61) French (Comrie 1976b: 262–3)

    a. Jean mangera les gâteaux
       Jean eat.FUT the cakes
       'Jean will eat the cakes.'

    b. Je ferai manger les gâteaux à **Jean**
       I make.FUT eat the cakes to Jean
       'I shall make Jean eat the cakes.'

    c. Je ferai manger les gâteaux **par** Jean
       I make.FUT eat the cakes by Jean
       'I shall make Jean eat the cakes.'

For a possible explanation of 'passive marking', see e.g. Saksena (1980).

Rarer are other types of marking of the causee, and still rarer are languages like Nivkh (Gilyak), where the special case ending -*ax* is used solely to express the embedded Subject of causative constructions (cf. V. Nedjalkov, Otaina, and Xolodovič 1995: 77 [1969: 195]).

(ii) Syntactic doubling

Alternatively, the causee can be demoted to a position which is already occupied; for instance, in nominative–accusative languages, it can appear as another noun phrase in the accusative alongside the embedded Direct Object (cf. Aissen 1979: 156–201), as shown in (62) and exemplified in (63):

(62) Causative of transitive: DO doubling

X	Y		Causer	X (Causee)	Y
S	DO	⇒	S	DO	DO

(63) Sanskrit
    a. dasaś coram grbh-ṇā-ti
       servant.NOM thief.ACC catch-PRS-3SG.ACT
       'The servant catches the thief.'

    b. rājā dasam /dasena coram grāh-aya-ti
       king.NOM servant.ACC /servant.INS thief.ACC catch-PRS.CAUS-3SG.ACT
    'The king makes the servant catch the thief.'

However, some sophisticated syntactic tests and criteria may reveal differences between nominals which show the same case-marking, for instance, between the embedded DO and the 'new DO'. In particular, in many languages, only one of these (e.g. only the causee) may become a Subject in passive constructions, control possessive reflexives, etc. Moreover, syntactic criteria reveal that the causee may behave differently from any other (prototypical) object and retain a number of Subject properties—even in cases where there is no coding conflict in terms of case-marking (cf. Falk 1991). For a comprehensive treatment of this issue, see Kozinsky and Polinsky (1993) and Polinsky (1994), with some important criticism by Song (1995).

(b) Adding a Direct Object: applicative

Derivations which introduce a Direct Object (lacking in the initial structure) are called 'applicative'; for a detailed study of this derivation, see Peterson (2007).[15] This Direct Object may denote an entirely new participant in the situation, or it can be promoted from the periphery of the syntactic structure, where it surfaced as an Oblique Object in the non-derived diathesis; cf. scheme (64) and examples (65)–(67). The added object usually bears one of the non-core semantic relations—such as Locative, Beneficiary, Instrument, or Motive—but shows all object properties. In particular, it controls object agreement (if any), as in (66b), and can be promoted to the Subject position in passive constructions:

(64) Applicative

X	(Z)		X	Z
S	(Obl)	⇒	S	DO

(65) German

    a. Der Meister arbeitet
       the master.NOM works
       'The master works.'

---

[15] Promoting the beneficiary of the activity to the DO position (often referred to as 'benefactive' derivation) can be regarded as a subtype of applicative (in the broad sense of the word); see Kittilä (this volume). However, there is no consensus as to whether all kinds of transitivity-increasing derivations that introduce a new (Direct) Object should be qualified as 'applicatives'. Some authors do not include here introducing a canonical DO (Patient), as in the German example (65).

b. Der Meister   be-arbeitet   eine   Platte
the   master.NOM   APPL-works   a   slab.ACC
'The master works on a slab.'

(66) Ndendeule, Bantu (Ngonyani 1996: 3)

    a. n-gheni   a-ki-hɛmɛl-a   ngoβo
    1-guest   1.SBJ-PST-buy-them   10:cloth
    'The guest bought clothes.'

    b. n-gheni   a-ki-n-hɛmɛl-ɛl-a   mw-ana   ngoβo
    1-guest   1.SBJ-PST-1.OBJ-buy-APPL-them   1-child   10:cloth
    'The guest bought the child clothes.'

(67) Bella Coola

    a. puλʼ·-ø   ti-ʔimlk-tx   ʔɬ   ti-nusʔūlχ-tx
    jump-3SG.SBJ   DEF-man-DEF   on   DEF-thief-DEF
    'The man jumped on the thief.'

    b. puλʼ-m-is   ti-ʔimlk-tx   ti-nusʔūlχ-tx
    jump-TR-3SG.SBJ/3SG.OBJ   DEF-man-DEF   DEF-thief-DEF
    'The man attacked the thief.'

Compare examples (8) and (9) from Worombori and Creek quoted in Kittilä's chapter, this volume.

(c) Adding an Indirect Object: benefactive

Adding an Indirect Object to the set of arguments and the meaning 'for (the sake of)' to the meaning of the base proposition typically yields the derivative called 'benefactive'. The Indirect Object refers to a participant, which usually bears the semantic role of Beneficiary,[16] corresponding to the person or entity benefiting from the performed activity—hence the term 'benefactive'. Another term taken from the Kartvelian grammatical tradition is 'objective version';[17] see Boeder (1969, 2005: 34 ff.):

(68) Benefactive

(69) Georgian
    a. Sandro-m   koka-ø   ga-ṭex-a
    Sandro-ERG   jug-NOM   PREV-break-3SG.AOR
    'Sandro broke the jug.'

---

[16] For some situations, this semantic role is closely related to or even (almost) identical with that of the Recipient.
[17] 'Version' ← Georg. kceva 'change, transformation'.

    b. Sandro-m   bavšv-s   koka-ø   ga-ø-u-ṭex-a
    Sandro-ERG   boy-DAT   jug-NOM   PREV-IND.OBJ.3SG-OBJVRS-
                                     break-3SG.AOR
    'Sandro broke the jug for the boy.'

An important (and typologically quite common) type of verbal derivation based on the benefactive is called 'self-beneficent', 'subjective version' (in Kartvelian grammar; see Boeder 1969), or 'affective'. It can be described as a result of a successive application of two elementary derivations, the benefactive and the indirect reflexive; cf. (70) and (71):

(70) Autobenefactive (reflexive benefactive, subjective version)

(71) Georgian
    a. šen   m-i-krep   vašl-s
    you   IND.OBJ.1SG-OBJVRS-pluck.PRS   apple-DAT
    'You pluck an apple for me.'

    b. šen   i-krep   vašl-s
    you   SBJVRS-pluck.PRS   apple-DAT
    'You pluck an apple for yourself.'

The autobenefactive meaning was one of the main functions of the ancient Indo-European middle type of inflexion (see sections 1.1 and 5); cf. (72):

(72) Vedic Sanskrit
    a. brāhmaṇo   (rājñe)   prayājaṃ   yaja-ti
    priest.NOM   (king.DAT)   sacrifice.ACC   worship.PRS-3SG.ACT
    'The priest performs the sacrifice (for the king).'

    b. brāhmaṇaḥ   prayājaṃ   yaja-te
    priest.NOM   sacrifice.ACC   worship.PRS-3SG.MED
    'The priest performs the sacrifice (for his own sake).'

2.3.2 Valency-decreasing derivation: anticausative

The main representative of the class of diatheses deleting some argument(s) from the base structure is the anticausative (decausative),[18] which removes the Subject (Agent) from the structure:

(73)   Anticausative

X	Y			Y
S	DO	⇒	–	S
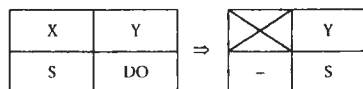
The anticausative has an important feature in common with the agentless passive: both entail the promotion of the initial Direct Object (Patient) and the demotion of the initial Subject (Agent), which accounts for their similar morphological marking in many languages. Some languages, nevertheless, make a morphological distinction between these two categories, compare (74b, c) in Russian:

(74)   Russian

    a. Ivan   razbi-l-ø   vazu
        John.NOM break-PST-SG.M vase.ACC
        'John broke the vase.'

    b. Vaza   razbi-l-a-s'   (*Ivanom)
        vase.NOM break-PST-SG.F-REFL (John.INS)
        'The vase broke (*by John).'

    c. Vaza   by-l-a   razbi-t-a   (Ivanom)
        vase.NOM be-PST-SG.F break-PART.PFV.PASS-SG.F (John.INS)
        'The vase was broken (by John).'

In cases where the markers of the passive and anticausative overlap, passives without an overtly expressed Agent can be distinguished from anticausatives only by semantic criteria. The standard description of this semantic opposition is given as follows by Comrie (1985b: 326): 'Passive and anticausative differ in that, even where the former has no agentive phrase, the existence of some person or thing bringing about the situation is implied, whereas the anticausative is consistent with the situation coming about spontaneously.' Distinguishing passives without an Agent from non-passive intransitives (anticausatives) is one of the most complicated problems with which a linguist is confronted when undertaking a syntactic study of the verb. Alongside clear instances of passives, which raise no doubts by virtue of the inherent agentive semantics of the corresponding verb (cf. such

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[18] Other terms used include 'inchoative' (cf. Haspelmath 1993), 'unaccusative', 'ergative (intransitive)', 'quasi-passive', and 'fientive' (now common in Indo-European scholarship); see Kulikov (2001: 888) for a survey. On anticausatives, see esp. Haspelmath 1987 and Schäfer 2008.

predicates as *build: is built*), and doubtless anticausatives (cf. *falls, grows*), there is an area of uncertainty, i.e. intransitive usages that allow for both passive and anticausative interpretations (cf. such meanings as 'is born/arises').

3. RELATIONSHIPS BETWEEN DIATHESES/VOICES

3.1 Diathesis/voice clusters

In some cases, a particular verbal form (voice) may correspond to just one particular diathesis. However, more often than not, we are faced with the situation where a group of (similar) diatheses is represented by the same verbal form (voice). That is, one morphological voice corresponds to a number of diatheses, a 'diathesis cluster' or 'family' (see e.g. Shibatani 2004: 1157 ff.). The diatheses belonging to the same cluster normally share some feature(s). The following groups of diatheses are often clustered together.

3.1.1 Passive cluster

Probably in all languages with passive, the class of constructions where the form called 'passive voice' is employed includes canonical and/or agentless passives, which suggest the demotion of the initial Subject (see section 2.1.1). The range of other members of this cluster (which differ in behaviour of other arguments) varies across languages. Thus, the passive cluster may optionally include backgrounding passives without DO-foregrounding, as in Polish or Dutch; include dative passives, as in English; or exclude from its members passives with an overtly expressed Agent, as in Latvian.

3.1.2 Middle voice

A much larger cluster is known under the traditional term 'middle (voice/diathesis)'. Middle forms typically express a variety of diatheses which 'focus' the activity on the first argument (Subject) and/or intransitivize the base structure (for details, see Geniušienė 1987, Klaiman 1991: 44 ff., Kemmer 1993, and Kazenin 2001b). Here may belong the passive, conversive, anticausative, reflexive, reciprocal, antipassive, and autobenefactive (reflexive benefactive). Compare the Russian 'reflexive' morpheme *-sja/-s'*, which can express most of the above-listed functions (except for self-beneficent), as in (16b), (34b), (41b), (42b), (50b), (53b), and (74b). Several attempts have been made to capture the general, invariant meaning of the middle voice. One of the most elaborated theories is offered by Kemmer (1993). According to Kemmer (p. 243), '[t]he middle is a semantic area comprising events in which (a)

the Initiator is also an Endpoint, or affected entity[,] and (b) the event is characterized by a low degree of elaboration [. . .] The first property is a subaspect of the second.' The (low) elaboration of events is a complex notion, which includes, in particular, such parameters as (low) distinguishability of participants and (low) distinguishability of events (pp. 109 ff., 208 ff., and *passim*).

3.1.3 Causative–passive polysemy

In Korean, some Altaic languages of Siberia (Tuvan, Yakut, Mongolian, Manchu, and other Tungusic languages), some West African languages (Songhai, Dogon), Bella Coola (Amerindian), and some other languages of the world, verbs with causative markers can also function as passives, as in (75):

(75)   Manchu (I. Nedjalkov 1991: 5)

    a. Bata   i-mbe   va-ha
        enemy   he-ACC   kill-PST
        'The enemy killed him.'

    b. I   bata-be   va-bu-ha
        he   enemy-ACC   kill-CAUS/PASS-PST
        'He made (somebody) kill the enemy.'

    c. I   (bata-de)   va-bu-ha
        he   (enemy-DAT)   kill-CAUS/PASS-PST
        'He is/was killed (by the enemy).'

The passive usage is likely to have developed, most often and quite naturally, from the permissive (e.g. 'I let someone catch my hand' → 'I was grabbed by the hand', etc.) and/or from the reflexive-causative meanings ('I let someone photograph myself' → 'I was photographed'), as shown in (76):

(76)   From causative to passive

X	Y
S	DO

⇓

Causer	X (Causee)	Y
S	IO / Obl / –	DO

⇓

Causer = Y	X (Causee)
S	IO / Obl / –

⇓

Y	X (pass. Ag)
S	IO / Obl / –
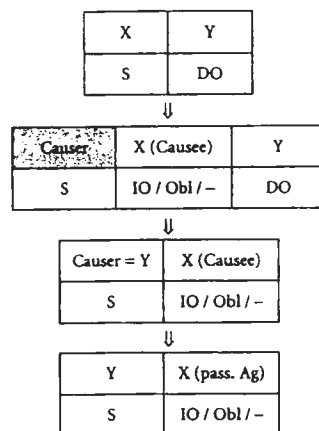
For a general discussion, see V. Nedjalkov (1964), Andersen (1991: 75–82) (on cognitive sources of the causative/passive polysemy), and I. Nedjalkov (1991).

3.1.4 Transitive cluster

Some languages group together diathesis changes that increase the valency of the base pattern, most commonly, causative and applicative (see Kittilä, this volume). This is, for instance, the case of some Uto-Aztecan languages; compare Nahuatl *ni-mēwa* 'I arise' vs. *ni-k-mēwi-liya* 'I raise him' (causative), and *ni-¢ah¢i* 'I shout' vs. *ni-k-¢ah¢i-liya* 'I shout to him' (applicative) (see Tuggy 1988). For the causative/applicative polysemy, see, in particular, V. Nedjalkov and Sil'nickij (1973: 17–25 [1969b: 35–43]), Austin (1997), Dixon and Aikhenvald (1997: 77 ff.), Shibatani (2000: 563–71), and Shibatani and Pardeshi (2002: 116–22).

3.2 Voices *sensu stricto* vs. *sensu latiore*: their status in the grammar

According to the definition given in section 1, diatheses and voices in the strict sense of the concepts suggest only modifications in valency pattern with no semantic changes (but see also section 4); correspondingly, the addition or deletion of a semantic argument—as in the case of (anti)causatives, applicatives, and benefactives—which affects the propositional meaning cannot be considered a diathesis modification *sensu stricto*. Nevertheless, in a number of grammatical descriptions (in particular, in many Altaic and Uralic grammars), causative, reflexive, reciprocal, and some other derivations are grouped together with voices *sensu stricto* ('causative voice', 'reciprocal voice', etc.) (see Shibatani 2000: 547–48 in particular). Given a more rigorous definition of voice (see esp. Mel'čuk 1993), there are several reasons for treating such quasi-voices separately.[19] Not only do they change the lexical meaning of the base verb, they can also be combined with other (quasi-)voices within one form (cf. passives derived from causatives, causatives derived from reflexives, etc.; see e.g. Muysken 1981: 457 ff. on the interaction between the causative and other derivational processes in Quechua) and even form double (e.g. double causatives), triple, and, theoretically, *n*-ple derivatives.

However, for some languages, there are also several system-related considerations in favour of the broader understanding of the term 'voice'. This is particularly obvious in the case of large voice clusters, such as the middle, which may include diatheses in both the strict (e.g. passive) and the broad (e.g. reflexive) senses of the term.

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[19] Cf. also Mel'čuk (1993: 11, 1994: 324–6) and Babby (1983), where the causative in Turkish is regarded as a grammatical voice, in contrast with the (anti)causative in Russian.

4. SEMANTICS OF VOICES AND SEMANTIC EFFECTS OF DIATHESIS MODIFICATION

The semantic content of voices and diatheses *sensu latiore*, such as the causative or benefactive, was briefly discussed above: the causative adds the meaning 'cause' and a new actor, the Causer; the benefactive adds the meaning 'for (the sake of)' and a Beneficiary. Likewise, applicatives may add a new semantic role (locative, instrumental, etc.). Besides, both benefactive and applicatives typically imply that the promoted participant (locative, instrumental, beneficiary) is 'more thoroughly affected by the Agent's action' (Shibatani 2006: 245). A particular variety of valency increasing characterizes the voice traditionally called 'adversative passive'. The textbook example is the Japanese verbal form with the suffix *-rare*: it adds the semantic role of the 'affected' participant in the same way as causativization adds a causer (see Kortlandt 1992); compare (77):

(77)   John   wa   dareka   ni   ie   o   yakareta
       John   TOP   someone DAT   house ACC   burn.PASS.PST
       'John's house was burnt by someone; John was (negatively) affected by it.'

For the semantic content of the middle voice, see 3.1.2 above.

Diatheses in the strict sense of the word, such as passive, are often believed to be semantically (nearly) empty. Nevertheless, even canonical voices introduce some important semantic effects into the meaning of the sentence.

Thus, antipassives (see 2.1.2) typically introduce habitual meaning and non-referential status of objects (see esp. Hopper and Thompson 1980: 268–70); in addition, they may express the disposition of the actor to perform the action. The 2/3 permutation (see 2.1.3(b)) is generally used to express the complete character of the action which entirely affects its goal (cf. (47b)).

Finally, a number of important studies on the passive (see e.g. Givón 1979: 185 ff., Kazenin 2001a: 907 ff.) have essentially increased our understanding of the semantic conditions and effects of the use of passive (which was earlier considered a canonical example of a purely syntactic category, e.g. in the generativist tradition). In particular, it has been demonstrated that passives are more common in the backgrounded part of discourse (Hopper and Thompson 1980). They place the semantic focus on the non-agent argument (Undergoer or Theme) and detopicalize (de-focus or suppress) the Agent/Actor (Shibatani 1985, Givón 1994b, 2001, II: 123 ff.). The passive is typically used if the Agent has a relatively low degree of discourse relevance,[20] or topicality (Shibatani 2006: 248). In numerical terms,

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[20] The high discourse relevance of an argument suggests a number of features, such as its salience in the speaker's mind, its importance in the propositional act, and the focus of the hearer's attention on it (see Shibatani 2006: 259).

passivization considerably decreases the 'cataphoric persistence' (or 'topic persistence') of the Agent of a clause, i.e. the frequency of the occurrence of its referent in the following part of the text (Givón 1994b, 2001, II: 123). This parameter can be measured by the number of clauses to the right in which the Agent appears as one of the semantic arguments. By contrast, the cataphoric persistence of the Patient is increased by passivization. Passivization has also some important implications for the characteristics of the event; in Shibatani's (2006: 229) formulation: 'voice is concerned with the evolutionary properties of an action'. In particular, passivization is often (but not always) accompanied by stativization and/or inactivization of the situation (Haspelmath 1990, Kazenin 2001a: 908, Shibatani 2006); it has recently been argued by Abraham and Leiss (2006) that impersonal passives are strongly correlated with the imperfective aspect. A detailed survey of the semantic and pragmatic effects ('conceptual basis') of voice can be found in Shibatani (1985, 1998, 2006).

5. DIACHRONIC SOURCES OF VOICE MARKERS

Valency-decreasing morphemes, such as the passive and reflexive, as well as markers of the middle 'voice' (= voice cluster), often go back to reflexive pronouns, as in many Indo-European languages (cf. Russian *-sja*, Swedish *-s*, etc., which can be traced back to forms of the Proto-Indo-European pronominal lexeme **s(u)e-* 'own, -self'). Passive morphemes may also originate from the third person plural pronoun ('they'), as in Maasai (Kemmer 1993: 198). (For further discussion of the origin of passive morphemes, see Haspelmath 1990 and Givón 2001, II: 132 ff.) Reciprocal markers may result from reduplication of reflexive morphemes; compare Udehe *mene-mene-* 'each other' based on the reflexive pronoun *mene/ me(n)-* (see V. Nedjalkov 2007). Causative morphemes often go back to half-auxiliary causative verbs meaning 'make', 'let', 'allow', 'give', etc., while applicative and benefactive markers can be based on or etymologically related to locative adverbials (cf. German *be-* ~ *bei* 'at') (see e.g. Haspelmath and Müller-Bardey 2004: 1142). Typical sources of causative morphemes also include directional or benefactive affixes, as discussed in Song (1990: 169–93, 1996: 80–106). For instance, in Lamang (Chadic), the causative suffix *-ŋà* may be related to the benefactive preposition *-ŋgà*; in Kxoe (Central Khoisan), the causative suffix *-kà* is identical to the directional preposition *-kà*. Finally, causative markers can develop from verbal affixes with non-causative meanings, such as intensive and iterative, as argued for in Li (1991), Kulikov (1999b), and Kölligan (2004). For a diachronic study of voices and valency-changing categories, see Kulikov (2010).

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CHAPTER 19

GRAMMATICAL RELATIONS TYPOLOGY

BALTHASAR BICKEL

1. GRAMMATICAL RELATIONS: PAST AND PRESENT

Traditionally, the term 'grammatical relation' (GR) refers to the morphosyntactic properties that relate an argument to a clause, for example, its subject or its object. Alternative terms are 'syntactic function' or 'syntactic role', and they highlight the fact that GRs are defined by the way in which arguments are integrated syntactically into a clause, i.e. by functioning as subject, object, etc. Whatever terminology one prefers, what is crucial about the traditional notion of GRs is (a) that they are identified by syntactic properties, and (b) that they relate an argument to the clause.[1] This differentiates GRs from semantic roles (SRs), also known as thematic roles (θ-roles): SRs are semantic not syntactic relations, and they hold between arguments and predicates (typically verbs), rather than between arguments and clauses. The difference between GRs and SRs is best

[1] Technically, adjuncts also bear grammatical relations in this sense. In this chapter, I only discuss argument relations; for some suggestions on how adjuncts can align with arguments in grammatical relations, see Bickel and Nichols (2009).

visible in such contrasts as *Sue has killed the shark* vs. *Sue was killed by the shark*. In both cases, the NP *Sue* is the subject of the clause. But in the active clause, the referent of *Sue* is the agent of 'kill', while in the passive clause, *Sue* is the patient of 'kill'.

The syntactic properties that have traditionally been considered the key identifiers of GRs are the property of triggering verb agreement and the property of being assigned a specific case. In our example, *Sue* triggers third person singular agreement in the verb, and this identifies the NP as the subject of the clause. In some languages—for example, Russian and Turkish—the subject would furthermore be identified by nominative case assignment.

Research over the past three decades has greatly expanded the range of syntactic properties that identify GRs in particular languages, and one of the most important results of this research is that properties often do not converge on a single set of GRs in a language. Consider the following examples from Nepali:

(1)   Nepali (Indo-European, Himalayas)

    a. ma   ga-ē
        1SG.NOM go-1SG.PST
        'I went.'

    b. mai-le   timro   ghar   dekh-ē
        1SG-ERG   your   house.NOM see-1SG.PST
        'I saw your house.'

In both examples, the expression for 'I' is identified as the subject of the clause by the fact that it triggers verb agreement (*-ē* 'first person singular past'). But with regard to case, we are dealing with two different relations: the one identified by nominative case (*ma*) in (1a), and the one identified by ergative case (*maile*) in (1b). Examples like these multiply in many ways when we expand our dataset of languages across the world, and even more when we look, as we will do in this chapter, at the syntactic properties of arguments beyond agreement and case—for example, at the behaviour in relative clauses or raising constructions. This finding has become known in the literature as the construction-specific nature of grammatical relations.

The construction-specific nature of GRs poses important problems for the traditional view. As noted above, an argument is traditionally said to bear a GR to a clause, and properties like case and agreement serve as 'diagnostics' or 'tests' for identifying the GRs of the clause. A first problem with this view is that, as we just saw, these tests often do not converge on the same GR. This makes it unclear which GR is borne by an expression like 'I' in (1): is it or is it not the subject of the clause? If we say 'yes' on account of 'I' triggering agreement in both examples, what do we gain beyond replacing the term 'agreement trigger' by the term 'subject', and how do we explain the fact that the same GR gets different case-marking in the two

examples? Moreover, given that *mai* 'I' in (1a) bears the same case as *timro ghar* 'your house' in (1b), shouldn't we rather say that this argument, the one in the nominative, is the subject? But then, why go with the evidence from case-marking rather than from agreement? A second problem is that the traditional view treats properties like agreement as if they were test tools for the linguist rather than grammatical devices in their own right, but this deflects from the crucial question of why some devices seem to define GRs in one way while others define them in other ways. For example, there are many languages like Nepali where agreement treats 'I' the same way in the two examples, while case differs; but only a few languages do it the other way around (cf. Siewierska 2004: 53 ff.), where agreement differs in the two examples, while case is the same. Why? As long as case and agreement are seen merely as diagnostic identifiers, the question is even difficult to ask.

The properties that define GRs receive their deserved centre-stage status as soon as we reconceptualize the notion of GR as the syntactic relation that an argument bears *to a specific construction or rule*[2] rather than to the clause in which the argument is realized. Thus, in (1), 'I' bears one GR to the agreement construction (the same in (a) and (b)) and one GR to the case construction used (not the same in (a) and (b)). In general, then, a GR is defined as the set of arguments that is selected by a construction for a particular syntactic purpose, for example, for agreement rules or case government. This means that an argument can bear as many GRs as it enters constructions in a given syntactic context, and these GRs need not be the same across constructions. How GRs are selected, how they are defined for each construction, to what degree their distribution overlaps across constructions, how types of GRs correlate with each other, and how they are distributed in the languages of the world—these are the core issues that define research in GR typology.

In what follows, I first review the typological variables that define or condition specific GRs (sections 2 and 3). In section 4, I survey the kinds of constructions that have GRs, and in section 5, I look into interactions between GR definitions in different constructions. Section 6 briefly addresses issues of worldwide distributions, and section 7 concludes with suggestions for future research.

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[2] While the difference among rules, constructions, and ordered constraint sets is of critical importance for the architecture of formal grammar models, it is irrelevant to defining typological variables. Also, it is irrelevant to typology whether GRs are mathematically modelled as feature attribution matrices (e.g. in LFG or Construction Grammar) or as graph-theoretical nodes (e.g. in Minimalism). All that matters for typology is that phenomena like case-marking or agreement can be precisely identified across languages and that they can be coded as to how they involve GRs, what arguments these GRs include, and what other grammatical properties the phenomena have.

2. DEFINING GRAMMATICAL RELATIONS

GRs are equivalence sets of arguments, treated in the same way by some construction in a language—for example, being assigned the same case in a language or triggering the same kind of agreement. Arguments in turn are defined—to take up Evans's (1997) apt simile—by cast and role: each predicate takes a cast of characters, and each member of the cast plays a distinct role. In more technical terms, arguments are defined by both their referential type (as animate, speaker, topic, etc.) and their relation to the predicate (as agent, theme, etc.). Languages vary as to whether their GRs select arguments on the basis of role or reference properties or by combining these two kinds of properties. In the following, I first discuss relational roles, then referential properties of arguments (to which I devote more space since these are less well known).

2.1 Roles

Arguments bear specific semantic relations to the predicate; for example, 'the one who sees', 'the one who sleeps', 'the one who is given something'. A very successful theoretical proposal, which I will follow here, is that for the purpose of GR specifications, such individual, predicate-specific roles merge systematically into generalized roles, sometimes called macro-roles (Foley and Van Valin 1984, Van Valin and LaPolla 1997, Van Valin 2005) or proto-roles (Dowty 1991, Primus 1999, this volume). This reduces the range of predicate-specific roles to a small set of generalized argument roles that are referenced by specific constructions.

There are various ways to define this set, but the theory that has proven to best capture typological variance is one that defines the set as the minimal set distinguished by numerical valence, i.e. by the distinction between intransitive (one-place), transitive (two-place), and ditransitive (three-place) verbs.[3] This leads to the by-now classic schema of labels introduced by Comrie (1978) and Dixon (1979b): S 'sole argument of an intransitive verb', A 'most actor-like argument in a transitive verb', and O 'not most actor-like argument in a transitive verb' (Comrie actually uses P here). In order to further distinguish between the two non-actor-like arguments of ditransitives, I will use G for the most goal-like or ground-like (e.g. the one who is given something, or the one to which something is applied) and T for the other (most patient-like) argument (e.g. that which is given or that which is applied to something); compare Figure 19.1.

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[3] For reasons of space, I disregard four-place predicates like causatives or benefactives of ditransitives, although in some languages, they are an important class that deserves more attention than the issue has traditionally received.

```
                              A
                        A
                  S           T
                  O
                              G
```

Figure 19.1. Numerical valence and generalized argument roles

Note that if the set is defined, as it is here, by the minimal distinctions required by the three basic numerical valences, we also expect languages to distinguish between the A of transitives ('A1') and the A of ditransitives ('A2'). This expectation is met by Gyarong, where case-marking is sensitive to the distinction between A1 and A2:

(2)   Gyarong (lCog-rtse rGyal-roṅ) (Sino-Tibetan, Himalayas; Nagano 1984)

    a. nəyo-ki   chigyo   kəw-nasŋo-ch ko.
        2SG-ERG (A1) 1DU.NOM (O) 2>1-scold-1DU AUX
        'You (SG) scold us (DU).'

    b. nəyo   chigyo   kəw-wu-ch   ko.
        2SG.NOM (A2) 1DU.NOM (G) 2>1-give-1DU AUX
        'You (SG) give (it to) us (DU).'

The sentence in (2a) is monotransitive, and its A argument is obligatorily marked by the ergative in -ki. With ditransitive verbs like 'give', by contrast, no such marking occurs on the A argument.[4] Such distinct treatment of A1 and A2 is rare, presumably a result of the great overlap between A1 and A2 in semantics. In the following, A1 and A2 will be subsumed under the cover-term 'A'.

In the simplest case, the generalized argument roles defined in Figure 19.1 suffice to define the GRs in a given language as specific subsets, in the limiting case as a subset with one member—for example, a GR allowing only S arguments. The most frequent GRs so defined are given in Table 19.1. They are also (beginning with Plank 1979) called 'alignment types', a term that highlights the fact that by subsetting arguments, they are being aligned with each other so that they can receive the

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[4] As important as this observation is for appreciating the true range of typological variation, the distinction between A1 and A2 is currently becoming lost among younger speakers of Gyarong, probably because of increased exposure to Chinese (Nagano, pers. comm., October 2003).

Table 19.1. Some common GRs defined as subsets of generalized argument roles

Grammatical relation	Commonly used names
{S}	intransitive subject, nominative
{S, A}	subject, nominative; accusative alignment
{A}	transitive subject, ergative
{O, T}	direct object, accusative; indirective alignment
{O, G}	primary object, dative; secundative alignment
{T}	secondary object
{G}	indirect object, dative
{S, O, T}	absolutive; nominative; ergative alignment
{S, O, G}	absolutive; nominative; ergative alignment

same treatment by a specific construction; for example, so that they can all trigger the same agreement paradigm on the verb, or so that they can all be assigned the same case marking.

The terminology for the GRs in Table 19.1 is heterogeneous, and when comparing different languages, it sometimes helps to avoid ambiguous terms like 'subject' or 'object' and use instead names that directly refer to the defining properties of the GR, for example, 'the {S, A} relation' or 'the {O, T} relation'. But occasionally the traditional terms are also useful, and I sometimes use 'subject' for {S, A} relations (following Dixon 1994) and 'object' for any relation that contains at least O (and perhaps also S, T, or G). An additional term that is frequently used for some GRs is the term 'pivot', popularized by Dixon (1979b) and Foley and Van Valin (1984). This term refers to any of the subsets in Table 19.1 but is limited to the special case of a GR in a biclausal construction; for example, the GR that is referenced in some languages by switch-reference constructions (cf. section 4.6). For some other biclausal constructions—for example, control and raising constructions (cf. section 4.5)—the terms 'controller' and 'controllee' are useful.

2.2 Reference

Of the GRs listed in Table 19.1, we already encountered the {S, A}, the {A}, and the {S, O, T} relation in the Nepali example (1). The {S, A} relation is instantiated by the agreement construction: only S and A arguments trigger agreement. The {S, O, T} relation is referenced by nominative case, which is in opposition to the {A}-marking ergative. However, this alignment only holds as long as the O argument is inanimate, as in (1b). If it is animate or otherwise socially important ('O-high'), it

receives the same dative marking that is also generally used in Nepali for the G argument of ditransitives (Pokharel 2054[1997]):

(3)   Nepali
a. mai-le   Prembahādur-lāi   dekh-ē
   1SG-ERG (A)   Prem Bahadur-DAT (O)   see-1SG.PST
   'I saw Prem Bahadur.'

b. mai-le   celi
   1SG.-ERG (A)   marriageable.female.clan.relative.NOM (T)
   vahã -haru-lāi   di-ē
   3.HON-PL-DAT (G)   give-1SG.PST
   'I gave them a *celi* (in marriage).'

Because the O argument in the monotransitive sentence in (3a) is animate, it is aligned with the G argument of ditransitives, as illustrated by (3b), and receives the same dative case-marker. This yields a dative-bearing {O-high, G} relation. This is then in double opposition to both the ergative {A} relation and the nominative {S, O-low, T} relation, resulting in what is called tripartite alignment. (Note that the T argument always remains in the nominative, even when it is human, as in (3b).)

The phenomenon we have just looked at in Nepali is also known as differential object marking (beginning with Bossong 1985a): O arguments are mapped into different GRs (notably, direct vs. primary object) for some construction, depending, mostly in a probabilistic rather than categorical way, on such referential properties as animacy, humanness, definiteness, specificity, or more general notions of saliency.[5] The constructions mostly affected by such referential conditions are case and agreement construction. Nepali was an example with case. An example with agreement comes from Swahili:

(4)   Swahili (Benue-Congo, East Africa; Seidl and Dimitriadis 1997)
   mbwa   a-li-ona   mbuzi.   a-li-kata   kamba   na   ku-kimbia.
   dog   3SG-PST-see   goat   3SG-PST-cut   rope   and   INF-run
   a-li-m-rarua   mbuzi   vipande   vipande.
   3SG-PST-3SG.O-tear.apart   goat   part   part
   'The dog saw a goat. It cut the rope and ran free. It tore the goat to pieces.'

Mapping O arguments into the agreement-triggering object relation is more likely if the referent is animate (especially human) and/or known to the hearer. Thus in (4), the patient *mbuzi* 'goat' only achieves full objecthood in the last clause, where

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[5] Therefore, an adequate understanding of the way referential properties affect GR choice requires statistical analysis, for example, multiple logistic regression as proposed by Bresnan, Cueni, Nixitina, and Baayen (2004). Unfortunately, for most languages, we lack corpora of adequate size so that many statements must remain impressionistic hypotheses. The current emphasis on corpora in endangered language documentation will hopefully change this situation.

the referent is already known and established. In the initial clause, *mbuzi* is new and therefore projected into a different kind of object, one that does not trigger agreement but is in all other respects the same as the general object relation.

Two related responses to O arguments that do not make it into the regular object relation because of their 'low' referential status are antipassivization and incorporation. The difference between these and agreement-dropping as in Swahili is a matter of degree, and depends on the number of constructions in which the O argument still behaves as a direct or primary object: in canonical agreement-dropping, the O argument behaves like an object in all constructions except the agreement construction itself; in canonical antipassives and under incorporation, the O argument does not behave like an object in any construction—but there are many cases in between; see, for example, Bickel, Gaenszle, Rai, Rai, Rai, and Sharma (2007) for a recent case study.

Yup'ik Eskimo illustrates a canonical antipassive: indefinite, non-specific, or mass-noun Os are usually not treated as objects for the purpose of agreement (as in Swahili) and also for the purposes of case-marking (where they receive ablative instead of absolutive case) (cf. Mithun 1999: 234 ff., 408). In the following data from Central Yup'ik Eskimo, (5a) is an active sentence, where the O argument (*nutek* 'gun') is definite and therefore functions as an object. As such, it is marked by the absolutive case and triggers agreement. In (5b), by contrast, the O argument is indefinite and can therefore not be an object. As a result it appears as an oblique NP in the ablative, and the verb is marked as antipassive:

(5) Central Yup'ik Eskimo (Eskimo-Aleutan, Alaska; Reed, Miyaoka, Jacobson, Afcan, and Krauss 1977)

   a. angute-m   tamar-a-a   nutek.
       man-SG.ERG   lose-TR-3SG>3SG   gun.SG.ABS
       'The man loses the gun.'

   b. angun   tamar-i-u-q   nuteg-mek.
       man.SG.ABS   lose-ANTIP-INTR-3SG.S   gun-SG.ABL
       'The man loses a gun.'

Chukchi also has antipassives, but they are rarely used for regular main clause purposes. The most prominent response to non-salient O arguments in this language is incorporation:

(6) Chukchi (Chukchi-Kamchatkan, Siberia; Dunn 1999)
     taŋ-amənan   Cəkwaŋaqaj   ɣa-qora-nm-at-len.   qora-ŋə
     INTS-alone   C.3SG.ABS   PRF-reindeer-kill-V-3SG   reindeer-3SG.ABS
     təm-nen   ŋelyə-n   jən-nen
     kill-3SG>3SG hide-3SG.ABS   take.off-3SG>3SG
     'Cakwangaqaj all by himself slaughtered reindeer. He killed a deer [and] took off its hide.'

The first clause describes the activity of reindeer slaughtering, with no reference to any specific O referent. In the following clause, by contrast, the speaker refers to a specific reindeer (cf. the NP *qoraŋə*), which is also the topic of subsequent clauses. With this referential status, the O argument is now treated as a fully-fledged object, and appears as an independent NP, bearing absolutive case and triggering object agreement.

Referential properties are also important for the mapping of A arguments. A fair number of languages allow arguments in the {S, A} relation only if they are animate and/or topical—a pattern that is sometimes called 'differential subject marking'. For case constructions, this can again be illustrated by Nepali. While in past tense contexts (see examples (1) and (3) above and the discussion in section 3.3 below), A arguments are always in the ergative-marked {A} relation, in non-past contexts, A arguments are regularly included in the nominative {S, A} relation. However, the odds for this {S, A} status decrease if the A is abstract, inanimate, or non-topical; in all these cases, A arguments are more likely to be projected into an ergative {A} relation, even in the non-past (Clark 1989, Pokharel 2054[1997]):

(7) Nepali

   a. mero   sāthi   momo   khāi-rahe-cha.
       my   friend.NOM   Tibetan.dumplings.NOM   eat-IPFV-3SG.NPST
       'My friend is eating momos.'

   b. dhumrapān-le   aru-lāi   kharab   gar-cha.
       smoking-ERG   other-DAT   harm   do-3SG.NPST
       'Smoking harms others.'

   c. bāhira   ke-ko   khalbal? — karmi-haru-le   chānā
       outside   what-GEN   noise   worker-PL-ERG   roof.NOM
       hāli-rahe-chan.
       lay-IPFV-3.NPST
       'What's the noise about outside? — It's the workmen laying the roof.'

The A argument in (7a) is animate and topical, and it is therefore mapped into a nominative-marked {S, A-high} relation. But in (7b) and (7c), the A arguments are assigned the ergative-bearing {A} relation: in (7b), because the A is inanimate; and in (7c), because it is focal.

In some languages, the odds of inanimate A arguments functioning as {S, A} are virtually zero. If there is no competing {A} relation available (as there is in Nepali), the response to this constraint is parallel to the treatment of indefinite or inanimate Os in such languages as Eskimo and Chuckchi: the inanimate A is demoted by diathesis, or it is incorporated. Kiowa has both options:

(8) Kiowa (Kiowa-Tanoan, Eastern North America; Watkins and McKenzie 1984)

   a. *téː-gyà   é-thêm
       ice-NML   3SG.A>3cP-break.PFV
       Intended: 'The ice broke it.'

a'. tę̀:-gyà   phí: nɔ̀   ɔ́yhɔ̀-dè
    ice-NML   [3SG.S]-heavy and.DS   there-DIR
    è-thém-gyá
    3cS-break-DETRANSITIVE.PFV
    'The ice$_i$ is heavy, and therefore it$_{*i,j}$ got broken.'

b. *góm-gyà   é-thêm
    wind-NML   3SG.A>3cP-break.PFV
    Intended: 'The wind broke it.'

b'. è-góm-thém-gyá
    3cS-wind-break-DETRANSITIVE.PFV
    'The wind broke it.' (literally 'It got wind-broken.')

Using A arguments in the agreement-triggering subject function, (8a, b) is ungrammatical. The grammatical version in (8a') deletes the A argument of 'break', and the verb appears in a detransitivized form functioning as a passive. In (8b'), the A argument is incorporated into the verb. Both options effectively block the A argument from bearing any GR for any construction in the language.

Referential properties are most central to what are commonly called hierarchical systems. In all examples discussed so far, GRs are defined by pre-selecting one of the transitive arguments (A or O) to combine with the S argument, or by pre-selecting one of the ditransitive arguments (T or G) to combine with the O argument. In hierarchically defined GRs, by contrast, all or nearly all arguments compete for the same GR, and the choice among arguments rests on referential properties alone.

An often-discussed example of this is what one finds in some Austronesian languages (especially those in the Philippines and those in Taiwan). In each clause, one NP is selected as the principal GR, variously identified in the literature as 'topic', 'focus', 'pivot', 'nominative', or 'subject'. I will use the term 'proximative' because all other terms have well-established uses at odds with the nature of the principal GR under hierarchical alignment. The proximative GR is marked by *ang=* in Tagalog and is referenced by a number of constructions, for example, conjunction reduction, relative constructions, and floated quantifiers (see sections 4.3, 4.7, and 4.8, respectively). The choice of which NP bears the proximative GR depends exclusively on referential properties and can fall on any argument (S, A, O, T, or G) or adjunct: all that matters is that the NP has specific reference and that it is the most topical element in discourse (indicated here by italics in the translation):

(9) Tagalog (Austronesian, Southeast Asia; Kroeger 1993)

    a. bumili   ang=lalake   ng=isda   sa=tindahan
        PFV.ACT.buy PROX=man   OBL=fish   LOC=store
        '*The man* bought fish at the/a store.'

    b. binili   ng=lalake   ang=isda   sa=tindahan
        PFV.PAT.buy OBL=man   PROX=fish   LOC=store
        'The/a man bought *the fish* at the/a store.'

    c. binilhan   ng=lalake   ng=isda   ang=tindahan
        PFV.DAT.buy OBL=man   OBL=fish   PROX=store
        'The/a man bought fish *at the store.*'

The verb indicates the role that the proximative NP plays in the clause—in our examples, this is A (indicated by the 'active' or antipassive voice in (9a)), O ('patientive' or passive voice in (9b)), or G ('dative/locative' voice in (9c)), but other roles are possible as well. The non-proximative NPs are marked either as oblique (*ng=*) or by the more specific case clitic *sa=* 'locative, dative'.

What is more common is proximate GRs that admit only arguments but no adjuncts.[6] This is found in a number of languages of the Americas (see Zúñiga 2006 for a survey). In Algonquian languages, for example, the most topical argument is assigned the (zero-marked) proximative GR, while the other argument(s) are marked as obviative. In Central Ojibwa, the proximative is furthermore referenced by raising and other constructions (see section 4.5 below).

(10) Central Ojibwa (Algic, Eastern North America; Rhodes 1976)

    a. aw   aniniw   w-gii-waabam-aa-n   niw   kweew-an
        DEM.PROX   man   3-PST-DIR-3OBV   DEM.OBV   woman-OBV
        '*The man* saw the woman.'

    b. aw   kweew   w-gii-waabam-igw-an   niw   aniniw-an
        DEM.PROX   woman   3-PST-see-INV-3OBV   DEM.OBV   man-OBV
        'The man saw *the woman.*'

In example (10a), the A argument is assigned the proximative relation; in (10b), it is assigned to the O argument. Similarly to what we found in Tagalog, the verb morphology tracks this role assignment: the 'direct' suffix (*-aa*) signals that the proximate GR is the A argument (10a); the 'inverse' suffix (*-igw*) indicates that the proximate GR is the O argument or an inverse scenario (10b).[7]

In many languages (but not e.g. Tagalog), hierarchical alignments are 'frozen', in the sense that the proximative GR choice is dictated by a hierarchy ranking speech act participants (SAP) above third persons, or possessors above possessees. (This is

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[6] But under one analysis (Foley 1998), what looks like an adjunct ('at the store') in sentences like (9c) is in fact an argument licensed by what is traditionally called the 'focus' or 'voice' marker on the verb (here, the 'dative/locative' voice assigning a goal or other locational role to the proximative argument).

[7] Marking SR-to-GR mapping under hierarchical GR choice is not the only function of inverse-marking. In some languages, it reflects deictic and empathy functions independently of the GR system (cf. DeLancey 1981, Bickel 1995, Zúñiga 2006). Conversely, hierarchical GR choice can be found without inverse-marking (DeLancey 1981, Siewierska 2004).

sometimes referred to as 'semantic', as opposed to 'pragmatic', inversion; see Givón 2001.) In Ojibwa, for example, speech act participant arguments must always be proximative, while inanimate or possessed NPs must always be obviative. Thus, in order to say 'I see him', the first person must be proximative and the verb must be inflected as 'direct', indicating that the proximative is the A argument (*n-waabam-aa* [1-see-DIR] 'I see him'). In order to express 'he sees me', the first person must again be assigned the proximative GR; that it is now in O role must then be signalled by inverse inflection (*n-waabam-igw* [1-see-INV] 'he sees me'). Inanimate arguments must always bear the obviative GR. Consider the following data:

(11)   Central Ojibwa (Rhodes 1994)

    a. w-gii-miigshkaa-go-on   mtigo-on   nJohn
         3-PST-hit.the.mark-INV-3OBV   tree-OBV John.PROX
         'The tree hit John.'

    b. *w-gii-miigshkaw-aa-n   nJohn-an   mtig
         3-PST-hit.the.mark-DIR-3OBV   John.OBV   tree.PROX
         'The tree hit John.'

In (11a), *mtigoon* 'tree' is in the obviative, and in order to signal that it is in A role, the verb is marked as inverse. Assigning 'tree' to the proximative GR and, accordingly, using a direct form is ungrammatical, as shown by (11b). Languages differ as to whether assignment to the proximative and obviative GRs is dictated by a strict hierarchy (as in a number of Tibeto-Burman languages; DeLancey 1981), whether the speaker is free to choose on pragmatic grounds of relative topicality (as in Tagalog), or whether both patterns coexist (as in Algonquian languages).

    The data surveyed here suggest a common principle in the way referential features affect GR specifications. Regardless of whether we are looking at subjects, objects, {S, O} relations, or proximatives, and whether we are looking at case assignment or agreement rules, it appears that many languages open their GRs preferably to animates rather than inanimates; to speech act participants rather than third persons; to known rather than unknown referents. These rankings can be summarized in terms of what is variously known as the 'referential', 'animacy', 'person', or 'indexicality' hierarchies (see e.g. Silverstein 1976, Moravcsik 1978b, Comrie 1981, DeLancey 1981, DuBois 1987, Givón 2001, Siewierska 2004, Haspelmath 2005c, Bickel and Nichols 2007):

(12) a. SPEECH ACT PARTICIPANT > KIN/NAME > HUMAN > ANIMATE > INANIMATE > MASS

    b. SPECIFIC > NON-SPECIFIC REFERENTIAL > GENERIC/NON-REFERENTIAL

    c. KNOWN/TOPICAL/THEMATIC/DEFINITE > NEW/FOCAL/RHEMATIC/INDEFINITE

    d. SINGULAR > PLURAL

But other referential notions may also play a role in GR specifications. In a number of Kiranti languages (Sino-Tibetan, Himalayas), for example, issues of politeness (face-saving) require that first person O arguments must not be overtly indexed. These languages have obligatory object agreement, and the only way to delete reference to a first person O argument is to deny it object status, so that it can no longer trigger agreement. In Puma (Bickel and Gaenszle 2005), this is achieved by antipassivization: an antipassive form like *kha-en-a* [ANTIP-hear-3sPST] 's/he heard (someone)' is regularly used for first person arguments, meaning 's/he heard us' (and as such can even co-occur with an independent first person object pronoun, although this may be impolite).

3. CONDITIONING GRAMMATICAL RELATIONS

The role and reference properties just surveyed define the individual arguments that can be variously included or excluded by specific GRs. But these decisions of inclusion or exclusion—often called 'mapping', 'linking', or 'projecting' procedures—can be, and often are, conditioned by the nature of the larger syntactic environment, specifically by properties of the entire clause or of the predicate.

3.1 Scenario

In some languages, the assignment of an argument to a specific GR depends not only on that argument's role and reference properties but also on the nature of other arguments in the clause.[8] In other words, the assignment is conditioned by the way two or three arguments interact with each other, i.e. by the scenario they define. This is illustrated here by case-marking on pronouns in Yurok.

(13) Yurok (Algic, Western North America; Robins 1958: 21)
    a. ke?l   nek   ki   newoh-pa?
         2SG.NOM 1SG.NOM FUT   see-2>1SG
         'You will see me.'

    b. yo?   nek-ac   ki   newoh-pe?n
         3SG.NOM 1SG-OBJ FUT   see-3SG>1SG
         'He will see me.'

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[8] This was first identified by Silverstein (1976) in terms of 'global rules' of case-assignment.

The object marker *-ac* is used only when there is a third person subject in the clause. This is so in (13b) but not in (13a). In Finnish, accusative case on objects is marked only if there is a subject NP in the clause, but not, for example, in imperative constructions, which lack an overt subject NP (Comrie 1975a).

In Sahaptin, it is subject- rather than object-marking that is sensitive to the properties of another argument (cf. Zúñiga 2006):

(14)   Umatilla Sahaptin (Plateau, Western North America; Rigsby and Rude 1996)

    a.   iwínš   i-tu.xnana   yáamaš-na
        man   3SG.SBJ-shot   mule.deer-OBJ
        'The man shot a mule deer.'

    b.   iwínš-nim=nam   i-q'ínu-ša
        man-ERG=2SG   3SG.SBJ-see-IPFV
        'The man sees you.'

The A argument is assigned an ergative-marked relation only if the O argument is a speech act participant. In (14), this condition only obtains in (b). A similar distribution is found in Tauya, a language of Papua New Guinea:

(15)   Tauya (Trans-New-Guinea, Papua New Guinea; MacDonald 1990)

    a.   ya-ni   fanu   yau-e-ʔa
        1s-ERG   man   [3SG.O-]see-1SG.A-IND
        'I saw the man.'

    b.   ya   pai   yau-eʔa
        1SG.NOM   pig   [3SG.O-]see-1SG.A-IND
        'I saw the pig.'

If there is a human or other high-ranking O argument, the A argument must be in the ergative, as in (15a); if not, ergative-marking is optional, as in (15b). Variations on this theme can be found in languages like Fore (also Trans-New-Guinea; Scott 1978), Acehnese (Austronesian; Durie 1987), or Rapanui (Austronesian; Du Feu 1996), where ergative-marking appears whenever the O argument precedes the A arguments in linear order, and therefore tends to be higher-ranked (in terms of the hierarchy in (12) above).

These kinds of conditions on GR-assignment are most common in case-marking systems. The reason is perhaps that case (as opposed to other manifestations of GRs) often has a prominent discourse function of distinguishing transitive arguments, especially when both are animate (see e.g. Comrie 1981).

3.2 Lexical predicate class

Another factor in conditioning GRs is the lexical (or lexical-semantic) class of the predicate from which arguments are selected. This is very common in the languages of the world, and there are many ways in which classes can play a role.

One way in which predicate classes define GRs is known as 'split intransitivity'. The basic observation is that in some languages the S argument of some predicates (e.g. depending on the language, those with agentive or activity semantics) aligns with A, while the S argument of other predicates (with patientive or stative semantics) aligns with O, T, or G, or a combination of these. Instead of, or in addition to, such distinctions, one also often finds a class of intransitives that aligns S with G (typically with experiential semantics). Languages vary strongly as to how they group the lexicon here; indeed, they vary even as to whether the classification is rigid ('split-S' in Dixon's 1994 terms), whether it is more amenable to constructional and conceptual choice ('fluid-S'), or whether the semantic motivation between classes draws more on notions of agentivity or experience, or on Aktionsart notions of activity (or combinations of all these). And if the classification is rigid, languages may distinguish a closed (small) vs. open (large) class (Merlan 1985).[9]

An example with a three-way contrast is Chickasaw. While case assignment and switch-reference (cf. Section 4.6) are based on a subject vs. object distinction, agreement is triggered by three distinct GRs: type (a) aligns S with A; type (b) aligns S with O; and type (c) aligns S with G. The choice is largely lexical, but some predicates are flexible.

(16)   Chickasaw (Muskogean, Eastern North America; Munro and Gordon 1982)

    a. malili-li   a. chi-sso-<u>li</u>
       run-1SG.ACT   2SG.PAT-hit-1SG.ACT
       'I ran.'   'I hit you.'

    b. sa-chokma   b. is-<u>sa</u>-thaana
       1SG.PAT-good   2SG.ACT-1SG.PAT-know
       'I'm good.'   'You know me.'

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[9] For recent surveys and discussion, see Donohue and Wichmann (2008). Split intransitivity is sometimes taken to challenge the universality of the notion 'S'. But S is defined here purely by numerical valence, as an argument licensed by an intransitive predicate (cf. section 2.1); and in all languages with split intransitivity that I am aware of, intransitive verbs behave differently from transitive verbs in at least some morphological or syntactic effects, minimally with regard to the number of syntactic argument positions they license. The universality of S can only be challenged by demonstrating that the difference between intransitive and transitive predicates plays no role whatsoever in a language.

c. an-takho'bi   c'. iss-<u>am</u>-a
   1SG.DAT-lazy   2SG.ACT-1SG.DAT-give
   'I'm lazy.'   'You give it to me.'

The data in (16) show on the left-hand side the three types of intransitive predicates; the data on the right show the transitive clauses, each highlighting the argument that is aligned with the S argument on the left.

The alignment of S with G in type (16c) reflects a frequent pattern cross-linguistically, especially for predicates that include experiential or possessive semantics, and it is often based on a metaphorical analogy of experiencers with goals (Bickel 2004b, Nichols 2008). An example is Nepali, where some experiential predicates include their S argument in a nominative-marked {O-low, T} relation while others include it in the dative-marked {O-high, G} relation. (To highlight the parallel to Chickasaw, I chose here similar predicates.)

(17) Nepali
   a. ma   rāmro   thiẽ
      1SG.NOM   good   COP.1SG.PST
      'I was good.'

   b. malāi   alchi   lāgyo
      1SG.DAT   lazy   be.3SG.PST
      'I was lazy.'

In addition, there is a small set of intransitive predicates denoting body functions ('cough', 'urinate', 'vomit', etc.) that require ergative case, yielding, for this (and only this) predicate class, an ergative-marked {S$_a$, A-low} relation (where the subscript a indexes the lexical class):

(18) Nepali
      kānchā-le   khok-yo
      last.born-ERG cough-3SG.PST
      'Kancha coughed.'

Predicate classification is not limited to intransitive predicates. GR definitions are affected by such classifications just as easily in transitive predicates. For one thing, transitives often treat the A argument of experiential predicates in a distinct way and assign them the same dative-marked GR as with experiential intransitive predicates. This can again be illustrated by Nepali. Apart from sentences like (17b), there are transitives like (19):

(19) Nepali
      malāi   tyo   ciyā   dherai   man par-yo
      1SG.DAT   DEM   tea.NOM   very   please-3SG.PST
      'I liked that tea very much.'

The result of this is a complete reversal of relations in case assignment: the A argument (the more actor-like experiencer) is coded like an {O-high, G} object, whereas the O argument (the less actor-like stimulus) is treated like a {S, O-low, T} subject for the purposes of nominative case-assignment. (For the purpose of verb agreement, the O argument qualifies as a {S, A} relation, as evidenced by the third person singular agreement in (19).)

Another way in which lexical distinctions among transitives matter for GR definitions is the way O arguments align with the G or T of ditransitives. In some European languages, we find lexical contrasts between {O, T} transitives assigning accusative (e.g. German *unterstützen* 'support') and {O, G} transitives assigning dative to their O argument (e.g. *helfen* 'help').

Other important lexical classes are motion and especially caused motion verbs. Motion verbs often assign their goal argument variably to a regular object relation or to an oblique function. English has fluid objecthood here; compare, for example, *load hay onto the truck*, where the goal is an oblique, with *load the truck with hay*, where the goal is treated as a direct object. By contrast, some languages fairly consistently assign their goal arguments to objects, stranding the T argument as an oblique. (For a survey, see Bickel and Nichols 2009).

3.3 Tense, aspect, and other clause type categories

In a number of languages, the choice between different sets of GRs, especially GRs in case assignment, depends on the choice of the verb form. We have already noted this in the data from Nepali, which are fairly typical of the way such choices are distributed. Table 19.2 summarizes the facts (based on Clark 1989, Pokharel 2054 [1997], and my own observations), where 'low' and 'high' mean probabilistic values on the hierarchies in (12) and the subscripts e and a index arguments of specific lexically defined predicate classes (e for broadly 'experiential' and a for a subset of body-function predicates). Set I includes the past (perfective and imperfective), perfect, and converb forms, as well as infinitival clauses (though dialects vary in this last regard). Set II includes all other forms.

Table 19.2. Distribution of GRs in Nepali case assignment rules

	Set I forms	Set II forms
NOM (ϕ)	{S, O-low, O$_e$, T}	{S, A-high, O-low, O$_e$, T}
ERG (-*le*)	{S$_a$, A}	{S$_a$, A-low}
DAT (-*lāi*)	{S$_e$, A$_e$, O-high, G}	

The reasons for distributions like these are best found in their etymology. In many Indo-Aryan languages, Nepali among them, one important observation is that the Set I forms go back to periphrastic participial constructions of the kind 'with-me the-book is written' = 'I have the book written', where the agent was coded by an oblique case-marker. This has developed over time into regular perfects and further into plain past tense forms (cf. 'I have the book written' > 'I have written the book') (see Peterson 1998).

In other languages, aspectual conditions are not mediated by periphrasis. In Yukatek Maya, for example, aspectual choice conditions the GRs for verb agreement in the following way: agreement follows an {S, O} pattern in clauses with perfective forms, but an {S, A} pattern in clauses with imperfective forms. In addition, the {S, O} alignment is also conditioned by subjunctive forms, which characterize subordinate clauses.

Thus, apart from aspectual and temporal conditions, the status of clauses as subordinate vs. main may also be a relevant factor. In other Mayan languages—for example, Mam (England 1983)—this is the only factor. Languages differ strongly in the precise definition of these conditions and the way they interact with each other.

Another frequent way in which the clause type is relevant for GR assignment is finiteness. In many languages, non-finite constructions obligatorily demote S and A arguments to GRs with oblique case-marking. One instance of this is participial constructions in classical Indo-European languages, where overt S or A arguments must appear in an oblique case. Ancient Greek chose the genitive (while Latin chose the ablative). This is exemplified in the following (20) by the pronoun *autoû* 'of him', which is the S argument of the participial form *asthenésantos* 'being feeble':

(20)   Ancient Greek (Bickel 1999)
[asthenésa-nt-os   aut-oû]   oudépote
feeble-IPFV.PTCP-GEN.SG.M   3-GEN.SG.M   never
ap-é-leip-e   tòn   pápp-on
away-PST-leave-3.SG.IPFV   ART.ACC.SG.M   grandfather-ACC.SG
(Xen. *Cyr.* I, 4, 2)
'When he (grandfather) was sick, he would never leave his grandfather.'

Some modern Indo-Aryan languages require overt S or A arguments in participial or converbial clauses to be in the genitive or dative, while the usual nominative or ergative case assignments are banned. Maithili chooses the dative:

(21)   Maithili (Bickel and Yādava 2000)

a. Rām-kē/*Rām   ehan   kitāb   padh-ab   thīk   nahi ai-ch
R.-DAT/R.NOM   such   book.NOM   read-INF   right   not   3-be
'It is not good for Ram to read such a book.'

b. hamrā/*ham   ghar   āib-kē   pitā-jī   khuśī
1DAT/1NOM   home   come-CVB   father-HON.NOM   happy
he-t-āh
be(come)-FUT-3HON.NOM
'When I come home, father will be happy.'

Thus, in Maithili non-finite constructions (infinitives in -*ab* as in (21a) and converbs in -*kẽ* as in (21b)), case assignment rules align S and A with G, neutralizing distinctions made in finite constructions.

4. GR CONSTRUCTIONS: A SURVEY

In the preceding sections, we have surveyed various ways in which languages subset arguments into GRs, illustrated exclusively by case assignment and agreement rules. But these are, of course, not the only kind of constructions that specify a GR. In principle, any syntactic construction can specify a GR: whenever some combinatorial rule or constraint is limited to a subset of arguments, this reflects a GR. In the following, I review the best studied of these GR constructions beyond case and agreement.

4.1 Phrase structure

Phrase structure has been noted to reference GRs in two basic ways. One of them is well known, because it is found in English. Here, clause-level phrase structure specifies rigid positions for subject and object relations—for example, a preverbal position for subjects and a postverbal position for objects. If GRs have such positional properties in a language, the language is sometimes said to be 'configurational' (following a tradition established by Hale 1983 and standard in most theories); but note that in those theories that seek to represent all dimensions of syntax in phrase structure terms, the term 'configurational' is also used in a different sense, as implying that there is a subject/object asymmetry, regardless of surface positioning possibilities (e.g. Speas 1990, Baker 1996).[10]

An additional property of the GR positions in a language like English is that they need to be filled obligatorily (unless they are deleted in specific constructions; see

[10] In such theories, free ordering of GR-bearing NPs (i.e. apparent non-configurationality) is usually accounted for by constraints against NPs in argument positions, so that the freely ordered NPs are no longer real arguments.

below). Obligatorily filled positions are not very common in the languages of the world, and when they occur, they need not be defined as subjects or objects. In Movima, a language isolate from Bolivia, for example, clauses have to have one overt NP (lexical or pronominal), and this is the proximative NP, i.e. the argument that ranks highest on the referential hierarchy (Haude 2006). The role of this argument as A or O in transitive clauses is then indicated by direct vs. inverse voice on the verb, similarly to what we saw in Ojibwa in section 2.2. The same basic principle, with an obligatory proximative NP but with a more extensive voice system, is known from Tagalog. In the example in (9), the *ang*-NP is obligatory.

Another, less well-known way in which phrase structure can reflect GRs concerns projection levels, in particular the NP vs. N distinction. Belhare (Bickel 2004a, 2006a), an Eastern Kiranti language of Nepal, for example, has two kinds of primary object GRs: one for specific {O, G} arguments, and one for generic {O, G} arguments. Specific objects project a full-fledged NP; generic objects, only bare Ns (for a similar pattern in related Limbu, see Angdembe 1998):

(22)   Belhare (Sino-Tibetan, Himalayas; Bickel 2004a, 2006a)

   a. unchik-ŋa   [$_{NP}$ khaī=kha   cece]   n-cai-t-u
      3NSG-ERG   good=ART   meat   3NSG.A-eat-NPST-3SG.O
      'They eat (the) good meat.' (specific referent)

   b. unchik   [$_N$ (*khaī=kha)   cece]   n-ca-yu
      3NSG.NOM   good=ART   meat   3NSG.S-eat-NPST
      'They eat meat.' (= 'They are not vegetarians.')

In (22a), the O argument is specific and is therefore realized as a specific object relation. As such, it can be expanded into a modified NP. In (22b), by contrast, the O argument is generic and is therefore realized as a generic object; as such, it cannot be expanded into a modified NP. The same distinction between specific and generic objects is also relevant for agreement: only specific objects trigger agreement, as shown by the different verb forms in (22). However, the distinction is irrelevant for all other GR constructions of the language: all primary objects are assigned absolutive case; they can be fronted (e.g. instead of *unchik cece ncayu*, one can also say *cece unchik ncayu*); and they can be relativized on (see Bickel 2006a).

4.2 Diathesis

Many kinds of diathesis (voice, applicatives, causatives, etc.) assign virtually any argument to some specific derived GR (see Kulikov, this volume). Many applicatives, for example, are able to assign virtually any argument or even adjunct to object status (German *be-*, for example, can turn a locative adjunct into a direct object just as well as a G argument; compare the applicativized locative adjunct

in *be-arbeiten* 'work on or at something' from *arbeiten* 'work' with the applicativized G argument in *be-schenken* 'give someone a gift' from *schenken* 'give a gift').

But sometimes diatheses can only assign members of one GR to another GR, and then these constructions specify an 'input' GR. Especially passives and antipassives are often restricted in such ways. German, for example, has one passive (using the auxiliary *werden*) on arguments projectable into the {O, T} relation, and one passive (using *kriegen* or *bekommen*) on arguments projectable into the {G} relation:

(23)   German

   a. Der   Wagen   wurde   ihm
      ART.SG.M.NOM   car   PASS.AUX.3SG.PST   3SG.DAT
      geschenkt
      give.as.present.PST.PTCP
      'The car was given to him as a gift/for free.'

   b. Er   kriegte   den   Wagen
      3SG.NOM   PASS.AUX.3SG.PST   ART.SG.M.ACC   car
      geschenkt
      give.as.present.PST.PTCP
      'He was given the car for free/as a gift.'

The result of passivization and antipassivization is a new set of derived and demoted argument roles. Derived S and A arguments share syntactic transitivity with their non-derived counterparts—derived S occurs in intransitive; derived A, in monotransitive clauses—but they differ in argument structure: derived clauses still contain two-place or three-place predicates, with A, O, T, and G roles, whereas non-derived S and A clauses contain one-place and two-place predicates, respectively. Despite this difference, most languages treat derived S and A roles exactly like non-derived S and A roles for many purposes (the roles are assigned the same case, trigger the same kind of agreement, etc.). Yet, as we will see in section 5, some constructions in some languages treat derived and non-derived S roles differently. Demoted A (as in passives) and demoted O (as in antipassives) arguments are sometimes called 'logical subjects' and 'logical objects', respectively. They typically behave like adjuncts, but for specific constructions, they can also align with other grammatical relations. Again, examples of this are discussed in section 5.

4.3 Conjunction reduction

In many languages, such as Chinese, sentences like the following receive a natural interpretation based entirely on world knowledge (Comrie 1988a):

(24)   Mandarin Chinese (Sino-Tibetan, China; LaPolla 1993)
　　　nei　　ge　　ren　　ba　　xigua　　　　diao　zai　　dishang,　sui
　　　that　CLF　person　OBJ　watermelon　drop　LOC　ground　break
　　　le
　　　PFV
　　　'That man dropped the watermelon on the ground and it burst.'

In the English translation, the sentence only receives a natural interpretation if we include the pronoun *it* in the second clause (as is done in the translation of (24)). Without *it*, the syntax of English enforces an interpretation whereby the S argument of *burst* is the same as the A argument of *drop*—despite all our world knowledge that makes this a very unlikely scenario. The reason for this is that English, but not Chinese, has a GR construction here. The construction is conventionally called 'conjunction reduction'. It is formally identified by deletion of the subject argument in the second clause and by a rigid constraint demanding co-reference between the two subjects. It is important to note that the co-reference condition is a rigid syntactic constraint on interpretation, which can even overrule pragmatic background assumptions, because conjunction reduction is easily confused with zero anaphora, which does not impose any such constraint. Zero anaphora is the widespread tendency across languages to leave out topical arguments, such as was done in the second clause of the Chinese version of (24). Unlike under conjunction reduction, the interpretation of zero anaphora entirely rests on our knowledge of the world and the previous discourse.[11]

Conjunction reduction is probably not very common in the languages of the world. An interesting example comes from Dyirbal, however, where the construction demands co-reference of the {S, O} arguments, i.e. reversing the English alignment:

(25)   Dyirbal (Pama-Nyungan, Northern Australia; Dixon 1972)
　　　bayi　　　　　yara　　　bangun　　　　dyugumbiru　balga-n
　　　DET.SG.M.NOM　man.NOM　DET.SG.F.ERG　woman-ERG　hit-NFUT
　　　badyi-nyu
　　　fall.down-NFUT
　　　'The woman hit the man and he (*she) fell down.'

The construction is formally characterized not by a conjunction or affix but by forming a single intonation group. This distinguishes the construction from syntactically unconstrained zero-anaphora (see Dixon 1979a for further discussion of this important point).

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[11] Conjunction reduction has been claimed e.g. for many Indo-Aryan languages. On closer inspection, however, all putative instances turn out to be zero anaphora, where world knowledge can easily override the syntax, like Chinese and unlike English. See Bickel and Yādava (2000) and Bickel (2004b).

In Tagalog, the deleted argument in conjunction reduction precedes the antecedent,[12] and both arguments must bear the proximative GR, regardless of their semantic role:

(26)   Tagalog (Kroeger 1993)
　a.　tinukso　　　　　ng=mga=kaibigan　at　kinagalitan　si=Juan
　　　PFV.PAT.tease　OBL=PL=friend　　and　PFV.G.anger　PROX=J.
　　　ng=kaniya=ng　　　　　guro
　　　OBL=3SG.DAT=LNK　teacher
　　　'His friends teased and his teacher scolded Juan.'

　b.　pumunta　　　　sa=tindahan　at　bumili　　　ang=kapatid　ko
　　　PFV.ACT.go　　LOC=store　　and　PFV.A.buy　PROX=sibling　my
　　　ng=bigas
　　　OBL=rice
　　　'My brother went to the store and bought some rice.'

　c.　^(√*)niluto　　　　　ang=pagkain　at　hinugasan　　ang=mga=pinggan
　　　PFV.PAT.cook　PROX=food　　and　PFV.G.wash　PROX=PL=dish
　　　ni=Josie
　　　OBL=Josie
　　　Intended: 'Josie cooked the food and washed the dishes.'

In (26a), *Juan* is chosen as proximative in the two conjoined clauses, and the verbal voice inflections (O and G) signal Juan's role as O (patient) and G (experiencer) argument, respectively. In (26b), *kapatid ko* 'my sibling' again bears the proximative GR, and here the verbs indicate a role as A in each clause. (26c) is ill-formed because the proximative arguments *pagkain* 'food' and *mga=pinggan* 'dishes' are not shared and not deleted. The fact that the clauses share an agent is irrelevant.

4.4 Non-finite constructions

The key property of conjunction reduction is that a missing argument is obligatorily interpreted as co-referent with the preceding subject (or, in Dyirbal, the {S, O} relation), but there need not be a missing argument to begin with. It is perfectly fine not to omit any argument, regardless of whether there is co-reference or not (cf. *My friend_i went to town and he_i bought a case of champagne!*). This is very different from cases where a language bans the occurrence of any overt argument in some construction. The most common such constructions involve non-finite forms (infinitives, participles, converbs, purposives, supines, etc.), and the ban is most often specified as a ban on subject arguments. Most European languages, for

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[12] When it does not, this is zero anaphora, and there is no GR specified at all. See Kroeger (1993).

example, ban the appearance of any overt subject in infinitives (cf. *he to work) or converbs (*while he working), but it is important to note that this is by no means universally so: many languages allow any overt argument in, for example, infinitival clauses (e.g. Nepali; Bickel and Yādava 2000), or they allow them if they are mapped into a specific case relation (see section 3.3).

Most bans on overt arguments are complemented by some constraint or formal marking regulating the reference of these arguments. One type involves superordinate constructions, such as control and raising constructions. Another type involves morphological co-reference marking. Both types also occur without obligatory argument deletion, and they are discussed below.

4.5 Control, raising, and other co-reference constructions

Many languages have constructions that require a certain subordinate GR (the 'controllee') to be co-referential with a superordinate GR (the 'controller'). These constructions vary typologically in two basic ways. One variable is whether the superordinate GR is a semantic argument of the superordinate clause. If it is, the construction is traditionally called a 'control construction' (e.g. he wants to go); if not, it is called a 'raising construction' (he seems to work). Another variable concerns the question of whether the subordinate argument is obligatorily deleted (see the preceding section) or not. When it is obligatorily deleted, the construction is sometimes said to involve 'EQUI-deletion'. When it is not deleted, co-reference constructions are sometimes called 'copying constructions', 'backward control', 'backward raising', or, when combined with verb agreement in the main clause, 'long-distance agreement'. (We will encounter examples of backward control and raising below.)

In any of these constructions, the controller is sometimes lexically defined as subject (control: He wants to work; raising: He seems to work) and sometimes as object (control: I ask you to work; raising: I believe you to work). The controllee, by contrast, is most often defined as subject. But other GRs are also known, especially in constructions that do not ban the occurrence of overt NPs in the subordinate clause.

In Belhare, raising and control constructions with nus- 'may' and khes- 'must',[13] for example, the controllee must bear the {S, O} relation. (The controller is always S with these verbs.)

(27)   Belhare (Bickel 2004a)

    a. khoŋ-ma   nui-ka
       play-INF   may.NPST-2
       'You may play.'

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[13] Nus- 'may' is a control verb: it does not have an impersonal alternate and assigns a semantic role to its S argument. Khes- 'must' and some other verbs do have impersonal alternates and are likely to be raising verbs. See Bickel (2004a) for discussion.

    b. lu-ma   nui-ka
       tell-INF   may.NPST-2SG
       '(They/someone) may tell you.', not 'You may tell someone.'

The dependent infinitive can have overt arguments (e.g., unchikŋa 'they.ERG' and han 'you.NOM', as in unchikŋa han luma nuika 'they may tell you'); i.e. there is no syntactic ban on overt NPs in infinitives in this language (although Belhare speakers in general tend not to use overt NPs unless they are really unavoidable pragmatically). But regardless of whether arguments are overt or not, the constraint holds that the lower {S, O} argument must be co-referential with the S argument of the main clause: *hanna luma nuika, with the ergative-marked pronoun hanna 'you.ERG', is ungrammatical because it would require A=S co-reference: 'you [S] may [A] tell them'. Similar patterns of syntactic ergativity have been noted in a number of Nakh-Dagestanian languages (Caucasus; Bickel and Nichols 2001).

Another example of an {S, O} constraint in a control construction is found in Dyirbal:

(28)   Dyirbal (Dixon 1995)

    a. bayi   yara   walŋgarra-nyu   baŋgun
       DET.SG.M.NOM   man.NOM   want-NFUT   DET.SG.F.ERG
       yibi-ŋgu   bura-li
       woman-ERG   see-PURP
       'The man wanted the woman to see him' (e.g. while he was 'showing off').

    b. bayi   yara   walŋgarra-nyu   bural-ŋa-ygu
       DET.SG.M.NOM   man.NOM   want-NFUT   see-ANTIP-PURP
       bagun   yibi-gu
       DET.SG.F.DAT   woman-DAT
       'The man wanted to see the woman' (he might be worried about her).

The verb walŋgarra- 'want' is an intransitive control verb and requires the lower {S, O} argument to be co-referential with its S argument. In (28a), this is yara 'man', and this argument is in O function in the dependent clause. If the semantics require co-reference with an A argument, as in (28b), the dependent clause needs to be antipassivized so that the A argument is re-assigned the S function.[14]

Occasionally, control or raising verbs in some languages constrain the controllee to bear a more narrowly defined GR. In a number of Mayan languages, control

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[14] Dixon (1995) and Manning (1996) claim that these are not control constructions comparable to English 'want' constructions because the dependent clause is not embedded and because the

constructions impose obligatory deletion of the controllee, and the controllee is restricted to S arguments:

(29)   Yucatec (Mayan, Mexico; Verhoeven 2005)

   a.   in=k'áat   bin   Cancun
       1SG.A-wish go   Cancun
       'I want to go to Cancun.'

   b.   in=k'áat   in=kan   Màaya
       1SG.A-wish 1SG.A-learn[-3SG.O] Maya
       'I want to learn Maya.'

   c.   in=k'áat   káa   u=bis-en   Cancun in=tàatah
       1SG.A-wish COMP 3SG.A-carry-1SG.O Cancun 1SG.POSS=father
       'I want my father to bring me to Cancun.'

If the dependent clause is intransitive, as in (29a), it is integrated into a control construction: the verb is non-finite and the controllee is obligatorily deleted under co-reference (so that *in=bin* 'I go' would be ungrammatical here). Under all other conditions, the dependent clause obligatorily retains clitics for both arguments. Neither co-reference of the subordinate A, as in (29b), nor co-reference of the subordinate O, as in (29c), allows the use of the Yucatec control construction.

In the data so far, the controllee was specified as {S}, {S, A}, or {S, O}, but purely referential GR specifications (as discussed in section 2.2) are also found in co-reference constructions. The Algonquian language Ojibwa, for example, imposes a co-reference constraint on 'know' constructions between the main clause obviative and the embedded proximative argument. The proximative argument is the one that is considered most topical in a clause, and it is the A argument if the verb is inflected as direct and the O argument if the verb is inflected as inverse (cf. the data in (10) above). (Note that the controllee is not deleted in this language.)

(30)   Central Ojibwa (Rhodes 1994)

   a.   n-gikenm-aa-g   ninw-ag   gii-baashkzw-aa-waad Maagiiy-an
       1-know-DIR-3PL   man-PL.PROX PST-shoot-DIR-3   Marge-OBV
       'I know the men shot Marge.'

subordinate controllee may be overt (as long as it is co-referential with the superordinate S argument). But English infinitives after *want* are not embedded either (they do not fill the canonical object position, nor have they all object properties; cf. Van Valin and LaPolla 1997: 461 ff.), and overt controllees are widely attested in other languages (cf. the Belhare example above, and see Polinsky and Potsdam (2006) for a recent survey). What makes Dyirbal 'want' sentences control constructions is that the matrix verb 'carries the expectation of a further verb in purposive construction with it' (Dixon 1995: 206). Also, I would be surprised if the dependent clause did not exhibit such properties of subordination as disjunct illocutionary scope (whereby only one but never both clauses can, for example, be questioned). But on this, we lack data.

   b.   n-gikenim-aa   Maagii   gii-baashkzo-go-d ninw-an
       1-know-DIR[3SG] Marge.PROX PST-shoot-INV-3   man-OBV
       'I know the men shot Marge.'

   c.   *n-gikenm-aa-g   ninw-an   gii-baashkzo-go-d Maagii
       1-know-DIR-3PL   man-PL.OBV PST-shoot-INV-3   Marge.PROX
       Intended: 'I know the men shot Marge.'

In (30a), *ninwag* 'the men' is chosen as the proximative GR, and this argument is the controllee, as shown by its co-reference with the third person plural controller in the main clause (indexed by the agreement suffix *-g* '3p' and registered as an obviative O-argument in the main clause by the direct marker). In (30b), *Maagii* 'Marge' is chosen as the proximative GR in the dependent clause. Accordingly, this argument is now the controllee, and as such is co-referential with the third person singular obviative controller in the main clause. The construction is ungrammatical, however, if the co-reference relation is intended as holding between the main clause controller and the subordinate obviative argument. This would be the case in (30c), where the main clause inflection signals a plural controller, but in the subordinate clause it is again the singular NP *Maagii* that is assigned the proximative GR. A similar pattern is found in Tagalog, where the controllee in raising constructions must also bear the proximative GR. Different from Ojibwa, the Tagalog raising construction also requires the controller to be in proximative function (and also different from Ojibwa, the controller must be deleted in the dependent clause; see Kroeger 1993).

4.6 Switch-reference and other kinds of cross-clausal co-reference marking

Many languages have a morphological device for explicitly signalling whether or not selected arguments of two clauses have the same reference. Such devices are called switch-reference markers. The question of which arguments are monitored for co-reference is defined by the GR of the construction. The near-universal choice here is subject relations; that is, switch-reference morphology indicates co-reference of subjects. The following illustrates this in Kâte:

(31)   Kâte (Trans-New-Guinea, Papua New Guinea; Pilhofer 1933)
     ra   fisi-pie   fahare-râ   yâpe?-yopa-pie
     go   arrive-SEQ.3PL.DS rise-SEQ.SS   chase.away-3PL.DO-SEQ.3PL.DS
     mafa-yeŋi?   behe-râ   wise-pie   fiu?
     stuff-3PL.POSS throw.away-SEQ.SS flee-SEQ.3PL.DS illicitly
     ro=fâre-mbiŋ.
     take=all-3PL.REM.PST

'When they$_i$ (the foreigners) arrived, they$_j$ (the villagers) got up and chased them away. They$_i$ threw away their stuff and fled. Then, they$_j$ stole their stuff.'

The dependent forms marked as 'DS' signal that the following clause has a different subject; those marked as 'SS' indicate that the same subject referent will follow.

Switch-reference systems compare the reference of two GRs: the one in the clause bearing the switch-reference markers with the one in the clause referred to by the markers. Most often, the GRs are specified in the same way, both as subjects. But sometimes they need to be distinguished as the controller GR and the controllee GR; then the controller may precede or follow the controllee, and there may be a constraint on whether one, both, or none of them needs to be deleted.[15] Also, note that switch-reference systems may be equipollent, as in Kâte, with one marker for 'same GR' and one for 'different GR', but privative systems with a marker for just one option (typically for 'same subject') are also very widely attested (e.g. in the form of many converbs, such as Turkish forms in -Ip and -ErEk). And finally, it is important to note that switch-reference can be found in many different kinds of clause linkage. Kâte illustrated switch-reference in clause chaining, but switch-reference devices are also frequently found in various kinds of subordination and embedding.

Switch-reference systems in clause chaining seem to favour subjects as the GR they target, but other options are also attested. Dyirbal has a privative system marking co-reference, where the controller is defined as {S, O} and the controllee as {A}. The controller must precede the controllee, and the two events must follow each other immediately:

(32)   Dyirbal (Dixon 1994)
    yabu   ŋuma-ŋgu   bura-n   (ŋuma)   banaga-ŋurra
    mother.NOM   father-ERG   see-NFUT   father.NOM   return-{S, O}={A}
    'Father saw mother and immediately returned.'

Another, very rare kind of GR referenced by co-reference marking is reported (in a brief analysis) from Angaataha, a Papuan language, which apparently has a system of switch-reference targeting locative relations rather than subjects (Trans-New-Guinea; Huisman 1973, Foley 1986).

Outside chaining constructions, the GRs monitored by switch-reference are more varied. Eskimo languages, for example, have two forms of signalling co-reference with a subject controller: one for subject controllees and one for object controllees (traditionally called 'reflexives'):

(33)   Central Yup'ik Eskimo (Eskimo-Aleut, Alaska; Reed et al. 1977)

a.   angute-m   tange-llr-ani   tuntuvak
      man-ERG   see-when-3SG.A>3SG.O.{O}={S, A}   moose.NOM
      aya-llr-uuq
      go.away-PST-INTR-3SG
      'When the man saw him$_i$, the moose$_i$ went away.'

b.   tang-ller-miniu   tuntuvak   angun
      see-when-3SG.A>3SG.O.{A}={S, A}   moose.NOM   man.NOM
      aya-llr-uuq
      go.away-PST-INTR.3SG
      'When he$_i$ saw the moose, the man$_i$ went away.'

The mirror-image of this distribution of co-reference markers is conjunct participles and related constructions, where the controllee is always the subject (and, in addition, obligatorily deleted) but where different forms indicate the GR of the controller in the main clause. Warlpiri has two options for signalling co-reference (plus one for disjoint reference). The suffix -karra, illustrated by (34a), indicates that the controllee is co-referential with the subject of the main clause, while -kurra, as in (34b), indicates that the controllee is co-referential with the (primary) object.

(34)   Warlpiri (Pama-Nyungan, Australia; Simpson 1991)

a.   ngarrka=ka   wangka-mi   karli
      man.NOM=PRS   speak-NPST   boomerang.NOM
      jarnti-rninja-karra
      trim-INF-SIM.{S, A}={S, A}
      'The man talked when trimming the boomerang.'

b.   ngajulu-rlu-rna   yankirri   pantu-rnu   ngapa
      1SG-ERG=1SG.A   emu.NOM   spear-PST   water.NOM
      nga-rninja-kurra
      drink-INF-{S, A}={O, G}
      'I speared the emu while it (not I) was drinking water.'

The classical Indo-European languages have as many options as they have distinct cases: the case on a conjunct participle indicates with which argument or adjunct of the main clause the (obligatorily deleted) subject of the participle is co-referential, namely, with the one that bears the same case.[16]

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[15] The special case of constructions with obligatorily deleted controllees and co-reference-marking is sometimes identified as 'depictive' or 'secondary' predication. In Tagalog, for example, secondary predicates must have a controller bearing the proximative GR (Kroeger 1993: 30 ff.). See Schultze-Berndt and Himmelmann (2004) for a typological survey of depictive predicates.

[16] This system of co-reference-marking is complemented by what is called 'absolute' constructions. These constructions often (but not obligatorily) have an overt subject with disjoint reference. See Bickel (1999) for discussion of this point and a short typological survey of absolute constructions.

In canonical instances of switch-reference, the system is marked on the verb or on conjunctions. When co-reference is marked on pronouns, the system is usually not called 'switch-reference' but 'cross-clausal' or 'long-distance reflexivization' or 'logophoricity'. (The term 'logophoricity' is usually reserved for clause linkage involving reported speech or thought; Hagège 1974.) Since the controlled pronoun can typically assume any GR, such systems only need to specify the GR of the controller (also known as the antecedent). Most often, this is the subject, but logophoric pronouns sometimes specify their controller as whichever argument represents the information source.

A construction related to switch-reference is odd-pivot marking, described for the Australian language Kayardild by Evans (1995). Odd-pivot marking involves the spread of additional cases on subordinate clauses (and their NPs), and signals that two clauses do not share a subject referent, i.e. that they share no argument at all, or that they share one or more arguments but at least one of them is not a subject in both clauses. Thus, the relevant GR is again the subject relation.

4.7 Relativization

One type of construction that varies strongly in terms of GR specifications across languages is the relative construction. Relative constructions turn a propositional expression into a referential one, for example, a clause like *he read it* into *the one he read*. The referent of the expression is thereby chosen among the arguments and adjuncts of the clause, and I refer to it as the relativization site. The site is sometimes linked to a NP that further constrains the referent (e.g. *the book he read*), and this NP may occur inside the construction (then it is called 'internally headed', as in *whichever book he read*) or adjacent to it (then it is an attributive construction, as in *the book which he read*). In many languages, relative constructions have no GR restrictions: the same construction can be used on any relativization site. But we also frequently find constructions that are limited to sites bearing a specific GR. One very common instance of this is attributive participles, for example, English *the man [walking down the street]* or *the man [telling the stories]*. Often, such constructions are restricted to relativization on subjects (cf. **the stories telling the man*, which is ungrammatical when intended as 'the stories that the man is telling'). However, it has been noted for languages with syntactically unconstrained site choice that in discourse the most frequent sites tend to be O or S arguments (Fox 1987). It does not come as a surprise, therefore, that relative constructions are not infrequently specialized for {S, O} GRs. Here is one example:

(35)   Oirata (Timor-Alar-Pantar, Eastern Indonesia; Donohue and Brown 1999)

a. inte   [ihar [mara-n]]   asi
    1PL.EXCL.NOM   dog   go-REL   see
    'We saw the dog that had left.'

b. [ihar [ante   asi-n]]   mara
    dog   1SG.NOM   see-REL   go
    'The dog that I saw left.'

c. *[ihar [ani   asi-n]]   mara
    dog   1SG.ACC   see-REL   go
    'The dog that saw me left.'

Relativization is marked in this language by the suffix -*n* and is only possible if the site is S, as in (35a), or O, as in (35b). It is not possible to relativize on A. In order to express the intended meaning of (35c), a circumlocution is used that involves not a relative construction but clause chaining with same-subject morphology ('the dog saw me and left').

As we have seen in other constructions (e.g. raising or case assignment), referential properties can also be relevant for GR definitions. This is also attested for relative constructions. In Tagalog, the relativization site must bear the proximative GR (Foley and Van Valin 1984, Kroeger 1993). In Movima, we find the opposite. In this language, the relativization site is limited to obviatives in transitives and the S argument of intransitives. Obviatives are assigned to whichever argument is less topical in discourse, which mostly means that it ranks low on the hierarchies in (12a) and (12d) above.

(36)   Movima (isolate, Bolivia; Haude 2006)

a. [kinos   ney ay'ku [di'   jaynta   kayni]]
    ART.F.ABSENT   here aunt   REL   DISCNT   die
    'that aunt of mine who has already died'

b. [isos   wa:ka   [di'   chik<a>ye=is   neyru=s
    ART.PL.PST   cow   REL   find<DIR>=PL.ABSENT   here=DET
    ben'i]]
    grassland
    'the cows which they had found in this grassland'

c. [us   ney   juyeni   [di'   alwani-kaya=y'łi]]
    ART.M   here   person   REL   talk-INV=1PL
    'that person who had spoken to us'

d. [is   juyeni   [di'   jayna   kwey   way-na
    ART.PL   person   REL   DISCNT   ANTIP   take.up-DIR
    n-i'ne]]
    OBL-3SG.F
    'the people who had taken her up'

(36a) shows relativization on an S argument (the argument of *kayni* 'die'). In (36b) and (36c), we find relativization on the obviative argument. The obviative is assigned the O role (of *chikaye* 'find') by the direct verb inflection in (36b) and

the A role (of *alwanikaya* 'talk to') by the inverse verb inflection in (36c). An alternative to the strategy in (36c) is to antipassivize the verb so that the A argument is reassigned derived S status and the O argument is demoted to an oblique NP. This can be observed in (36d), where the relativization site is the derived S argument of the antipassivized clause and the O argument is marked oblique (*ni'ne* 'to her'). Relativization on A arguments is impossible if the argument is not either assigned obviative status or reassigned to S derived by antipassivization.

4.8 Quantifier and other floating constructions

Another construction with considerable variation in the kind of GR involved is known as 'floating'. Floating refers to the possibility offered by some languages of positioning a referential operator—such as a quantifier, a numeral, or an indefinite marker—away from the NP which it has scope over. The actual scope is then often regulated by a GR; that is, the floated operator can only take NPs in its scope that bear a certain GR. In Tagalog, the quantifier *lahat* 'all' may float to the Wackernagel position, but then it can only have scope over the NP that bears the proximative GR:

(37)   Tagalog (Schachter 1976, Kroeger 1993)

    a. sumusalat   lahat   ang=mga=bata   ng=mga=liham
       ACT.IPFV.write all   PROX=PL=children OBL=PL=letter
       'All the children are writing letters.'
       Not: *'The children are writing all the letters.'

    b. sumusalat   lahat   ng=mga=bata   ang=mga=liham
       ACT.IPFV.write all   OBL=PL=children PROX=PL=letter
       'The children are writing all the letters.'
       Not: *'All the children are writing letters.'

If the quantifier *lahat* is in the Wackernagel position, it refers not to the immediately following NP but to the NP bearing the proximative GR, that is, *ang=mga=bata* 'the children' in (37a) and *ang=mga=liham* 'the letters' in (37b).

In Yélî Dnye, an isolate of Melanesia, most referential operators can float to preverbal position. If they do, their scope is defined as the NP bearing the {S, O} relation:

(38)   Yélî Dnye (isolate, Rossel Island; Henderson 1995, Levinson 2003)

    a. yeli   pi   nkéli=k:oo   ngmê=doo=dpodo
       Rossel man boat=inside INDF=3REM.PST.CNT=work.CNT
       'A Rossel man was working in the boat (day before yesterday).'

    b. pi=kni=y:oo   chêêpî
       man=AUG=PL.ERG   stone
       ngmê=dê=d:ii=ngmê
       INDF=3PST.PUNCT=throw.
       PROX=MONO.S>3SG.O
       'People threw some stones', not *'Some people threw the stones.'

The sentence in (38a) is intransitive, and the floated indefinite marker *ngmê* takes scope over the S argument ('some Rossel man'). In (38b), the scope of the marker can only be over the O argument ('some stones') and not over the A argument ('some people'). Quantifier-floating restricted to {S, O} argument has also been noted for Halkomelem (Salish; Gerdts 1988), and Donohue (2008) describes it for Japanese.

4.9 Other constructions

Apart from what we have surveyed so far, many languages have other constructions specifying GRs. Here are some that have been noted in the literature:

- *Lexical nominalizations:* Lexical nominalizations often remap arguments to specific GRs, producing specific kinds of alignments (e.g. *my dancing* and *my hitting*, where the possessor codes S or A, but not O).
- *Focus constructions:* In some languages, one focus construction is used for A arguments, while another one is reserved for {S, O} arguments. This is widely attested in Mayan languages (e.g. Van Valin 1981), but it has now also been reported for a language of Melanesia, Yélî Dnye (Levinson 2003).
- *Imperatives:* While in many languages imperatives can only be formed from agentive or volitional predicates (e.g. in Tagalog; Kroeger 1993: 88 ff.), some languages specify the conditions in terms of a GR. In English, for example, imperatives can only be formed if the addressee is the subject, regardless of its semantic role. Hence, we get *Watch this!* with a transitive A argument and both *Go!* with an agentive S argument and *Be seen at the grand opening!* with a passive derived-S argument. But we do not get imperatives where the addressee is a transitive O argument (**People see at the grand opening!* intended as 'They should see you at the grand opening') (cf. Dixon 1979b, Comrie 1981, Dixon 1994, Donohue 2008). In many languages, however, imperatives are a regular subset of agreement paradigms, and therefore the definition of the controller is simply the same as the definition of the agreement-triggering GR. No special statement is needed in the grammar.

Another construction type that is frequently adduced as GR-specifying is intraclausal reflexives, but the evidence is often thin for this. Because reflexive pronouns often lack a nominative form in many languages, it is commonly

expected that they only take subjects as their antecedents. In many cases, however, antecedents can assume a variety of GRs—for example, both subject (*John talked about himself*) and object (*John told Mary about herself*)—and it is not at all clear whether the relevant constraints are best captured in terms of GRs. Further, closer inspection of languages for which a subject antecedent condition has been claimed suggests that antecedent choice is flexible and influenced by such discourse variables as topicality and animacy and by lexical choices (e.g. experiential vs. other predicates) (cf. a 2002 discussion on the Linguistic Typology mailing list [LINGTYP] about cases of reflexives in A-function, and e.g. Timberlake 1980, Faarlund 1998, Bickel and Yādava 2000, or Bickel 2004b for evidence against a strict definition of reflexive antecedents as subject in a number of languages). This is not to say that reflexive antecedents are never defined by a strictly syntactic notion of subjects, but the burden of proof is much heavier than is often assumed.

5. CODING CONSTRUCTIONS AND GR
SPECIFICATIONS IN OTHER CONSTRUCTIONS

Expanding on a suggestion of Keenan's (1976b), one can classify GR constructions as coding vs. behavioural constructions. Under coding constructions, I include here case, agreement, phrase structure, and diathesis: they all overtly mark the GR that they specify, by assigning a specific case, selecting a specific agreement paradigm, defining a specific position in phrase structure, or signalling a specific assignment of roles to a GR (diathesis). All other constructions surveyed are behavioural constructions, insofar as the GR they specify is only relevant as a constraint on syntactic behaviour (on what can or must be deleted, on what can be relativized on, etc.) but there is no overt indication of the GR in terms of morphology or position.

The distinction is important in some but not all languages. It is important whenever the GRs of behavioural constructions are constrained by simultaneously established GRs of coding constructions. Thus, if an argument is affected by diathesis, triggers a specific agreement paradigm, appears in a specific case, or is assigned a specific position, this sometimes has an impact on whether or not the argument is included in a GR specified for another construction such as raising or relativization. Languages differ strongly in these regards.

For example, under detransitivizing diathesis (passive and antipassives), a derived S argument is sometimes not admitted to the same GR as non-derived S

arguments. In section 4.5, we noted that Yucatec control constructions are possible only if the controllee assumes the {S} relation (cf. the data in (29)). S arguments that are derived by one kind of passivization, however, do not qualify and, as a result, cannot be deleted controllees like ordinary S arguments:

(39) Yucatec (Verhoeven 2005 and personal communication)

  a. *in=ka'áat   bis-a'l   Cancun   tumen   in=tàatah
      1SG.A=wish carry-PASS.IPFV Cancun   by   1SG.POSS=father
      'I want to be taken to Cancun by my father.'

  b. in=ka'áat   bis-bil   Cancun   tumen   in=tàatah
      1SG.A=wish carry-GER.PASS   Cancun   by   1SG.POSS=father
      'I want to be taken to Cancun by my father.'

Under regular passivization, as in (39a), the derived S argument of the dependent clause cannot be equi-deleted. But Yucatec has an alternative passive construction, the gerundial passive in (39b), and the derived S of this construction groups with non-derived S arguments. The GR specified by the Yucatec control construction is therefore defined as the set {non-derived-S, gerundial-passive-S} rather than as a generalizing notion {S, derived-S}. Such kinds of specifications are essentially parallel to other conditions on argument subsetting discussed in section 2.2.

Constructions vary not only as to whether a derived S argument is part of an S-including GR but also as to whether a demoted (oblique) argument (a demoted O in antipassives; a demoted A in passives) is included in a GR. In most languages, the demoted A in passives does not qualify as a subject in such constructions as switch-reference or conjunction reduction. But in some languages, it does. Consider the following data from Seri, where disjunct subject reference is signalled by the clause-final particle *mai* 'different subject' and co-reference, by the absence of this particle:

(40) Seri (Hokan, Mexico; Farrell, Marlett, and Perlmutter 1991)

  a. mi-nail   kom m-po-ki:xk   x,   Pata?p
      2POSS-skin the 2SG.SBJ-IRR-wet   AUX   mucus
      ko-mi-si-a: Pa=Pa
      3OBL-2SG.SBJ-IRR-be   AUX=DECL
      'If you wet your skin, you will be with mucus' (i.e., get a cold).

  b. Pa:t   ki?   p-a:?-ka: x,   Pe:pol ki?   mos
      limberbush the IRR-PASS-seek   AUX   ratany   the   also
      si-a:?-ka: Pa=Pa
      IRR-PASS-seek   AUX=DECL
      'If limberbush is looked for, white ratany should be looked for also.'

  c. m-yo-a: ?-kašni,   kokašni   šo   m-t-a?o   ma
      2SG.SBJ-DIST-PASS-bite   snake   a   2SG.SBJ-RLS-see DS
      'You were bitten, after you had seen a snake.'

(40a) illustrates a regular same-subject relation holding between the A of the subordinate (conditional) and the A of the main clause. In (40b), the clauses are both passivized, but now the same-subject relation holds between the demoted (and deleted) A arguments. The fact that the derived S arguments are different (the two kinds of plant named *ʔaːt* and *ʔeːpoɬ*, respectively) is immaterial. Conversely, the fact that, in (40c), the derived S of the main clause is co-referential with the A argument of the subordinate clause is irrelevant for switch-reference. What matters is that the demoted A argument of the first clause is distinct from the A argument in the subsequent subordinate clause. Therefore, the subordinate clause (obligatorily) receives different subject marking (by *mai* at the end of the clause). Thus, the GR targeted by switch-reference in this language is specified as {non-derived-S, A, demoted-A}.

Case assignment rules provide other coding constructions that in some languages affect the GR specifications of behavioural constructions, while in other languages, they do not. In many languages, for example, the GRs defined by relative constructions are immune to variance in case assignments resulting from lexical predicate classification (in the sense discussed in section 3.2). In Belhare transitive clauses, for example, the most actor-like argument is part of the {S, A} relation (e.g. in non-finite constructions), and the other argument is part of the {S, O} relation (e.g., for internally headed relativization and control constructions). For these assignments, the GRs and alignments defined by case do not matter: the S and A arguments are part of the {S, A} relation regardless of whether the lexical predicate assigns it nominative, ergative, or genitive. This is illustrated here by active participle constructions, which limit the relativization site to {S, A}.

(41)   Belhare

　　a. un　　　iŋa　　　　lim-yu
　　　　3SG.NOM　beer.SG.NOM　[3SG.S-]like-NPST
　　　　'S/he likes (the) beer.'

　　a'. iŋa　　　　ka-lim-ba
　　　　beer.SG.NOM　ACT.PTCP-go-M
　　　　'the one who likes (the) beer.'

　　b. (un-na)　　tombhira　　kiiʔ-t-u
　　　　3SG.-ERG　lynx.SG.NOM　[3SG.A-]fear-NPST-3SG.O
　　　　'S/he fears (the) lynx.'

　　b'. tombhira　　　ka-kit-pa
　　　　lynx.SG.NOM　ACT.PTCP-fear-M
　　　　'the one who fears (the) lynx', *not* 'the lynx that s/he fears'

　　c. (un-naha)　u-kipma　　　kaʔ-yu
　　　　3SG-GEN　3SG.POSS-fear　[3SG.S-]come.up-NPST
　　　　'S/he is afraid.'

　　c'. u-kipma　　　ka-kat-pa
　　　　3SG.POSS-fear　ACT.PTCP-come.up-M
　　　　'the one who is afraid'

The data in (a), (b), and (c) of (41) illustrate A and S arguments bearing nominative-, ergative-, and genitive-marked GRs, respectively, but they all qualify equally well for the subject GR in the participle constructions derived from these clauses. As a result, the GRs specified by case assignment rules are totally different from the GR defined by the participle construction and, for that matter, from the GR of any other construction in the language (a phenomenon called 'hidden syntax' in Bickel 2004a).

This contrasts with almost all Indo-European languages, where the most actor-like argument of a transitive verb can only function as a subject if it is also assigned nominative case. For example, in German, an experiencer can only function as the subject in active participle constructions if it is in the nominative:

(42)   German

　　a. Die　　　　　Studenten　　mög-en　　　　den
　　　　ART.PL.NOM　student.PL　like-3PL.NPST　ART.M.SG.ACC
　　　　Wein
　　　　wine.SG
　　　　'The students like the wine.'

　　a'. die　　　　　den　　　　　　Wein　　　mög-end-en
　　　　ART.PL.NOM　ART.M.SG.ACC　wine.SG　like-ACT.PTCP-PL.NOM
　　　　Studenten
　　　　student.PL
　　　　'the students who like the wine'

　　b. Den　　　　　　Studenten　　schmeck-t　　　der
　　　　ART.M.PL.DAT　student.PL　taste-3SG.NPST　ART.MSG.NOM
　　　　Wein
　　　　wine.SG
　　　　'The students like the wine.'

　　b'. *die　　　　　der　　　　　Wein　　　schmeck-end-en
　　　　ART.PL.NOM　ART.SG.NOM　wine.SG　taste-ACT.PTCP-PL.NOM
　　　　Studenten
　　　　student.PL
　　　　Intended: 'the students who like the wine.'

Like in Belhare, lexical conditions assign A arguments to one case for some predicates and to another case for others. In (42a), the verb assigns the A argument to a nominative-marked subject GR; in (42b), it assigns it to a dative-marked {S$_e$, A$_e$, G} relation (where the subscript e indexes the lexical class). The GR specification of active participles follows this, and allows an A argument to satisfy its crucial

subject GR only if it also has subject status for case-marking purposes. Therefore relativization is impossible in (42b′). As a result, the GR identified by nominative case is virtually identical with the GR specified by the participle construction. In fact, this overlap permeates almost all GR constructions in the language (evident in the examples by the fact that verb agreement is also controlled by the nominative-marked subject and not by the $\{S_e, A_e, G\}$ relation). Given this, it has occasionally even been proposed to replace the GR notion of subject in such languages with the case notion 'nominative' *tout court* (e.g. Reis 1982). The empirical facts are typical for Indo-European languages in general (see Bickel 2004b for Indo-Aryan data), and it is interesting to note that Pāṇini did not use a notion of GR in his grammar of Sanskrit (Kiparsky 2002). All that he needed was generalized semantic role (the *kāraka*s) and the morphological exponents of case and voice (and, of course, an intricate theory of linking).

Lexical conditions affect agreement construction just as easily as case constructions, and the typological question again arises whether differences in agreement GRs can also affect the GRs in other constructions. In Chickasaw, the language illustrated in section 3.2, they do not. Thus, while different predicates condition different agreement GRs, switch-reference (and nominative case assignment) constructions all reference a subject GR completely independently of this:

(43) Chickasaw (Munro and Gordon 1982)

    a. top-at   tiwwa-li-kat   sa-hotolhko-tok.
       bed-NOM   lie-1SG.A-SUB.SS 1SG.O-cough-PST
       'Lying in bed, I coughed.'

    b. alhponi'   aa-sa-bashafa-kā   Bonnie-akot
       kitchen   LOC-1SG.O-be.cut-SUB.DS B.-CONTR.NOM
       sa-bashaffi-tok
       1SG.O-cut-PST
       'I got cut in the kitchen, and Bonnie did it.'

The sentence in (43a) shows same-subject marking on the subordinate clause, which shows that the difference between aligning S with A, in the case of *tiwwa* 'lie', and with O, in the case of *hotolhko* 'cough', is immaterial to the relevant notion of {S, A} monitored by same-subject marking here. In (43b), we find different subject marking, because there is no co-reference between the S of the subordinate and the A of the final clause. The fact that the S of the subordinate clause happens to be co-referential with the O of the final clause, and that it even happens to trigger the same agreement forms, is irrelevant. Similar facts hold for Papuan languages like Amele (Roberts 1988) or Usan (Reesink 1983).

But in other languages and other constructions, agreement GRs conditioned by lexical classes are sometimes relevant for GRs in other constructions. Acehnese, for example, has intransitive verbs aligning S with A, as in (44a), and others aligning S

with O, as in (44b). (44c) shows the respective A and O agreement markers in a transitive clause, for comparison.

(44) Acehnese (Austronesian, Sumatra; Durie 1985, 1987)

    a. ji-jak   gopnyan
       3A-go   3HON
       'S/he goes.'

    b. gopnyan   rhët-geuh
       3HON   fall-3HON.O
       'S/he fell.'

    c. gopnyan   ka-ji-poh-geuh
       3HON   INCH-3A-hit-3HON.O
       '(S/he) hit him/her.'

Exactly the same split of GRs is also referenced by control constructions:

(45) Acehnese

    a. gopnyan   geu-tém   jak
       3HON   3HON.A-want   go
       'S/he wants to go.'

    b. geu-tém   taguen   bu
       3HON.A-want   cook   rice
       'S/he wants to cook rice.'

    c. *gopnyan   geu-tém   rhët
       3HON   3HON.A-want   fall
       Intended: 'S/he wants to fall.'

    d. *aneuk agam nyan ji-tém   geu-peuréksa lé   dokto
       child   male   DEM   3-want   3A-examine   ERG   doctor
       Intended: 'That boy wants to be examined by the doctor.'

The controllee is defined here not as the subject but as the $\{S_a, A\}$ relation, i.e. as A for transitive predicates and as S of a subset of intransitive predicates (indexed by the subscript *a*). The S argument of this subset turns out to have similarly 'agentive' semantic roles as A arguments, so the GR can equally well be called 'Agent', implying a close affinity to semantic notions.[17] Label choice notwithstanding, what is important is that the GR specified for control purposes is the same as the one governing the choice of the agreement paradigm.

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[17] Relations that closely mirror semantic roles are sometimes said not to be GRs at all (e.g. Van Valin and LaPolla 1997). But this is like saying that an English category like past tense is not a grammatical category just because it closely mirrors a semantic notion of past time. What matters is that the category or the relation is referenced by rules of grammar (morphological rules in the case of past tense; agreement and control rules in the case of Acehnese GRs); also cf. Dryer (1997a).

Last but not least, phrase structure rules are other coding constructions that in some languages affect the way GRs work in other constructions. As noted before, most GR constructions in German target a uniform subject (i.e. {S, A}) relation. There is also a phrase structure rule that assigns subjects a specific default position in the clause, the 'prefield' position before the finite verb indicating topicality. Subjects appear in this position (cf. (46a)), unless it is filled by another expression (as in (46b)):

(46) German

   a. Sie   schlief   heute   aus
       3SG.F.NOM   sleep.3SG.PST   today   out
       'She slept in today.'

   b. Heute   schlief   sie   aus
       today   sleep.3SG.PST 3SG.F.NOM   out
       'She slept in today.'

GR constructions like nominative case assignment or agreement ignore this positional assignment of subjects, so that *sie* 'she' is assigned nominative and triggers verb agreement in both (46a) and (46b). But the position is crucial for GR specification in conjunction reduction:

(47) German

   a. Sie   arbeitete   gestern   bis   spät
       3SG.F.NOM   work.3SG.PST   yesterday   until   late
       und   schlief   heute   aus
       and   sleep.3SG.PST   today   out
       'She worked late yesterday and slept in today.'

   b. *Sie   arbeitete   gestern   bis   spät
       3SG.F.NOM   work.3SG.PST   yesterday   until   late
       und   heute   schlief   aus
       and   today   sleep.3SG.PST   out
       'She worked late yesterday and slept in today.'

Deletion under co-reference is only possible if the subject is in the topic-indicating prefield, as is the case in (47a). If it appears anywhere else in the clause, it cannot be deleted, as in (47b). Thus, the proper characterization of the GR targeted by conjunction reduction must refer not only to the set {S, A} but also to its prefield default position.

6. VARIABLES AND DISTRIBUTIONAL TRENDS

Table 19.3 summarizes the variables relevant for the specification of GRs in specific languages. Obviously, this system of variables allows enormous diversity: the role

Table 19.3. Summary of typological variables identifying a specific GR

Role subset	some subset of {S, A1, A2, O, T, G}
Cast subset	various referential notions
Conditions	scenario, lexical predicate class, clause type properties
Construction	various GR-specifying constructions
Coding-on-behaviour constraint	present or absent, different kinds

variable alone allows for $2^6-1 = 63$ different (non-empty) subset definitions. This number is multiplied by the many ways in which various referential notions (like 'animate', 'topical', 'speech act participant') can further constrain or indeed directly define GRs, and external conditions (scenarios, lexical classes, tense, aspect, subordination, etc.) can condition GR definitions. We have seen many cases of GRs that vary from construction to construction in a single language; and if there is more than one GR construction in a language, another relevant variable is whether GR specifications in coding constructions (e.g. case assignment) affect the way other GRs (e.g. in relativization) work or not.

There have been a number of attempts to estimate significant clusterings or trends in how these variables interact. Nichols (1992) investigates areal and genealogical factors as well as correlations of GR types with word order and morphological complexity. Müller-Gotama (1994) researches the semantic role range of GRs and the relation of this to constructional choices and phrase structure types. But the topics that have dominated typological research into GRs are the role of the referential hierarchy in predicting GR types and the distribution of GRs across constructions. I take these up in turn.

6.1 Referential effects on GR distributions

When discussing how GRs can be defined, at least in part, by referential notions in section 2.2, we noted that languages frequently reserve access to their GRs (of whatever role alignment and for whatever constructional purpose) to referents ranking highest on the referential hierarchies in (12), repeated here as (48):

(48) a. SPEECH ACT PARTICIPANT > KIN/NAME > HUMAN > ANIMATE > INANIMATE > MASS

   b. SPECIFIC > NON-SPECIFIC REFERENTIAL > GENERIC/NON-REFERENTIAL

   c. KNOWN/TOPICAL/THEMATIC/DEFINITE > NEW/FOCAL/RHEMATIC/INDEFINITE

   d. SINGULAR > PLURAL

Alternative principles—for example, where access to GRs is constrained by face-saving strategies—have been less commonly noted. One reason advanced to explain this trend is that GRs typically reflect grammaticalized topicality assignments

and higher positions in the referential hierarchies are intrinsically more likely to be topical (Givón 2001).

The hierarchies in (48) have also been suggested to produce a specific effect on the typological distribution of case assignment. From discourse studies, it appears that A arguments are more frequently topical—i.e. filled by referents higher on the hierarchy—while O arguments are more frequently borne by NPs with referents lower on the hierarchy, especially with rhematic and new referents (e.g. DuBois, Kumpf, and Ashby 2003, Jäger 2007). Because more frequent patterns generally tend to be less marked, these findings from discourse patterns allow formulation of the following hypothesis:

(49)   *Hypothesis*
       Higher-ranking As and lower-ranking Os are more likely to be assigned a zero-marked case form than lower-ranking As and higher-ranking Os, respectively.

A popular variant of this hypothesis (originating in Silverstein 1976) equates 'zero-marked' with what is a distributionally unmarked form, i.e. a nominative or absolutive case. Two predictions follow. First, we can predict that across languages, pronouns (which necessarily rank high), but not nouns (which vary in their ranking), prefer accusative over other non-neutral alignments, so that they are in the unmarked nominative when in the A function. However, comparing the data on pronoun and noun alignment patterns in an expanded version of Nichols's (1992) genealogically balanced sample, this prediction has only marginal statistical support (Fisher Exact Test, $p = .075$, $n = 197$).[18] This contrasts with areal factors which do have highly significant effects on the distribution of alignment types (cf. Nichols 1992).

The second prediction is that if there is a difference in alignment within the same language, higher-ranking arguments are expected to show nominative {S, A} alignment (or no case), and lower-ranking arguments to show absolutive {S, O} alignment (or no case), while the reverse is unexpected. Comrie (2005) tests this prediction for the difference between pronouns and lexical nouns and finds a 20:3 support. However, the number of relevant languages (i.e. with a difference in markedness between pronouns and nouns) is small ($n = 23$), and genealogical and areal patterns are again a possible confounding variable.[19] Another prediction of (49) is that higher-ranking referents in O function tend to align with G arguments with overt (dative) case-marking, while the more common lower-ranking O arguments tend to align with less-marked T or S arguments. This prediction has not been systematically tested.

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[18] See: www.uni-leipzig.de/~autotyp. I removed cases of splits within categories to get clearer signals. The prediction has no good statistical support from Comrie's (2005) dataset either.
[19] For example, of the 20 languages that support the hypothesis, Eskimo and Pama-Nyungan representatives might be oversampled in the database; Comrie also notes that four of the supporting languages (i.e. 20%) are from Australia.

In summary, despite its popularity, the statistical evidence for referential hierarchy effects on case alignment is weak. Historical aspects relating to descent and contact appear to be just as relevant. Indeed, specific etymologies and paradigm structures are often demonstrably relevant. For example, if an ergative develops from an instrumental, a limitation of the ergative to low-ranking As is to be expected just because animate nouns may never have had an instrumental form to begin with (Garrett 1990); demonstratives often inflect following the same paradigm as lexical nouns, and they share the function of introducing new referents in discourse, unlike personal pronouns. Under such conditions, we would expect the distribution of case alignment to follow part-of-speech categories (and their functions in discourse), and less directly the semantic notions of the referential hierarchies. Similarly, a third person pronoun may have lexical noun etymology and thereby inherit its case paradigm, leading to a split between SAP and third person governed by paradigm structure rather than semantics. Or, an ergative system might survive in pronouns while lexical NPs lose case or develop new accusative marking, and this might result in a distribution that reverses what is predicted by discourse frequency (as happened in a number of Dardic and other Indo-Aryan languages; Filimonova 2005).

6.2 Constructional effects on GR distributions

Going back to early proposals by Anderson (1976), another popular idea is that some constructions universally favour {S, A} relations while others are more flexible. In general, behavioural constructions (as defined in section 5) are claimed to favour {S, A}, while coding constructions (especially case constructions) are expected to balance the odds for {S, A} vs. {S, O} more evenly. This idea also underlies early notions of 'deep' vs. 'surface' (or 'syntactic' vs. 'morphological') ergativity (e.g. Comrie 1978, Dixon 1994): many languages have 'surface' ergativity only, i.e. {S, O} alignments in their coding constructions, but not in their behavioural constructions or at least not all of them. Languages with 'deep' ergativity— i.e. with {S, O} relations in behavioural constructions—appear to be less common.

Some theories propose in addition that among the behavioural constructions, those involving control, imperatives, and reflexives universally favour accusative alignment. This is sometimes even claimed to be an absolute condition (e.g. Dixon 1994, Manning 1996), but at least for control constructions, there are counterexamples (see the data in section 4.5), and imperatives and reflexives often do not reference a syntactic GR notion to begin with (section 4.9). Still, it is possible that these three construction types indeed have a probabilistic preference for accusative alignments. At present, there are no sufficiently rich databases to allow empirical evaluation of this possibility.

One constructional effect that can be investigated is whether case and agreement construction differ in their preference for various GR types. Working on different samples, Siewierska (2004) and Haspelmath (2005c) both observe a significant preference for accusative over other non-neutral alignments in agreement as

opposed to case constructions (where there is no clear preference),[20] and for {O, T} alignments in case as opposed to agreement constructions.

While these are preferences across languages, patterns of preference have also been proposed for the distribution of GRs across constructions within the same language. Elaborating on proposals by Kazenin (1994), Croft (2003a), and others, it is likely that there is a hierarchy of GR constructions along the following lines:

(50)   case > agreement > relativization/focus/operator floating > conjunction reduction > co-reference constructions/co-reference marking

The hypothesis, then, is that ergatively aligned GRs in lower-ranking constructions in a language increase the odds for such GRs in higher-ranking constructions in the same language. However, as there are as yet no sufficiently rich typological databases on GRs in behavioural constructions, this hypothesis cannot be empirically tested and must remain speculative for a while. What is clear is that there are no absolute laws here: there are languages with accusatively aligned relative constructions (active participles) but ergatively aligned co-reference constructions (e.g. Belhare, discussed above); and there are languages with accusative-aligned case but ergatively aligned relative (e.g. Oirata, discussed above), quantifier floating (Japanese; Donohue 2008), or agreement (Siewierska 2004: 54) constructions. And it was noted long ago that even so thoroughly {S, A}-oriented languages as the Indo-European languages of Europe align the S argument of at least a lexical subset of intransitive verbs (called 'unaccusative' since Perlmutter 1978) with the O argument, leading to traces of ergatively aligned relative and other constructions (e.g. with past participle relativization). This all confirms the point made at the outset of this chapter: GRs hold in constructions and not in languages. (In other words, once-popular expressions like 'ergative language' are simply senseless.)

7. Conclusions and prospects
for further research

Research over the past three decades has been largely driven by the distributional theories discussed above, spawning much descriptive research and leading to the discovery of the great diversity of GRs as we now know it. However, there has been

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[20] This can be confirmed by an expanded version of Nichols's (1992) sample ($n = 233$): the odds for {S, A} relations in agreement rules are 2.55 times higher than in case rules (Fisher Exact Test, $p = .001$). In a 2 (case vs. agreement) × 4 (macrocontinents) logistic regression model, the areal factor also reaches significance at a .05 level, but there is no significant interaction.

a strong focus in this research on the specific distribution of {S, A} vs. {S, O} relations, and this focus has been at the expense of other relations. For example, research on GRs in behavioural constructions tends to neglect reference-based relations like the proximative and obviative GR, but it could very well be that there are interesting and significant trends in the distribution of such GRs as well. Likewise, GRs appear to distribute very unevenly over split intransitives, but there have not been many typological studies of this (though now see Donohue and Wichmann 2008).

More generally, given the large variable space, it is virtually impossible to estimate a priori which values on which variables will reveal significant clusters worldwide. Focusing on just one or two values of one single variable (i.e. on {S, A} vs. {S, O} in the role subset variable) might mask other interesting distributional patterns. And finally, as noted earlier, the actual distribution of GR patterns reflects areal factors, and a proper understanding of frequency distributions needs to factor in not only linguistic variables like the ones in Table 19.3 but also historical information about language and population movements (cf. Nichols 1992). In short, GR typology has much work ahead here, and many interesting patterns are yet to be discovered once a multivariate approach is taken.

Meanwhile, the main reason why we lack large databases on GRs in behavioural constructions is that detailed descriptions of GRs have become standard in reference grammars only over the past two decades. And much more is still needed. A general message that can be drawn from a typological point of view is that the most informative descriptions do not ponder at length whether or not the language has a subject (which is a theoretically dubious question anyway; Dryer 1997a). What is more informative is to describe each GR-sensitive construction in the language and to note in detail how the GRs in it are defined, and to what kinds of information they are sensitive. The variables described in this chapter are meant to help in this work by providing a toolkit for comparing GRs across constructions in a single language, as well as across languages.

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CHAPTER 20

TYPOLOGY OF TENSE, ASPECT, AND MODALITY SYSTEMS

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1. INTRODUCTION

This chapter is concerned with the notions of tense, aspect, and modality from a typological point of view. This is a large topic, and no single chapter can cover all developments in the field. I will offer here an overview of the major areas of ongoing research and also a description of where the three areas overlap or not. It is not possible to include all categories associated with them, and inevitably, some important ones are not discussed here.[1]

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[1] One such area that will not be discussed is evidentiality. Although it has traditionally been thought that evidentiality is a modal category (e.g. Palmer 1986), more recent work has cast doubt on that hypothesis. The reader is referred to de Haan (2006: 56 ff.) for more detail. Another area that has not been discussed in great detail is historical developments of tense, aspect, and modality, although some key developments are mentioned in this chapter at various points. The reader can consult Bybee et al. (1994) for extensive materials. Wholly missing in the present discussion are issues of areal linguistics.

One key advance in typological research in tense, aspect, and modality (hereafter TAM) is the recognition that these areas should be viewed not top-down but bottom-up. That is, the basic units are not the TAM categories themselves but rather the language-specific categories, such as the English Progressive or the Russian Perfect. This insight is due to the scholars Joan Bybee and Östen Dahl, who developed it in studies such as Bybee (1985), Dahl (1985), Bybee and Dahl (1989), Bybee, Perkins, and Pagliuca (1994), and Dahl (2000a). They refer to these language-specific categories as grams. These grams can then be compared cross-linguistically and grouped in a number of gram types which are the basis for typological investigations. For the most part, the notion of gram type is used in this chapter instead of abstract categories (the exception being the introductions to tense and aspect). Thus, when mention is made of habitual aspect, the gram type is meant.

The terminology involved with the TAM areas is notoriously confusing and unfortunately far from consistent, so that a comparison between scholarly works is not always straightforward. One aim is to clarify the major terminology used in various important studies.

2. TENSE

The semantic category of tense is usually defined as the linguistic representation of time. That is, tense tells us where the action or event reported on in the utterance is located in time (past, present, or future). This means that tense is a deictic category, as it tells us something about the location of an entity (here an action or event) with respect to a fixed point of view. This point of view is the time at which the sentence is uttered and is referred to as the moment of speech.[2]

Most, if not all, work on tense in typological frameworks is ultimately based on the terminology used in Reichenbach (1947) (also see Comrie 1985a). The basic idea is to describe tenses with three parameters: situation time (S), the time at which the statement was uttered (the moment of speech); event time (E), the time at which the event described in the utterance takes place; and reference time (R), the time against which E is measured.

When S and R are identical, events are measured against the moment of speech, and we speak of absolute tense. When E comes before S, we are dealing with past

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[2] Bhat (1999: 20–28) makes a distinction between deictic and non-deictic tense, and analyses the tense system of the Dravidian language Kannada in that light.

tense; when E and S are identical (or at least overlap), the present tense must be used; and when E comes after S, we have an instance of future tense.

When R is distinct from S, we speak of relative tense. In the sentence *John had left by 5:00 yesterday*, E takes place before R (5:00 yesterday), which in turn takes place before S (now). E is measured against R and, secondarily, against S. We can make finer distinctions, and the next two sections will discuss the two categories in more detail.

2.1 Absolute tense

As mentioned above, there are three absolute tenses: present, past, and future. It can be that a language formally distinguishes between all three in having separate morphology for each tense. It can also occur that a language uses the same form for two or more tenses. If a language combines past and present tense, we have a future/non-future opposition.[3] When a language combines present and future, we have a past/non-past opposition. If a language combines all three tenses, then we essentially have a tenseless language. Some examples of the first two possibilities are:

(1) Mao Naga: future/non-future (Bhat 1999: 67–8)

    a. ai   izo   ocü   vuta   le
       I   today home   go   IRR
       'I will go home today.'

    b. pfo zhü-e
       he good-PRED
       'He is good.'
       'He was good.'

(2) Kannada: past/non-past (Bhat 1999: 17)

    a. avanu   manege   ho:-d-a
       he   home   go-PST-3SG.M
       'He went home.'

    b. avanu   manege   ho:gu-tt-a:ne
       he   home   go-NPST-3SG.M
       'He goes home (habitually).'
       'He will go home.'

The present tense is used when the event time overlaps with the speech time. It is barely possible for E and S to be identical—for instance, if we are dealing with performative verbs—but normally E and S overlap but are not identical.

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[3] This can also be described as a distinction in mood or a realis/irrealis distinction.

Given that the present tense is cross-linguistically the most unmarked tense, it can acquire meanings that are not strictly temporal in nature. One such example is habitual aspect, which is illustrated in Comrie's (1985a: 39) example *John goes to work at eight o'clock (every day)*. S and E do not have to overlap here, but it can be argued that such sentences refer to habits and as such are true at S. Past habitual aspect would not be true at S. A related example is that of universal or gnomic tense: universally true statements, such as *roses are red, violets are blue*. Such statements include S.

The past tense is more complicated, as it can refer to a whole host of interpretations. In its simplest form, past tense refers to actions or events that took place before S, but there are other considerations at work as well. First, the matter of truth arises. Since the past is immutable, one could think that past events are the most certain, but this turns out not to be the case. In many languages, English included, a past tense can be used for modal notions (see section 7 below). Another matter is whether the action wholly took place before S, and thus no longer holds at or even after S. Usually, this matter is left open and treated as an implicature. In some languages, the presupposition seems to have been grammaticalized; that is, past events do not (or do) hold for the present. Comrie (1985a: 53–4) mentions that this is the case for certain Bantu languages. Note that this is distinct from the case in which past actions have relevance for the present. That is, the action or event may be over, but its consequences are still being felt. This is the perfect, which will be discussed in section 5.

Future tense is the one tense which is very close to being part of the modal system, because one cannot be certain of events in the future. In many languages, the future is indeed used as a mood, rather than a tense, but there are languages in which there is more than one future morpheme, and differences between these are attributable to differences in certainty. See 7.1 below.

In many languages, even finer distinctions can be made in the tense system by adding degrees of remoteness. If a language makes remoteness distinctions, it will usually do so in the past rather than in the future (there are no remoteness distinctions in the present) and usually not make more than two or three.[4] There are languages with more distinctions. Comrie (1985a: 87) mentions several dialects of the Bantu language Bamileke, and Dahl and Velupillai (2005a) add Yagua and Chacobo, both South American languages, to that list. The most common distinction, however, is between 'today'-tense and 'before today'-tense, or hodiernal and pre-hodiernal tense.

In Yagua, there are five distinctions: two proximate tenses and three past tenses.[5] They are exemplified in (3) below:

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[4] Of the 222 languages studied in Dahl and Velupillai (2005a), 88 did not have a past tense morpheme; a further 94 did not make remoteness distinctions; 38 had two or three remoteness distinctions; and only two languages had four or more.

[5] The Proximate tenses are not restricted to events prior to S. When used with the irrealis morpheme -*a*, the interpretation is future in nature, although they do not seem to indicate remoteness differences in the future in this case (Payne and Payne 1990: 316).

(3)   Past remoteness distinctions in Yagua

MORPHEME	MEANING
-*jásiy*	within a few hours of S
-*jay*	one day prior to S
-*siy*	roughly a week to a month prior to S
-*tiy*	roughly from a month or two to one or two years prior to S
-*jada*	distant past, also used for legendary past

Some examples are (Payne and Payne 1990: 387):

(4)   Yagua
    a.   sa-díiy-siy-maa   /sadíichimyaa/
        3SG-die-PST.1-PRF
        'He has died (between a week and about a month ago).'
    b.   sa-díiy-tíy-maa   /sadíitimyaa/
        3SG-die-PST.2-PRF
        'He has died (between about a month and a year ago).'

Languages typically make fewer remoteness distinctions in the future, although the aforementioned Bamileke does have the same number of distinctions in the past and future (four or five, depending on the dialect, as in Comrie 1985a: 87).

2.2   Relative tense

A relative tense is a tense whose reference point is not the moment of speech, but rather a point on the timeline separate from both S and E. In the sentence *John had eaten by the time Mary came back*, the event time of John's having eaten is before the reference time of Mary's coming back. Both are before the speech time. This is usually schematized on a time-line:

(5)   Timeline of the sentence *John had eaten by the time Mary came back*
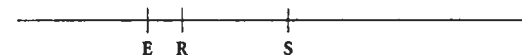
E = Event time (*John's eating*); R = Reference time (*Mary's coming back*) S = Speech time (the moment of speech).

In (5), we are dealing with a pluperfect tense (or 'past in the past'), which is marked in English with the past tense of the auxiliary verb *have*, rather than with an inflectional morpheme (as is the case with the English simple past tense, which takes -*ed*). In many languages, the relative tenses are less likely to be marked with affixes than absolute tenses.

3. ASPECT

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While tense tells us something about when the action or event takes place, the category of aspect tells us how the action unfolds. That is, aspect is a means of marking whether the action is viewed as complete or not, whether it is a repeated action, an action in progress, or whether it is engaged in habitually.

The most frequent aspectual distinction is between perfective and imperfective aspect, which mark completed and incompleted action, respectively. In contrast to other grammatical categories (such as tense), it is not possible to determine a typologically unmarked member of this opposition, as either one can be marked (Dahl 1985: 69 ff.). Consequently, it is not possible to distinguish sharply between the two, as there is cross-linguistic variation in how a given verb will be marked.[6]

The following example of perfective and imperfective aspect is from Russian:

(6)   Russian

    a. on   na-pisal   pis'mo
       he   PFV-write.PST.M letter
       'He wrote a letter.'

    b. on   pisal   pis'mo
       he   write.IPFV.PST.M letter
       'He wrote at a letter (was writing a letter).'

In many languages, aspectual distinctions are limited to the past tense because only actions in the past tense are viewed as either completed or not. Present tense actions are almost by definition incomplete, while it is also awkward to talk about completed events in the future, although some languages do have an aspectual distinction in the future. An example comes again from Russian:[7]

(7)   Russian

    a. on   na-pišet   pis'mo
       he   PFV-write.PRS.3SG letter
       'He will write a letter.'

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[6] One good example from Dahl's (1985) questionnaire on tense and aspect is the following sentence:

Q: What did your brother do after dinner yesterday?

A: He WRITE letters.

Although the verb 'write' is used perfectively in most languages in Dahl's sample (the situation is viewed as a whole and as concluded), in many languages (such as most Slavic languages), the verb is translated as an imperfective, as the action is viewed as occurring without an end-point, and in these languages, the imperfective must then be used.

[7] On the differences between the 'Slavic type' of aspect and the more common type, in which perfective aspect only occurs in the past tense, see Dahl (1985: 84 ff.) and Bybee and Dahl (1989).

    b. on   budet   pisat'   pis'mo
       he   be.FUT.3SG write.INF letter
       'He will write at a letter (will be writing a letter).'

The present tense morphology of perfective verbs is analysed as completed action in the future.

Another term used in the literature on aspect is Aktionsart, which is used in the sense of 'inherent aspectual meaning'. This term is used to mark that aspectual distinctions are marked lexically, rather than grammatically. Comrie (1976a: 6–7n.) does not use the term on account of conflicting uses of the term in Slavic linguistics, while Dahl (1985: 26–7) also avoids using the term, as it is not a necessary term for gram types (as do Bybee et al. 1994 and Smith 1997). In the framework of Bertinetto and Delfitto (2000), however, a formal distinction is drawn between aspect and Aktionsart (which they refer to as actionality), in which the former refers to the speaker's perspective while the latter refers to the type of event (based on such properties as bounded vs. unbounded, punctual vs. durative).

As far as the meanings of the perfective and imperfective aspects and their respective limits are concerned, there are almost as many opinions as there are scholars. Comrie (1976a: 16 ff.) takes the view that the use of the perfective aspect shows the action as a whole, without taking individual parts of that action into account. Dahl (1985: 74) criticizes that view and points out that there are cases in which the action is viewed as a whole, yet there are languages in which the imperfective aspect must be used. He (1985: 78) opts to use prototype definitions, according to which the prototypical use of a perfective aspect is one in which the verb denotes a single event, has a well-defined result (or end-state), and has past time reference. It also tends to denote a punctual event. The further away from this prototype, the more likely it is that an imperfective aspect is used.

Besides the perfective and imperfective aspect, there are other gram types that can be expressed by means of separate morphemes. There are a number of such aspects, but not all can be discussed here. The most common ones include the progressive, which indicates that the action is in progress. Although it has been proposed to view the progressive as a type of imperfective (see Comrie 1976a: 25), there are enough differences between the two to view them as separate aspects. (One such difference is the fact that progressives can occur with any tense, while imperfective is more restricted.) As Bybee et al. (1994: 139) and Dahl and Velupillai (2005c: 267) mention, progressives often turn into general markers of imperfective aspect.

Habitual aspect refers to situations in which the speaker wishes to express that the action being described occurs more than once. According to Comrie (1976a: 27–8), the habitual shows that the action described is 'characteristic of an extended period of time' so that the action is essentially a characteristic feature of

that period. In addition, languages may make a distinction between past and present habituals to distinguish whether the characteristic feature still holds or not. The English habitual phrase *used to* is past habitual because it refers to situations that no longer hold. The sentence *He used to walk to school* can only be used if the subject no longer walks to school.

In some languages, there is a special form for one type of habituality, while the other type is subsumed under some other gram. This is, for instance, the case in the Papuan language Amele (Roberts 1987), in which there is only a separate morpheme for past habitual. The present habitual is subsumed under the present tense:

(8)   Amele (Roberts 1987: 247–8)

    a. uqa   gaid   nuo-i-na
       3SG   always go-3SG-PRS
       'He always goes.'

    b. uqa   gaid   nuo-lo-i
       3SG   always go-HAB.PST-3SG
       'He always used to go.'

In addition to tense, habitual aspect also has a connection with mood. In many languages, the same morpheme can express habitual as well as modal categories. An example is West Greenlandic (Fortescue 1984), where the past habitual morpheme *-ssa* also expresses obligation and future. The reason for grouping habitual aspect with modal and irrealis morphemes would appear to be grounded in the fact that both modal and habitual situations make reference to unactualized events (i.e. events that have no fixed reference point on the timeline). This point is elaborated upon in Cristofaro (2004; see also references therein).

There is a morphological issue as well: if a language has both tense and aspect morphemes, the aspect morphemes are usually found closer to the verb root (Bybee 1985). The reason is that morphemes closer to the root are more 'relevant' to the meaning of the verb. Aspectual morphemes, being more derivational than inflectional, have a higher degree of likelihood of changing the meaning of the verb than tense morphemes (which are more inflectional).

4. MODALITY

The area of modality is concerned with notions such as obligation and necessity (strong modality), possibility and permission (weak modality), and volition and ability. The notions of necessity and possibility are instances of epistemic modality, and those of obligation and permission are instances of deontic modality. The modal notions

commonly in use in the typological literature are ultimately derived from the literature on modal logic (starting with von Wright 1951), but in recent years, new terms have started to appear which are based on typological principles rather than on abstract notions. Some scholars, such as Joan Bybee (e.g. Bybee 1985; see also Bybee et al. 1994: 177 ff.), view modality as essentially a diachronic notion. For instance, she has introduced the term agent-oriented modality as a replacement for deontic modality. This is defined as conditions that influence the agent of the sentence to do something.[8]

In English, such notions are grammaticalized as modal verbs:

(9)   a. John must go to school.   (obligation)
      b. John must be at school.   (necessity)
      c. John may be at school.   (possibility)
      d. John may go to school.   (permission)
      e. John can swim.   (ability)
      f. John wants to swim.   (volition)

In English, as well as many other languages, notions such as obligation and necessity can be expressed by one and the same morpheme.[9] The verb *must* in English can be both obligative and necessitive in nature. Similarly, the verb *may* can be both permissive and probabilitive. Usually the context disambiguates the two meanings, but sometimes, even in context, it is impossible to decide which meaning is meant—a situation which Coates (1983) referred to as indeterminacy.

Beside modal verbs, other means of expression for modal notions include moods, modal affixes, modal adverbs/adjectives, and modal tags. The first two are the most common, and as they can be easily confused, some discussion is in order.

Moods are familiar from the Romance language family, among others. In Latin, there is a choice between the indicative and the subjunctive. Broadly speaking, the indicative is used to report factual information, while the subjunctive is used for permission, possibility, obligation, hypotheses, yes/no questions, optatives, and hortatives. The subjunctive can also be used in subordinate clauses after matrix verbs of hope, fear, volition, and surprise, among others. Examples (10a–c) below are from Hale and Buck (1903).

(10)   Latin

    a. quoad   potu-it,   resist-it
      as.long.as can-3SG.IND.PRF resist-3SG.IND.PRF
      'As long as he could, he resisted.'

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[8] For other terminology that has been used in conjunction with modal notions, see de Haan (2006: 29–32).

[9] Van der Auwera and Ammann (2005) studied the degree to which epistemic and deontic modality are expressed by the same morpheme. While there is considerable overlap of the two notions in Europe (there is overlap in both weak and strong modality), in other parts of the world there is only limited overlap—either in just weak or strong modality, or there is no overlap at all.

b. sint   beati
be-3PL.SBJ.PRS   happy.PL
'May they be happy!'

c. time-o   ne   laborem   auge-am
fear-1SG.IND.PRS   COMP   work.ACC   increase-1SG.SBJ.PRS
'I am afraid that I shall increase my work.'

In many languages, modality is marked by means of affixes on the verb. This is, for instance, the case in Turkic languages, Greenlandic Eskimo, Dravidian languages like Tamil, and many Native American languages.

(11)   a. Tamil (Dravidian; Asher 1979: 170; -*laam* permission)
avan   peeca-laam
3SG   speak-PERM
'He is allowed to speak.'

b. Koasati (Muskogean; Kimball 1991: 200; -*sahá:wa* probability)
ó:la-fon   aɬí:ya-:sahá:w-ok
town-ALL   go-PROB-SS.FOC
'She must have gone to town.' [also possibility]

c. Turkish (Turkic; Lewis 1967: 125–7; -*meli* necessitative)
gel-me-meli-siniz
come-NEG-OBLIG-2PL
'You ought not to come.'

The difference between mood and modal affixes is that mood is an obligatory category. That is, a speaker of a language like Italian must choose between the indicative and subjunctive, while a speaker of, say, Tamil can choose not to use a modal affix. This is similar to English, where speakers always have the option to use a modal auxiliary or not.

4.1 Realis and irrealis

Realis and irrealis morphemes divide the world into real and unreal events or situations. It has been claimed that there are languages which encode modality in precisely this way; that is, there are languages with irrealis morphemes, which mark an action or situation as unreal. But looking more closely, we find various problems with these terms.[10]

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[10] While languages with irrealis morphemes can be found on every continent, they have most prominently been described for New Guinea (Roberts 1990, Bugenhagen 1994). Other languages with irrealis morphemes can be found in North America (Chafe 1995, Mithun 1995). A recent typological study is Elliott (2000), who used the term 'reality' status to refer to the realis/irrealis opposition.

First, the term 'irrealis' is very vague and can refer to a number of different modal and non-modal situations (see Bybee 1998b and Palmer 2001: 149). Furthermore, the semantic content of irrealis morphemes differs from language to language (even between languages that are closely related). Categories that are marked as 'irrealis' in one language can be marked as 'realis' in another.

For example, consider the future gram type. It can be argued that future is a prototypical irrealis category because it refers to events that have not yet happened and are therefore unreal. In languages like Amele and Muyuw, the future is indeed an irrealis category. However, in others, it is treated as a realis category. One such language is the Native American language Caddo (Chafe 1995: 358), shown in (12). The future morpheme -*ʔaʔ* occurs not with the irrealis prefix *t'a-/t'i-* but with the realis prefix *ci-*:

(12)   Caddo
ciíbáw-ʔaʔ
ci-yi=bahw-ʔaʔ
1SG.A.RLS-see-FUT
'I will look at it.'

In yet other languages, the future can be used with either realis or irrealis, depending on the speaker's judgement of likelihood that the event described will actually occur. One such language is Central Pomo, a Californian language (Mithun 1995: 378–80).

The same is essentially true for other gram types that can be considered part of irrealis, including categories like negation, hypothesis (conditional and counterfactual), and imperative. The connection between irrealis and habitual aspect was discussed in section 3 above. Even a gram type which has traditionally been thought of as a prototypical irrealis category—namely, counterfactual hypothesis—is ambiguous, as there are languages in which the if-clause (the protasis) of the counterfactual statement is used with a realis morpheme. One such language is Sursurunga, a Papuan language (Bugenhagen 1994):

(13)   Sursurunga
ngo   á-k-te   han   balbal   ux   i   ráin
if   3SG.RLS-DEF-EMPH   go   again.RED   blow   SBJ   rain
na   han   kopkom   kuluk   á   namnam
3SG.IRR go   grow   good   SBJ   food
'If it had kept on raining regularly, the crops would have grown well.'

The protasis is marked with the realis prefix *á-*, while the then-clause (the *apodosis*) has the irrealis morpheme *na*.

Conversely, categories that are thought of as purely realis gram types can be used as irrealis as well. For instance, the past tense is thought of as a solid realis gram type because the past is known, but (as will be shown in 7.2 below) it can be expressed as an irrealis as well.

5. THE PERFECT

The perfect is a category that has elements in common with both tense and aspect. In some languages, the perfect has more temporal characteristics, whereas in others it has more aspectual ones. In addition, the perfect can develop evidential properties so that the perfect is at the intersection of all major categories discussed in the chapter (if one considers evidentiality as being a modal category; see note 1 and Lindstedt 2000).

The perfect is characterized as a past event with relevance to the present. In the sentence *John has left*, the past event of John's having left has relevance to the present because the sentence entails that John has not returned yet. The difference between *John has left* and the simple past *John left* is that the simple past portrays an event as being in the past without any repercussions for present events. In *John left*, the question of whether John has come back or not is left open.

It is well known that the English perfect differs from the perfect in many other languages in that the English perfect is not compatible with specific time references (14a), although general time references are fine (14b):

(14) (Comrie 1976a: 54)
    a. *John has left at 5 o'clock last Tuesday.
    b. I have seen Fred today.

In languages such as Russian and Spanish, sentences such as (14a) are perfectly grammatical. The English perfect (also known as present perfect) differs from the past and future perfect; in those cases, a specific time reference is acceptable (Comrie 1985a: 79):

(15) John had arrived on Tuesday.

The present perfect is usually kept distinct from the past and future perfect. In some languages, there is a present perfect but no past or future perfect (e.g. Swahili), while in others the reverse holds (e.g. Maltese). In yet others, all three exist but are marked differently. For instance, in Luganda, the present perfect is marked synthetically, but the others, analytically (see Comrie 1985a: 80 and Dahl 1985: 152 ff.).

Bybee et al. (1994: 54) calls the perfect an Anterior, a category which also includes the past anterior and future anterior. It is defined as a reference to a situation prior to the reference time and which holds at reference time.

Comrie (1976a) discusses various types of the category perfect, which Dahl (1985: 133) refers to as 'uses' of the perfect. Comrie's types are the perfect of result, experiential perfect, the perfect of persistent situation, and the perfect of recent past.

Many of these types are now considered to be separate grammatical categories, most notably the resultative (see Nedjalkov and Jaxontov 1988) and the experiential (Dahl 1985, 2000b).

The perfect of persistent situation is exemplified in sentences like *I have been waiting for hours*. Despite the fact that a past situation holds in the present (the implication of the sentence is that the speaker is still waiting), in many languages this sentence is translated as a simple present tense. Comrie (1976a: 60) speculates that this may be a property unique to the English perfect, but Dahl (1985: 136–7), who calls it a universal perfect, cites nine other languages (such as Estonian, Kikuyu, and Wolof) that have a universal perfect.

The experiential perfect is used to refer to situations that happened (at least once) in the past, as in *I have visited Paris*. Although Comrie (1976a) considers it a type of perfect, Dahl (1985: 140–42) argues for a separation of the experiential and the perfect into two distinct grams. For one, in many languages, the experiential and perfect are expressed by different morphemes which may or may not be compatible with each other. Dahl cites the example of Indonesian, where the two morphemes are mutually exclusive, but in Javanese, they normally co-occur in an experiential situation. Secondly, in some languages with an experiential morpheme, there is no perfect morpheme.

The term 'perfect of recent past' (similar to what McCawley 1971 calls the 'hot news perfect') is used to denote temporal closeness between the moment of speech and the event. An example is (Comrie 1976a: 60) *I have recently learned that the match is to be postponed*. Unlike other types of the perfect, the perfect of recent past allows a temporal adverbial construction, provided that it is an expression of temporal closeness.

The temporal closeness is in some languages expressed with the hodiernal past tense, and in many languages, there is no formal distinction between the hodiernal past and the perfect. The explanation for this appears to be that recent past events (events within a recent time frame) are much more likely to be relevant to the present than more distant events.

There is also a relationship between hot news perfect and areas of evidentiality: hot news perfect tends to refer to unexpected events and can be said to refer to mirative (unexpected) situations (see DeLancey 1997).

The origins of perfects are currently being hotly debated. One origin is in markers of possession: in English, the possessive verb *have* is used, apparently because of the metaphorical extension of possession (*I have the book finished*) to currently relevant state (*I have finished the book*). This is a completely European feature: in the 222-language sample of Dahl and Velupillai (2005b), of which 108 actually have perfect morphemes, all languages that mark the perfect with a possessive morpheme (seven) are found in Europe.

A more common origin of perfects is morphemes meaning 'finish' or 'already'. Twenty-one out of the 108 languages of Dahl and Velupillai (2005b) have such a perfect. Bybee et al. (1994: 64) list 'come' and 'be' as other possible origins.

In many languages, the perfect can be combined with other aspects and tenses. In English, it is normal for the perfect to be combined with the progressive, while in Bulgarian, the perfect can be combined with the imperfective aspect. However, if

the perfect is restricted to a specific aspect, it is always the perfective aspect. Such is the case in Greek. This would seem natural, as the perfective aspect inherently deals with actions that are bounded. Actions that are bounded in the past are finished and are therefore a natural partner for perfects (see Comrie 1976a: 64). Dahl (1985: 136) points to a relationship between perfects and statives. A current state obtains through a previous action.

6. RESULTATIVES

As mentioned above, although the resultative can be considered one of the sub-types of the perfect, there are good reasons for making a distinction between the two. A resultative is defined as a state resulting from a previous action. That is, the difference between a state and a resultative is that a state does not imply a preceding action (cf. Nedjalkov and Jaxontov 1988). A perfect then focuses on the preceding action, while the resultative reports on the resultant state. This is illustrated by the following pair (Nedjalkov and Jaxontov 1988: 7):

(16) a. John has broken the stick.
      b. The stick is broken.

The perfect (16a) focuses on the action of breaking, and the resultative (16b) shows the result of the action. As can be seen from (16), the two categories are distinct in English.

Nedjalkov and Jaxontov (1988) distinguish between various diathesis types, depending on which NP the subject of a resultative sentence is co-referent with. The type exemplified in (16) is the objective-resultative type, as the subject of the resultative sentence (16b) is the object in (16a). Nedjalkov and Jaxontov discuss various other types, such as the subjective, possessive, and oblique-objective types. An example of the latter is the Japanese example (17) (Nedjalkov and Jaxontov 1988: 10). The dative object *kisen* 'steamship' in (17a) is co-referent with the resultative subject of (17b).

(17) Japanese

      a. boku wa   kisen   ni   kyaku   o   nose-ta
         I   TOP steamship DAT   passenger OBJ   load-PST
         'I have boarded the passengers on the steamship.'

      b. kisen   wa   kyaku   o   nose-te   i-ru
         steamship   TOP   passenger OBJ   load-GER   AUX-PRS
         'The steamship is loaded with passengers.'

While there is a relationship between the perfect and the resultative, there are many languages in which only one or the other type occurs, or in which both are expressed by different morphemes.

7. INTERACTIONS BETWEEN TENSE, ASPECT, AND MODALITY

This section looks at some of the more important interactions between the various gram types. Some—for example, the interaction between habitual aspect and modality and the perfect—have already been discussed in the individual sections above. Here we focus on the interaction between modality and tense.

7.1 Modality and future tense

The fact that future events can be described both temporally and modally is an observation which goes back a long time. Discussions on the relation between the two areas can be found in Comrie (1985a: 43–6), Dahl (1985: 103 ff., 2000b), Bybee (1988), Bybee et al. (1994), and Palmer (1986, 2001) among others. These studies currently represent the state of the art in typological thinking on the future.[11]

Future is quite often a part of so-called irrealis morphemes, as discussed above. Nevertheless, as argued previously, there is no one-to-one correlation between the two categories, since there are many languages in which the future is a realis category (Maung, Caddo, Latin). Ontologically, future events have not come to pass, and epistemologically, the speaker cannot know for certain that the event will occur. Despite these logical uncertainties, there are languages in which these considerations do not play a role or in which there is a choice between various future tense forms to denote various shades of certainty. A language in which the future has been analysed as a pure tense (i.e. it refers to events occurring subsequent to the moment of speech without conveying a modal meaning as well) is the Tibeto-Burman language Manipuri (Bhat 1999: 18–19). In Manipuri, there is a basic future/non-future distinction. That is, there is one morpheme to denote future and one to denote present and past tense. In (18), the morpheme -*ŋi* is used for non-future (a, b), and -*kəni* is used for future (c).

(18) Manipuri

      a. ŋəsi   noŋ   məŋ-ŋi
         today   rain   cloudy-NFUT
         'It is cloudy today.'

      b. ŋəraŋ   noŋ   məŋ-ŋi
         yesterday rain cloudy-NFUT
         'It was cloudy yesterday.'

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[11] There are several important studies on the use and development of the future in individual languages and language families. Palmer (1990) and Coates (1983) include sections on the modal verbs with future reference, and Fleischman (1982) is an in-depth study on the future in Romance languages.

c. nuŋdaŋwayraŋmdə   noŋ   mɔŋ-gɔni
   evening.LOC   rain   cloudy-FUT
   'It will be cloudy in the evening.'

There are languages in which a speaker has a choice between different future morphemes to denote various shades of certainty. In Bybee et al. (1994: 247–8), several languages are listed in which there are two or more future morphemes with various levels of confidence. An example is Southern Agaw, a Cushitic language (Bybee et al. 1994: 248, data cited from Hetzron 1969). The future certainty morpheme -aGa is used when the speaker is certain that the action will occur, while -e is the future possibility morpheme.

(19) Southern Agaw

    a. táq-áGá
       know-2SG-FUT.CERT
       'You will [certainly] know [it].'
    b. dəngéta   ča   des-é
       perhaps   tomorrow   study-FUT.POSB
       'Perhaps tomorrow I shall study.'

Another connection between modality and future is the fact that quite often future morphemes develop from modal (deontic) forms. This has happened in English, of course, where the modal auxiliaries *will* and *shall* were originally modal verbs. The connection between obligation/volition and future is clear: one can obligate someone to do something only in the future. Thus, a sentence such as *You must go to school* means that the action of going to school is necessarily subsequent to the moment at which the obligation was uttered. This is a widespread development, accounting for the vast majority of cases in Bybee et al. (1994). Similarly, Fleischman (1982) discusses the French verb *devoir* 'must, ought to', which functions in many respects like a marker of future tense rather than obligation (1982: 146):

(20) French

    Je   dois   dîner   avec   Joseph   la   semaine   prochaine
    I   must   dine   with   Joseph   ART   week   next
    'I must/will have dinner with Joseph next week.'
    'I am to have dinner with Joseph next week.'

Fleischman comments that the modal verb can be replaced by other future forms (the go-future or the synthetic future) without much change in meaning.

7.2 Modality and past tense

While the past tense is usually taken as a pure temporal category, because it refers to events that are immutable and known, there is nevertheless a connection between the past tense and modality. This can be demonstrated even with English.

The past tense morpheme -ed is usually a pure tense morpheme, yet in certain environments it can mark various modal meanings, as in the following examples from Comrie (1985a: 19):

(21) a. If you did this, I would be very happy.
     b. If John was/were here ...
     c. I just wanted to ask you if you could lend me a pound.

Sentences (21a) and (b) are counterfactuals and hypotheticals, which are usually considered to be modal in nature (they are typical irrealis categories). Sentence (21c) is a polite request and refers to a non-actual event as well; a request is a type of wish. This is not an isolated fact of English, but a cross-linguistic feature. (If it were an isolated fact of English, examples (21a) and (21b) could be explained away as instances of homophony: the irrealis forms in (21a) and (21b) are homophonous with the regular past tense forms.)

Steele (1975) discusses the relation between past tense and modality through a reconstruction of part of the TAM system of Proto-Uto-Aztecan. She reconstructs two morphemes: *ta- as a general irrealis morpheme and *ta- as a past tense morpheme. She then goes on to state that both are actually the same morpheme, and that there is one abstract feature that underlies both categories. This feature is called dissociative, as past tense is dissociated from the present and irrealis is dissociated from reality. Steele suggests that this observation is valid cross-linguistically. This view of past tense as a remoteness device has been echoed in other works, such as James (1982) and Fleischman (1989). Palmer (1986: 211, 2001: 210) considers this line of reasoning circular but does not provide any real alternative. Bybee (1995: 513–16), which is a paper concerned with the development of the past tense forms of the modals *should* and *would*, rejects the notion that it is the past tense alone that is responsible for the modal interpretation. In her view, it is the combination of past tense with some other element, such as a modal verb, the subjunctive, or, as in Fleischman (1995), the imperfective aspect.

8. TAM AND ARGUMENT STRUCTURE

This section briefly examines the relationship between tense, aspect, and modality, and argument structure. Quite frequently, the choice of TAM elements influences the argument structure of the sentence. Two cases will be examined here: the status of subjects of modal sentences and the phenomenon of split ergativity.

8.1 Subjects of modal sentences

In many languages with a morphological case system, the presence of modal elements entails the marking of subjects with non-canonical morphological case. One such example is shown in (22), from Russian. The strong deontic adverb *nado* entails the use of a dative subject instead of the normal nominative.[12]

(22) Russian

mne   nado ujti   v   škol-u
I.DAT must go.INF to   school-ACC
'I have to go to school.'

In many languages, the non-canonical subject marking of modal sentences is part of non-canonical marking of the more general class of experiencer subjects.

8.2 Split ergativity

Many languages have both a nominative–accusative and an ergative–absolutive system, the choice of which is dependent on the TAM of the sentence. This phenomenon is known as split ergativity.[13] Most commonly, the split relates to tense and/or aspect: ergative–absolutive alignment occurs in the past tense, the perfect, or the perfective aspect. The nominative–accusative alignment occurs in the others. Palmer (1994: 58) cites Samoan as an example of such a split (original data from Milner 1973).

(23) Samoan

a. na   va'ai-a   e   le   tama le   i'a
   PST   look.at-PRF ERG the boy   the fish
   'The boy has spotted the fish.'

b. na   va'ai   le   tama i   le   i'a
   PST   look.at-PRF the boy   OBJ the fish
   'The boy was looking at the fish.'

DeLancey (1981) and Dixon (1994: 99) try to explain this split in terms of the relevance of the speech act participants (SAP) to the question of whether the action was completed or not. If an action is presented as completed (by using past tense of perfective aspect), then the SAPs that are most directly affected are object and subject, which leads to ergative–absolutive alignment. If the action is not presented as being

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[12] Not all modal elements in Russian require a dative subject, however. The modal verb *moč* 'may' and the modal adjective *dolžen* 'must' take a nominative subject, for instance.

[13] There are more ways in which split ergativity can occur that are not relevant to the present discussion. See the pioneering work by DeLancey (1981) as well as Dixon (1994: ch. 4) for extensive discussion (see also Primus, this volume).

complete (by using present or future tense, or imperfective aspect), then the SAPs most directly affected are agent and subject, yielding a nominative–accusative alignment.[14]

In the Nilotic language Päri (Andersen 1988), the split involves mood: in the imperative mood, the alignment is nominative–accusative (as this mood crucially relates to agent and subject equally), while ergative–absolutive is found in other moods.

9. SEMANTIC MAPS

The interactions of tense, aspect, and modality are evident on every level of grammar, as has become quite clear in recent research. Unfortunately, as we have seen, the terminology has not kept pace with new developments. This means that currently widely used terms, especially modal ones but also temporal and aspectual ones, suffer from lack of precision or are used interchangeably with others.[15] This problem—not unique to TAM issues, of course—seriously hinders progress in this area of grammar. We will look at one recent proposal that is gaining adherence in the typological literature.

In recent years, some effort has been made to deal with this problem, and one of the solutions proposed is to use semantic maps (or mental maps) which specify domains and parts of domains as well as relationships between parts of domains (see van der Auwera and Gast, this volume). Semantic maps are graphical representations of grammatical domains which show the semantic range of language-specific morphemes on a map that consists of the whole of the grammatical domain in question.

Semantic maps were first used by Anderson (1982) for his study of the perfect domain, and he (1986) later added maps for the evidential domain. The largest use of semantic maps in modality is van der Auwera and Plungian (1998). Maps have been used in other areas of grammar, but they had seen limited use in linguistic theory until recently, when Haspelmath (1997) used them in the domain of indefiniteness. He (2003) also proposed a formalization of semantic maps, which was extended in de Haan (2005) by sharply distinguishing between domains and functions of a domain. The resulting model is applied to modals in various Slavic languages.

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[14] Exceptions to this pattern are certain Cariban languages. In Cariña, the ergative pattern is found only in the future (Dixon 1994: 99, citing Gildea 1992), but this may be explained by the fact that the language is in a transitional phase, and that the observed pattern is a reflex of diachronic changes rather than of synchronic necessity.

[15] Witness, for instance, the interchangeability of root and deontic modality. These terms do have different scope (see Coates 1983 for the differences), but for all practical purposes they are used interchangeably.

There are many advantages of the semantic map model over other representational methods. One can dispense with terminological issues, such as the ones mentioned above. Instead, one can compare morphemes cross-linguistically by examining their respective maps and see how much overlap there is between morphemes. Also, the semantic map method is suited to computational approaches, as it can be easily represented in a computational model. Finally, the model fits in with current thoughts on representational schemas in cognitive science (see Gärdenfors 2000 for an overview of such approaches).

FURTHER READING

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CHAPTER 21

SYNTACTIC TYPOLOGY

LINDSAY WHALEY

1. INTRODUCTION

Syntactic typology is concerned with discovering cross-linguistic patterns in the formation of particular constructions, whether those constructions be phrasal (e.g. noun phrase possessives, equivalent to *John's house*), clausal (e.g. basic content questions, equivalent to *What did Marvin eat?*), or sentential (e.g. the reporting of speech, equivalent to *Phoebe says that she enjoys swimming*). There are two basic descriptive goals when comparing such structures as they arise in a diverse set of languages. First, the comparison is aimed at identifying the full range of devices that languages employ to create the structures. Second, it determines the relative frequency with which a specific device, or a specific constellation of devices, is used in languages. When these goals have been successfully met, then, the syntactic typologist can answer the questions of just how different languages can be in the way they form a construction (be it possessives, content questions, or anything else) and what set of linguistic devices is more (or less) likely to be used for this purpose.

Beyond these core descriptive goals, syntactic typology establishes, whenever possible, correlations between the mechanisms that a language utilizes in the formation of a construction and other linguistic properties of the language, or between the mechanisms and the geography or genetic affiliation of the language. As just one example of a correlation based on linguistic properties, it is widely known that languages with a basic constituent order of Subject–Verb–Object (one of the

mechanisms employed to create basic declarative clauses) will not be ergative (see Plank 2003b for a discussion of this correlation). Increasingly, it is recognized that syntactic features of a language are related to the region in which the language is spoken;[1] for example, object-initial languages are found primarily in South America. Finally, the correlation may be between features of the construction and the genetic affiliation of the languages which use them; for example, inverting the order of a verb and the subject of a clause in a yes/no question (e.g. *Has the cat been outside?*) is typical in Germanic and Romance languages, but rare in other language families.[2]

Of course, the descriptive goals described above, as well as the attempt to establish correlations, are not unique to syntactic typology but more broadly characterize the field of typology as a whole. Rather, syntactic typology, to the degree that it represents a distinct subfield of typology, is distinguished by the domains of language on which it focuses, namely, phrase structure, clause structure, and sentence structure. Central to such domains is the relative ordering of constituents, and typological research has been particularly prolific in this area over the past half-century (see Graffi and Song, this volume). Increasingly, it has been recognized that the syntactic characteristics of phrase, clause, and sentence structure are inextricably connected to morphological properties of language, and the disjunction between morphological and syntactic typology is seen more as a matter of historical convention than as having theoretical import. Indeed, many of the chapters in Part IV of this volume examine just this interplay of syntax and morphology.

2. RECENT WORK IN SYNTACTIC TYPOLOGY

An immense amount of work has been carried out in syntactic typology in the last several decades, and it would be impossible to provide even a cursory overview of this enterprise. In this chapter, then, a sampling of just three areas of syntactic typology is provided. The first summarizes work carried out on relative clauses, one of the most thoroughly examined topics in typology and one for which many outstanding overviews already exist (e.g. Song 2001a, Comrie 1989, Lehmann 1984, Keenan 1985).[3] The second example deals with noun phrase conjunction. This topic

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[1] A recent ambitious attempt to establish some of these geographically conditioned properties of language is *The World Atlas of Language Structures* (Haspelmath, Dryer, Gil, and Comrie 2005).

[2] Notably, this could also be expressed as a geographical correlation, since Romance and Germanic languages are predominantly found in western Europe.

[3] Perhaps the only constructions to have received more attention within syntactic typology are causatives (Nedjalkov and Sil'nickij 1969a, Shibitani 1975, 1976, Haiman 1985, Comrie and Polinsky 1993, Song 1996, 2001b, Kulikov 2001) and basic word order.

has been largely overlooked until recent work, particularly Stassen (2000), and is thus representative of the ways in which syntactic typology has been expanding as a field of study. The third example is an overview of research on content questions. While a great deal has been learned about how content questions are formed cross-linguistically, the points of variation, some of which are extremely subtle, are sufficiently complex that few conclusions have been reached about universals related to how content questions are formed. Consequently, content questions represent an area in which there is yet much typological work to be done.

2.1 Relative constructions

A relative clause typically serves as a noun modifier and functions to express some attribute(s) of the noun, as in (1).

(1)   Ewe (Lewis 1984: 198)

    amɛ   [si   ___   fie   agbalɛ̃-a]
    person   REL   buy   book-DEF
    'the person who bought the book'

In (1), the bracketed words constitute the relative clause. The noun *amɛ* is referred to as the head noun. The combination of the head noun and the relative clause will be referred to as a relative construction (following Comrie and Kuteva 2005). The grammatical function within the relative clause that corresponds to the head noun is referred to as the relativized position. The example in (1) represents an instance of subject relativization because a gap, represented by '___', occurs in the position where a subject noun phrase would appear in an independent clause; the head noun is associated with this gapped subject position.

In some languages, non-finite verb forms are used in the formation of relative clauses, as is the case in Even:

(2)   Even (Malchukov 2000: 6)

    [___ Hör-çe-l-bu]   beji-l-bu   haa-ra-m
    go-PRF.PTCP-PL-ACC   man-PL-ACC   know-NFUT-1SG
    'I know the men who have left.'

The verb in the bracketed relative expression in (2) is a participle which agrees in case and number with the head noun *beji-l-bu* 'men-PL-ACC'. At first glance, then, (2) is less obviously a relative construction because the participle seems to behave like an adjective in terms of its morphological properties. The concord in case and number between an adjectival participle and a noun is similar to many other languages, where such structures are not considered to be relative constructions (e.g. Ancient Greek in (3)).

(3) Ancient Greek

ho   basileu-ōn   Kur-os
ART.NOM.SG   reign-PRS.PTCP.NOM.SG   Cyrus-NOM.SG
'the reigning Cyrus'

However, despite the formal similarities between the Even participle in (2) and the Greek participle in (3), there are several reasons why the former is taken to be a relative clause, whereas the latter is not. First, the patterns of agreement for adjectives and participles differ slightly from one another in Even (Malchukov 1995: 30–31), but they are identical in Greek. Second, subject agreement occurs on the participles of relative clauses in Even, a fact obscured in (2), because the subject position has been relativized, but observable in other instances (see (4) below). Such subject agreement never arises on Greek participles. Third, Even relativizes positions other than the subject, including direct objects (4a), indirect objects (4b), and oblique objects (4c).

(4) Even (Malchukov 1995: 34–5)

a. [etiken   ___   maa-ča-n]   bujun
   old.man   kill-PRF.PTCP-3SG   reindeer
   'the reindeer which the old man killed'

b. [etiken   ___   oro-m   böö-če-n]   hurken
   old.man   reindeer-ACC   give-PRF.PTCP-3SG   youth
   'the youth to whom the old man gave the reindeer'

c. [etiken   ___   bi-če-n]   d'uu
   old.man   be-PRF.PTCP-3SG   house
   'the house where the old man has been'

As opposed to Even, the noun modified by a Greek participle can only be construed as its subject. Finally, Greek possesses a relative construction that is formally distinct from the participle construction:

(5) Ancient Greek

ho   Kuros [hos   ___   basileu-ei]
ART.NOM.SG   Cyrus REL.PRO.NOM.SG   reign-3SG.PRS
'Cyrus, who is reigning'

The discussion so far has highlighted the fact that relative constructions within a particular language often differ only subtly from other types of nominal modification, but it has also reflected an additional fact about relative constructions: languages vary in the formal properties used to indicate relativization. The first parameter of variation is the strategy used to indicate the relativized position in the relative clause. One common strategy is simply to leave a gap in the relative clause in the position normally associated with a specific grammatical function. This occurs, for example, in Even:

(6) Even (Malchukov 1995: 34)

a. [___   buju-m   maa-ča]   etiken
         reindeer-ACC   kill-PRF.PTCP   old.man
   'the old man who killed the reindeer'

b. [etiken   ___   maa-ča-n]   bujun
   old.man   kill-PRF.PTCP-3SG   reindeer
   'the reindeer which the old man killed'

Because Even is a SOV language with case-marking to indicate grammatical functions, the relativized position is easy to reconstruct from the gap. In (6a), a gap arises in the slot where a nominative noun phrase (zero-marked in Even) would typically be; hence, the head noun is construed with that slot. In the same way, in (6b), there is a gap in the object position, so the head noun is understood to fulfil that function within the relative clause.

Some languages that employ the gapping strategy, such as Ewe, also signal relativization by a particle or affix that occurs on the periphery of the relative clause.

(7) Ewe (M. Lewis 1984: 198)

a. ame   [si   ___   fie   agbalē-a]
   person   REL   buy   book-DEF
   'the person who bought the book'

b. agbalē   [si   Kofi   fie   ___]
   book   REL   Kofi   buy
   'the book Kofi bought'

c. ame   [si   Kofi   fie   agbalē-a   na ___]
   person   REL   Kofi   buy   book-DEF   for
   'the person Kofi bought the book for'

As can be seen in (7), the relativizer *si* occurs at the left boundary of the relative clause in Ewe. Because it is invariant in form (it does not change to indicate animacy, case, gender, and so on), the presence of the relativizer does not indicate which position has been relativized. This information is still determinable only by the gap that arises within the relative clause.

Besides gapping, another means to indicate the relativized position is to place a relative pronoun at the beginning of the relative clause, as in (8).

(8) Ancient Greek

a. ho   Kuros [hos   ___   basileu-ei]
   ART.NOM.SG   Cyrus REL.NOM.SG   reign-3SG.PRS
   'Cyrus, who is reigning'

b. ho   hipp-os   [hon   ho   Kuros ___
    ART.NOM.SG   horse-NOM.SG   REL.ACC.SG   ART.NOM.SG   Cyrus
    phil-ei]
    love-3SG.PRS
    'the horse which Cyrus loves'

c. ho   doul-os   [hō   ho   Kuros
    ART.NOM.SG   slave-NOM.SG   REL.DAT.SG   ART.NOM.SG   Cyrus
    hipp-on   ___ pemp-ei]
    horse-ACC.SG   send-3SG.PRS
    'the slave to whom Cyrus is sending a horse'

Though Greek relative clauses also have a gap in the position that is being relativized, the pronoun which occurs at the onset of the relative clause is marked for case. Therefore, the pronoun alone is sufficient to establish that the subject is being relativized in (8a); the direct object, in (8b); and a dative object, in (8c).[4] Notably, whereas the gapping strategy for relativization is common and widespread, the use of relative pronouns is not. Rather, it arises primarily in Europe, and it is the predominant strategy of this area (Comrie 1998, Haspelmath 2001, Comrie and Kuteva 2005).

Though gapping is the most common relativization strategy (particularly in the case of subject relativization), many languages employ other strategies. For example, the relativized position can be marked by a resumptive pronoun within the relative clause:

(9) Yoruba (Pulleyblank 1990: 984)
     eni   [tí   ó   wá]
     person   REL   he/she   come
     'the person who came'

In the Yoruba example, the presence of the pronoun ó 'he/she' in the relative clause indicates that the subject position is being relativized. This strategy occurs most commonly in languages in Africa. It also is largely restricted to languages in which the relative clause follows the head noun, a fact that is also true of languages that use relative pronouns (Lehmann 1986).

Finally, some languages employ what Comrie and Kuteva (2005: 495) refer to as the 'non-reduction' strategy of relativization. This strategy is characterized by the presence of a full noun phrase in the relativized position. There may be a co-referential element in the main clause, as in Pirahã (10), or may not, as in Lakhota (11).

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[4] It should be noted that in Ancient Greek the relative pronoun occasionally agrees in case with its antecedent (a process referred to as 'case attraction') rather than indicating the grammatical function of the relativized position. In such cases, the gap becomes a more important indicator of relativized position.

(10) Pirahã (Everett 1986: 276)
      boitóhoi   bog-ái-hiab-i-s-aoaxái   [boitó   báosa
      boat   come-ATELIC-NEG-EPENTH-?-INTER   boat   barge

      xig-i-sai]   (híx)
      bring-EPENTH-NMLZ   (COMP/INTER)
      'Might it be that the boat (which) tows barges is not coming?'

(11) Lakhota (Williamson 1987: 175–6)
      [Wįyą   wą   owįža   wą   kağe   ki]   he]   ophewathų
      woman   a   quilt   a   make   the   DEM   1SG.buy
      'I bought the quilt that a woman made.'

Non-reduction strategies such as these arise most frequently in North and South America (Comrie and Kuteva 2005).

Relative constructions have received significant attention within typology due to the pioneering work by Greenberg (1966c) and Keenan and Comrie (1977). Greenberg, for his part, noted intriguing patterns in the placement of 'relational expressions' (what I refer to in this chapter as relative constructions) vis-à-vis the noun that they modify. First, in the sample of languages examined by Greenberg, languages were far more likely to have a relational expression following the noun (twenty languages) than preceding it (seven languages).[5] Second, he observed that the two possible orders correlated with other aspects of phrase structure in the languages of his sample, especially the order of nouns and adjectives and the order of adpositions and the noun phrases they govern. This led Greenberg to postulate the following universal:[6]

(12) Greenberg's Universal 24
      If the relative expression precedes the noun either as the only construction or as an alternate construction, either the language is postpositional, or the adjective precedes the noun, or both.

A language such as Japanese reflects the predictions of Greenberg's universal: the relative construction precedes the noun that it modifies (13a); the language is postpositional (13a, b); and adjectives precede the nouns they modify.

(13) Japanese (Dubinsky 1990: 53, 57)
      a. [watasi   ga   hon   o   ataeta]   kodomo
          I   NOM   book   ACC   give.PRF   child
          'the child I gave a book to'

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[5] Two languages, Finnish and Nubian, were found to have both, though Greenberg noted that in Finnish the order relational expression–noun was an imitation of literary Swedish (Greenberg 1963c: 106).

[6] Though many of Greenberg's universals are cast as probabilities, Universal 24 is stated as an absolute. However, Greenberg (1963c: 90) mentions an exception, Mandarin Chinese, which places relatives before nouns, yet employs prepositions.

b. watasi   wa   Taroo   ni   hon   o   ataeta
   I   TOP   Taro   DAT   book ACC give.PRF
   'I gave a book to Taro.'

c. abunai   tokoro
   dangerous   place
   'dangerous place'

It is worth noting that Dryer (1992) builds upon Greenberg's work by examining whether the order of a relative construction and a noun also correlates with the order of verb and object in languages. He argues that there is, in fact, a correlation, though the correlation is not quite so simple as saying that VO and OV languages are mirror images of each other. Rather, while VO languages overwhelmingly employ the order Noun–Relative Construction (with only Mandarin Chinese and closely related languages being exceptional—see note 6), OV languages as a group reveal both the Noun–Relative Construction and the Relative Construction–Noun patterns, with the former being preferred overall. Dryer notes that only in Eurasia does one find a greater number of language genera that are OV and use prenominal relative constructions.[7] Even so, he still finds there to be a correlation between VO ordering and the placement of relative constructions in the following sense: In all six linguistic areas into which he places language genera, the proportion of genera that are OV and use the order Relative Construction–Noun is greater than the proportion of genera that are VO and use this order. Stating Dryer's finding more simply, if relative constructions appear before the nouns they modify in a language, that language is highly likely to be OV.

Keenan and Comrie (1977) tackle a very different property of relative constructions. They argue that relativization strategies are sensitive to the following hierarchy:

(14)   *Keenan and Comrie's Accessibility Hierarchy*
       Subject > Direct Object > Indirect Object > Oblique > Possessor

Keenan and Comrie make two core observations about the connection between the Accessibility Hierarchy and relativization strategies. First, if a language allows relativization for one of the positions on the hierarchy, it will also allow relativization for all the positions to the left of it. This observation entails the claim that relativization becomes less common the further to the right one moves on the hierarchy. Second, if a given relativization strategy in a language can be applied to more than one position on the hierarchy, those positions will be contiguous. For this reason, one should not expect to find a language that employs a gapping strategy for, say, subjects and indirect objects, yet a non-reduction strategy for direct objects. A third connection between the Accessibility Hierarchy and

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[7] By language genera, Dryer (1992: 84) means a genetic grouping of languages that has 'a time depth no greater than 4000 years'.

relativization also seems to hold: the pronoun retention strategy is preferred on the lower (i.e. the right) side of the hierarchy. Comrie and Kuteva (2005: 497), in particular, find good evidence for this correlation.

2.2 Noun phrase conjunction

One area of syntactic typology that has only begun to receive much attention in recent years (see esp. Stassen 2000, 2001, 2005a, Haspelmath 2004a) is the method by which languages indicate the conjunction of noun phrases, as in *the sun and the moon*.[8] There are three central parameters by which languages vary in this regard: (i) whether a language lacks an overt coordinating conjunction (asyndeton) or has one (monosyndeton) or more (polysyndeton); (ii) whether the conjunction or conjunctions are preposed or postposed relative to the noun phrases being combined; and (iii) whether the noun phrases are encoded with equal structural rank (the coordinating strategy) or not (the comitative strategy).

Turning to the first parameter, one finds that monosyndeton is the most pervasive strategy, particularly when the conjunction occurs between the two noun phrase conjuncts:

(15)   Ancient Greek
       Dareiou   kai   Parysatidos   gignontai   paides   duo
       Darius.GEN   and   Parysatis.GEN be.born.3P.MID   children.NOM   two
       'Darius and Parysatis had two children born to them.'

Not only is the use of a single 'medial connective' (Stassen 2000) the most common pattern found in noun phrase conjunction, but it also arises in every region of the world.

Asyndeton is also commonly found in languages. In such cases, the two noun phrases are simply juxtaposed, as in:

(16)   Udihe (Nikolaeva and Tolskaya 2001: 648)
       mamaka   aziga-la   digeŋ-ki-ni
       old.woman   girl-CONTR   hide-PST-3SG
       'The old woman and the girls have hidden.'

This kind of coordination through juxtaposition, though common, is rarely the sole means by which noun phrases get conjoined in a language. In Udihe, for

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[8] Stassen (2000: 4) understands a sentence to contain a noun phrase conjunction if two conditions hold: (i) the sentence describes a single occurrence of an event, and (ii) the event is predicated simultaneously of two referents, which are conceived of as separate individuals. By virtue of this definition, coordination of three or more entities (e.g. *John, Mary, and Joe went to the movies*) is excluded from consideration.

example, though asyndeton is the preferred means of noun phrase conjunction, there is the alternative of placing a focus clitic on the head noun of each conjunct:

(17)   Udihe (Nikolaeva and Tolskaya 2001: 649)
       käŋa-da   ña:-wa-ni   nakta-da   ña:-wa-ni   kai-ze-mi
       deer-FOC   skin-ACC-3SG   boar-FOC   skin-ACC-3SG   break-SBJ-1SG
       'I will break the skin of the deer and of the boar.'

Despite juxtaposition being widespread in languages, it is largely absent from languages in most of Africa and western Europe (Stassen 2005a: 258). Moreover, there appears to be a historical trend towards languages developing overt marking of coordination.[9]

With respect to the first parameter, polysyndeton, in which both noun phrases are marked with a linking particle, is the least common construction found in language. Examples are given in (17) above and in the Korean sentence in (18).

(18)   Korean (Ramstedt 1939: 156)
       na   hago   ne   hago   kagesso
       1SG   and   2SG   and   go.FUT
       'You and I will go.'

Notably, those languages that do employ polysyndeton often possess related constructions with only a single overt marker of coordination. This is true for Korean, and can also be seen in the Tubu examples in (19).

(19)   Tubu (Lukas 1953: 166)
       a. túrku   ye   mɔlɔfúr   ye
          jackal and   hyena   and
          'the jackal and the hyena'

       b. wúdɛn   arkɔ́   ye
          gazelle goat   and
          'the antelope and the goat'

Just as there is a clear asymmetry in the frequency of different coordination strategies for the first parameter (monosyndeton being more common than asyndeton, and both being far more common than polysyndeton), there is a clear pattern that arises with respect to the second parameter, the placement of a conjunction vis-à-vis the conjuncts. Apparently, no language places a monosyndetic marker prior to both noun phrases, and polysyndetic preposing (e.g. *both dogs and cats*) is never the only strategy employed for noun phrase conjunction in a particular language. Using a single postposed conjunction (see (19b) above) is also

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[9] Mithun (1988) argues that this trend may be due to the spread of literacy around the world, since written language lacks the intonational cues that tend to accompany asyndeton.

unusual, and when it occurs, the language typically also permits polysyndeton (as in (19a)). On the basis of these observations, it is possible to make the typological generalization that languages are far more likely to have a medial placement of overt conjunctions than preposing or postposing them,[10] and postposing is preferred to preposing.

The third parameter of noun phrase conjunction that has been examined in the literature concerns whether the two noun phrases involved are encoded with equal rank or not. In the so-called 'coordinate strategy' (Stassen 2000), the noun phrases have the same semantic role and grammatical functions (thereby being marked with the same case inflection in many languages). In the typical instance, the noun phrases in the coordinate strategy form a constituent and will commonly trigger plural agreement on verbs, even if both conjuncts are singular. Alternatively, in the 'comitative strategy', the noun phrases are encoded unequally in a sentence (as in *Paul wrote a book with David*). One of them is encoded as an oblique noun phrase or as part of an adpositional phrase, whereas the other can have any grammatical function. The two noun phrases do not form a constituent, and they do not bring about dual or plural agreement on verbs.

All languages seem to possess a comitative strategy for noun phrase conjunction, yet for some languages, this is the only strategy (Stassen 2000 refers to them as 'WITH-languages'), for example, Fijian (20) and Iraqw (21).

(20)   Fijian (Dixon 1988: 157)
       'eirau   aa   sota vata   o   yau   'ei   Jone mai   Viidawa
       1DU.EXCL   PST   meet together   ART   1SG   with   John at   Viidawa
       'John and I met at Viidawa' (lit. 'We two met at Viidawa, me and John').

(21)   Iraqw (adapted from Mous 2004: 112)
       muu-dá'   nee   dama-r-ín   ta-ri   waráahh
       people-DEM   with   calf-F-3PL.POSS IMPS-NAR   PASS.PST
       'Those people and their calf passed/Those people passed with their calf.'

WITH-languages are common in certain parts of the world, including eastern Asia, Polynesia, sub-Sahara Africa, and specific regions of Latin America. However, there are two senses in which the comitative strategy can be seen as less preferred in languages compared to the coordinate strategy (Stassen 2000, 2001, 2005a). On the one hand, there are about half as many WITH-languages as those that have other noun conjunction strategies. On the other hand, WITH-languages seem to be

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[10] Haspelmath (2004a) and Stassen (2000) both note that the medial connective might be construed as either postposed or preposed depending on whether it evinces a closer structural connection to one of the conjuncts (i.e. [NP conjunction] NP could be seen as a type of postposing, and NP [conjunction NP], as preposing). However, determining the constituent structure of noun phrase coordination is far from obvious in most languages (see Haspelmath 2004a: 6–9 for a helpful discussion).

unstable from a historical standpoint, in that many such languages show evidence of a drift towards developing a coordinate strategy for noun phrase conjunction.

In addition to showing that for each of the three parameters there are strong tendencies for languages to use particular strategies in the coordination of noun phrases, typological research has demonstrated that certain morphosyntactic properties correlate with specific coordination strategies. First, WITH-languages tend to be isolating.[11] Second, postposed markers of coordination (whether they be mono- or polysyndetic) tend strongly to occur in verb-final languages. Third, verb-initial languages which use a coordination strategy involving overt marking almost always employ a medial connective.

2.3 Content questions

Research on the syntax of questions reaches back both to the beginnings of modern typology (in particular, Greenberg 1963b and Ultan 1978) and to comparative generative syntax (e.g. Bach 1971, Frantz 1973). Consequently, a tremendous amount of data concerning cross-linguistic patterns in the formation of questions has been gathered, and many typological generalizations have been put forth about particular properties of interrogative constructions. As just one example, Greenberg (1966c: 81) notes that sentence-final question particles are common in verb-final languages, a finding that is corroborated in Dryer (1992). That said, there is still a great deal of typological work to be done on interrogatives because reliable findings on how particular properties—ones that are known to vary across languages—cluster together in individual languages have yet to be provided.

Traditionally, interrogative constructions are divided into at least two core types: polar questions and content questions. The former is employed to determine the truth value of a proposition and generally expects a 'yes' or 'no' answer, as in *Did it rain earlier today?* In contrast, content questions are utilized to derive information that fills out the interpretation of a proposition, as in *What does Phil expect me to buy?* Here, the proposition 'Phil expects me to buy X' can be completed when the variable X is given a referent. Essential to content questions, then, is an interrogative word, such as *what*.[12] Although the two basic interrogative types usually share many prosodic, morphological, or syntactic properties in a given language, there are inevitably differences as well. For this reason, we restrict attention to content questions in this section.

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[11] Stassen (2000), rather than making this general claim, argues for two distinct correlations: WITH-languages tend to be 'NonCased' (i.e. grammatical functions are not distinguished by means of case inflections), and WITH-languages are 'NonTensed' (i.e. there is no verbal morphology distinguishing between Past and Non-Past).

[12] Although there is a growing body of typological literature examining the sets of interrogative words that occur in language (Haspelmath 1997, Siemund 2001), this issue is ignored here.

There are two common means by which content questions are formed across languages. The most common is to place the interrogative constituent at the beginning of a sentence (22).[13]

(22)   Sharanahua (Frantz 1973: 532)
ahuua   min   rutua-mun
what.thing   you   kill.COMPL-INTER
'What did you kill?'

As (22) demonstrates, the sentence-initial placement of the interrogative constituent need not be the only marker of the question. In this instance, a verbal suffix also appears obligatorily in a content question (in other languages, there may be special intonation, special word order, and so forth).

The second common construction is to leave the interrogative constituent *in situ*, i.e. in the position where a constituent of its type would normally occur in a corresponding declarative clause:

(23)   Japanese (Hinds 1984: 159)
ano   seta   o   doko   de   kaimashita   ka
that   sweater OBJ   where   at   bought   Q
'Where did you buy that sweater?'

As with the fronting strategy, the *in situ* strategy may or may not be accompanied by other indicators that the clause is an interrogative.

Though both strategies are common and widespread, Dryer (2005g) points out that the *in situ* type dominates certain regions of the world: central, eastern, and southern Africa, Asia, and the island of New Guinea. Though not common, some languages mix the two strategies together, requiring some types of constituents to be fronted, yet not others. Here again, though, there is a geographical correlate, as most languages of this sort occur in Polynesia or West Africa. In these same regions, there are a handful of languages that use the in situ strategy for most constituent types but employ a special construction for others, as is the case in Indonesian:

(24)   Indonesian (Cole, Herman, and Nasanius Tjung 2005: 553–6)

a. Siti   mau   apa
   Siti   want   what
   'What does Siti want?'

b. Ani sudah   mengetik   laporannya   siapa
   Ani already   ACT.type   report.3POSS   who
   'Whose report did Ani type?'

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[13] Ultan (1978: 229) finds this strategy in three-quarters of the languages that he examines.

c. Kamu   akan   membayar   hutangmu   dengan   apa
   2SG   will   ACT.pay   debt.2SG   with   what
   'What will you pay your debt with?'

d. *Siapa   akan   menjadi ·   wasit   pertandingan   itu
   who   will   ACT.become referee   match   that
   'Who will be the referee of that match?'

As can be seen in these data, the dominant strategy for Indonesian is to leave the interrogative constituent *in situ*, as occurs with objects (24a), possessives (24b), and obliques (24c). However, it is not permitted with subjects (24d). In order to form an interrogative of the subject constituent, it is necessary to insert the complementizer *yang* after the subject, as in:

(25)   Indonesian (Cole et al. 2005: 557)
       Siapa   yang   akan   menjadi   wasit   pertandingan   itu
       who   comp   will   ACT.become   referee   match   that
       'Who will become the referee of that match?'

In addition to some correlation between geographical regions and the type of strategy used for content interrogatives, there may also be a correlation between the strategy used and the basic constituent order of languages. Greenberg (1966c: 82) observes that SOV languages tend to keep interrogative constituents *in situ*, whereas SVO and VSO languages favour fronting.

A handful of other constructions arise in language for content questions. Quite exceptionally, Khasi and Tennet have been claimed to place interrogative constituents at the end of a sentence, whereas others, such as Gujarati and Basque, use special positions within the sentence (usually the position right before the verb). Nearly all of these languages are spoken in Europe or western Asia. Finally, some languages—for example, Malagasay—use special focus constructions for content questions.

As noted above, the position of the interrogative constituent is only one aspect of the syntax of content questions in many languages. Not uncommonly, question markers (either in the form of particles or verb morphology) appear, as is possible in Japanese (see (23) above) and Lakhota (26).

(26)   Lakhota (Van Valin and LaPolla 1997: 617)
       šų́ka   ki   táku   ø-ø-yaxtáka   he?
       dog   the   what   3SG-3SG-bite   Q
       'What did the dog bite?'[14]

The use of particles in content questions appears to be restricted to languages that use the same particles for polar questions. This can be seen in (27) for Lakhota.

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[14] It should be noted that the question word *táku* can also be interpreted as an indefinite pronoun, so this sentence can also mean 'Did the dog bite something?'

(27)   Lakhota (Van Valin and LaPolla 1997: 424)
       šų́ka   ki   igmú   wą   ø-ø-yaxtáka   he?
       dog   the   cat   a   3SG-3SG-bite   Q
       'Did the dog bite a cat?'

As a result of this fact, it is possible to pose the following implication: if a language uses a particle to mark content questions, then this language will also allow the use of this particle in polar questions (Siemund 2001: 1021).

Other facts about the use of question particles suggest their use is associated with other linguistic properties of the languages in which they occur. For instance, they are more likely to be used in cases where the in situ strategy is employed. Furthermore, question particles, when they arise in content questions, tend to be sentence-final, especially in eastern Asia, New Guinea, western Africa, and eastern Africa, though in a few languages, they appear elsewhere in the clause.

Another somewhat exceptional syntactic property that may be used in content questions is the reordering of constituents (other than the question word) in a clause. This arises in English, for example, where subjects and auxiliary verbs are inverted in all instances in which a non-subject is being questioned:

(28)   English
       a. What type of bird did he shoot?
       b. To whom was he speaking?
       c. Why has he been rushing around?

Inversion strategies such as this are largely restricted to Indo-European languages of western Europe. Similar to the case with particles, it seems that when inversion is used in the formation of content questions in a language, it is also used in polar questions (e.g. *Did he shoot a bird?*).

As the discussion has indicated thus far, a great deal of cross-linguistic information has been gleaned about the distribution of individual properties of content questions. However, determining which properties are likely to cluster together in specific languages (and why they cluster) has proved much more difficult (see e.g. Cheng 1997, who attempts to do this within the framework of generative grammar). Limiting attention to just some of the properties described above (whether the fronting strategy or the in situ strategy is used, whether there is a question particle, and whether there is inversion) and determining their distribution in languages of different basic word orders, one finds tremendous variation.

(29)   English
       (SVO, obligatory fronting, no question particles, inversion)
       a. You have seen him.
       b. Did you see him?
       c. Whom did you see?

(30) Colloquial French (Ouhalla 1999: 304)
(SVO, optional fronting, no question particle, inversion with movement)

a. tu   as   vu   Michel
   you   have seen   Michael
   'You have seen Michael.'

b. qui   as-tu   vu?
   who   have-you seen
   'Whom have you seen?'

c. tu   as   vu   qui?
   you   have seen   who
   'Whom have you seen?'

(31) Evenki (Nedjalkov 1997)
(SOV, fronting required, no question marker in content questions, no inversion)

a. amin-ni   tadu   bi-dʒərə-n
   father-your there   be-PRS-3SG
   'Your father lives there.'

b. iːdu   amin-ni   bi-dʒərə-n
   where   father-your be-PRS-3SG
   'Where does your father live?'

c. ər   dukuvun-mə   taŋ-tʃa-s-ku
   this letter-ACC.DEF read-PST-2SG-Q
   'Did you read this letter?'

(32) Chinese (Li and Thompson 1981)
(SVO/SOV, in situ, no question marker in content questions, no inversion)

a. tā   xiàwŭ   lái
   3SG   afternoon   come
   'S/He will come in the afternoon.'

b. tā   shénme shíhou lái
   3SG   what   time   come
   'When will s/he come?'

c. nǐ   haŏ   ma
   you   good   Q
   'Are you well?'

(33) Japanese
(SOV, in situ, question marker, no inversion)

a. John-wa   hon-o   kaimasita
   John-TOP   book-ACC   bought
   'John bought a book.'

b. John-wa   nani-o   kaimasita ka?
   John-TOP   what-ACC   bought   Q
   'What did John buy?'

(34) Ocotepec Mixtec (Alexander 1988)
(VSO, fronting, no question marker in content questions, no inversion)

a. kíshin   nu
   CNT.sleep   2SG.FAM
   'You are sleeping.'

b. á   kíshin   nu
   QM   CON.sleep   2SG.FAM
   'Are you sleeping?'

c. ní   kwahan   de
   where   INC.go   3SG.RESP
   'Where did he go?'

These data, which exemplify only some of the kinds of variation that are encountered in basic content questions, reflect the fact that particular morphosyntactic properties of questions combine in an unexpectedly free range of possibilities. Despite the depth of typological research undertaken to identify restrictions on these possibilities, there is still clearly much work to be done.

The need for further typological research is underscored when attention is turned to more complex content questions, such as when the interrogative constituent is associated with a position in an embedded clause (35) or multiple interrogative constituents occur in the same clause (36).

(35)   Who do you hope wins the race?

(36)   What will John be giving to whom?

Though such constructions in a variety of languages have been explored in formal syntactic frameworks, very little typological research has been carried out, in spite of the fact that there are significant differences among languages in whether the constructions are allowed and what their morphosyntactic properties are. For example, restricting discussion solely to word order facts, one finds that certain fronting languages allow only one of the interrogative constituents to be moved to the front of the sentence, as in English; (36) is grammatical (at least under certain pragmatic conditions), whereas (37) is not.

(37)   *To whom what will John be giving?/*What to whom will John be giving?

Other fronting languages require all the interrogative constituents to be fronted.

(38)   Georgian (Harris 1984: 71)

   a. vin   ras   qidulobs?
      who what he.buy.it
      'Who is buying what?'

   b. *vin qidulobs ras?
      who he.buy.it what
      'Who is buying what?'

Still other fronting languages allow all the interrogative constituents to be fronted, but do not require it.

(39)   Hungarian (Kiss 1994: 39)

   a. ki   vett   el   kit?
      who married PTL whom
      'Who married whom?'

   b. ki   kit   vett   el?
      who whom married PTL
      'Who married whom?'

In addition, for languages that allow multiple interrogative constituents to be fronted, there is variation in whether the relative order is restricted, as in Hungarian (40), or not, as in Czech (41).

(40)   Hungarian (Kiss 1994: 39)

   a. Ki-dat   miért   segített-él?
      who-DAT   why   helped-you
      'Why did you help who?'

   b. *Miért ki-nek   segített-él?
      why   who-DAT helped-you
      'Why did you help who?'

(41)   Czech (Siemund 2001: 1025)

   a. Kdo kdy   koho   pozval, nevim
      who when whom invited   I.don't.know
      'Who invited whom when, I do not know.'

   b. Kdy kdo koho   pozval, nevim
      when who whom invited   I.don't.know'
      'Who invited whom when, I do not know.'

The examples of multiple interrogative constituents provided here are all drawn from Eurasian languages that either are verb-medial or have flexible constituent order. Moreover, all these languages lack question particles. In these ways they are all quite similar, yet they evince a high degree of difference in terms of this one

parameter. Examining in situ languages, languages with alternate constituent orders, languages with question markers, and languages from other parts of the world would, no doubt, reveal an even greater amount of variation, which raises the question of whether such variation is at all predictable on the basis of geography, genetics, or language structure. It is a question that as yet has no answer in syntactic typology.

3. METHODOLOGICAL ISSUES

In the course of the overview of relative clauses, noun phrase conjunction, and content questions, certain key methodological questions have been left implicit. It is important, now, to make them explicit, since they have a significant bearing on the conclusions reached by syntactic typology.

3.1 The issue of multiple coding strategies

As has been shown in preceding sections, there are often multiple strategies within a language to accomplish the same ends. Consider, as just one instance, noun phrase conjunction in Oroqen. The most common method is by way of the comitative strategy (see section 2.2).

(42)   Oroqen

    bi: tarı   bəjə-dʒi   dʒanda-tʃa-w
    1SG   that   man-INS   sing-PST-1SG
    'I sang with that man./That man and I sang.'

However, co-ordinated noun phrases are also frequently juxtaposed.

(43)   Oroqen

    ɔlɔ   bolbokon   eyi-dʒə-rə
    fish   butterfly   play-DUR-AOR
    'The fish and the butterflies were playing.'

Less frequently, the postposed suffix -da/-də is used.

(44)   Oroqen

    imukʃə(-da) inmə-yə-də   min-du   bu:-tsə
    oil-(CONJ)   needle-ACC.INDF-CONJ   1SG-DAT give-PST
    'She gave oil and a needle to me.'

As is indicated in (44), the coordinating suffix can be omitted from the first conjunct.

Given that all three strategies are available in the language, the question arises as to how Oroqen should be typed in a cross-linguistic examination of noun phrase conjunction. On the one hand, one might choose the most frequent strategy as characteristic of the language. On the other, one might choose to create a category for languages that use multiple strategies or even several such categories depending on which combination of strategies is utilized. Still another possibility is to define language types in a way that a 'pure' type is set against all others. This, recall, is the method employed by Stassen (2000) in his seminal work on noun phrase conjunction. So-called WITH-languages are those that use the comitative strategy exclusively. All others are considered to use the coordinate strategy. Under this approach, then, Oroqen would not be considered a WITH-language despite the fact that the comitative strategy is most common.

Any one of these approaches might be used for particular reasons. However, as a general rule of thumb, syntactic typologists have preferred to define a dominant strategy for a language and then type the language accordingly. The dominant strategy is typically the one that is most frequent and has the fewest pragmatic restrictions on its use. Typically, only in instances when no single dominant strategy can be determined is resort had to mixed-language types.

3.2 The issue of equivalence across languages

Another methodological issue that is ubiquitous in syntactic typology is whether constructions in two different languages can be considered equivalent for comparative purposes (see Stassen, this volume). Consider the problem raised by certain Altaic languages in the cross-linguistic study of relative clauses (see section 2.1). These languages use non-finite verb forms for this purpose.

(45)   Oroqen
       [bi: ___   umu-ŋki-w]   arakı
       1SG   drink-PTCP.HAB-1SG.POSS liquor
       'the liquor that I used to drink'

Oroqen employs a gapping strategy with no relative pronoun or relativizer. The verb in the relative construction is a participle, though it is possible, as can be seen in (45), to use a possessive suffix to indicate the subject of the participle. The question arises, however, as to why such a construction should be considered as a relative clause when similar constructions occur in many languages which are not so considered. For example, English allows nouns to be modified by participles, as in *a stimulating conversation* or *the candidate hoping to win*. Should such structures be considered a type of relative clause that uses a gapping strategy and no relative

pronoun/relativizer, just as Oroqen does? Alternatively, should the Oroqen construction not be considered an instance of relativization?

Again, there is clearly room for argument on this issue, but in general, syntactic typology relies on the (admittedly intuitive) notion of there being *enough* functional equivalence between constructions in two languages to consider them as being equivalent. In this case, for example, the English participial modifier is fairly limited in its use. When it is prenominal, it cannot arise with any arguments (*a stimulating the mind conversation*); whether prenominal or postnominal, only a subject gap can be construed with the participle; and so on. Finally, there is in English a construction which is more obviously an instance of relativization (*a conversation which stimulates the mind, the candidate who hopes to win*). In contrast, the Oroqen participle heads a constituent that is clause-like in every-way except that the verb is non-finite; a range of grammatical functions can be construed with the participle; and there is no other construction that might be deemed a relative clause.

3.3 The issue of how to interpret correlations

The ultimate goal of syntactic typology (and the field of typology more generally) is to find restrictions on logically possible properties of language either in an absolute sense or in terms of other structural characteristics of the language and then to explain them. However, it is not always clear that this is possible, because of the limited number of languages that there are. For example, in the discussion of content questions in 2.3, it was noted that when question particles are used, these tend to be sentence-final. Does this represent a general property of the human capacity for language? This is one possibility, but there is an obvious complicating factor. The presence of sentence-final question particles in polar questions shows some areal bias; they show up most commonly in west and central Africa, parts of Asia, and New Guinea (Dryer 2005h). Since the set of languages that use a question particle in content questions is a subset of languages that use them for polar questions, the same areal bias is likely to hold. It is possible, then, that the predilection for sentence-final particles in content questions is a geographical or genetic accident, since genetically related languages tend to be spoken in the same regions.

Of course, typologists have long been aware of the need to control for areal and genetic factors when testing typological claims (see Bakker, this volume). The problem, however, is that controlling for such biases in a language sample requires a sufficient number of geographically and genetically distinct languages. When looking at certain properties or clusters of properties known to vary in human language, this may not be possible in all cases.

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CHAPTER 22

MORPHOLOGICAL TYPOLOGY

DUNSTAN BROWN

1. THE TERM 'MORPHOLOGICAL TYPOLOGY'*

1.1 The received view of morphological typology

The term 'morphological typology' has been traditionally associated with the division of languages into basic 'holistic' types, such as 'inflectional', 'agglutinative', and 'isolating', which could be used to characterize a complete language (see Croft 2003a: 45–8, Song 2001a: 41–5).

In defining fundamental language types, Sapir (1921: 136–46) drew a distinction between 'technique' (formal process) and 'synthesis' (number of concepts per word). Formal processes are the following: (a) isolating, where the word is the same as the root (1921: 126); (b) agglutinative, involving regular affixation (p. 129); (c) fusional, where affixation may be accompanied by changes in the root (p. 130); (d) symbolic, where there are changes which alter the root itself (p. 126). The terms 'analytic', 'synthetic', and 'polysynthetic' can be seen as describing the relative weight of individual words within a sentence, with analytic words being 'minor' in contrast to polysynthesis at the other end of the scale (p. 128). Sapir himself

pointed out that terms such as 'analytic', 'synthetic', and 'polysynthetic' are quantitative and relative, and cannot be used exclusively to characterize a language. This is why he developed a classification using formal process and degree of synthesis to cross-cut each other. He also pointed out the greater value of applying the classification of formal processes to 'relational concepts' (p. 127), which can be interpreted as meaning that the typology must distinguish the formal processes (morphological operations) used for marking syntactic relations from those processes which are derivational. As Croft (2003a: 46–7) notes, Greenberg (1954) developed this conception further by creating quantitative indices for these types, thereby overcoming the problem that a language never entirely belongs to one type or the other. This allowed for a ranking of a language relative to other languages. Characterization of the morphological complexity of words is, therefore, the sense in which morphological typology has traditionally been understood.

1.2 Typology and the relation between syntax and morphology

Another aspect of morphology which is often subjected to typological work is the relationship between word order and the order of affixes. For instance, it has been noted that there is a preference for suffixation in languages in general (Sapir 1921: 67, Greenberg 1957, Song 2001a: 119). In particular, for languages which have SOV order and/or Noun–Postposition order, there is a strong preference for suffixes (Hawkins and Gilligan 1988). There are a number of possible explanations for this observation.

One account is to see similar principles at work in syntax and morphology. So under this view, morphological typology is directly associated with syntax, in that the preference for a particular affix order is related to the preference for a particular syntactic order. For instance, Hawkins and Gilligan's (1988: 227) Head Ordering Principle treated affixes as heads, and so the preference for suffixes with SOV and Noun–Postposition languages can be understood as a requirement that the head occurs to the right of a phrase or word. This is based on an assumption that the structures of syntax and morphology are similar or the same.

Another approach to the observed relationship between word order and the order of inflectional formants is one based on diachronic explanation. Under such an account, there is no obligation to assume that the ordering of affixes results from active syntactic principles; it is rather the result of historical processes. Siewierska and Bakker (1996) show that the diachronic account fares better in predicting the prevalence of prefixation and suffixation in languages belonging to the major word order types, although even the diachronic account does not cover all of the data.

While statistical relationships between word order and the order of morphological elements may be accounted for to a large extent through diachrony, there is another reason why it is problematic to compare orderings across the two

components. That is, we know that there are languages where there is no basic word order (Mithun 1992). In contrast with this, although there exist potential counter examples—such as the variation in ordering of certain case-markings relative to the possessive in the Finno-Ugric language Mari (Luutonen 1997)— morphology typically imposes a rigid order, which, unlike ordering in syntax, does not allow for alternatives. The assumption that syntactic and morphological principles are one and the same thing fails to account for such differences.

1.3 Pure morphology and its implications for typology

In addition to mismatches in ordering, there is other evidence that linguistic morphology cannot be reduced entirely to the principles of other parts of grammar. Aronoff (1994) argues that there are pure morphological functions and, among other things, demonstrates with the example of the 'third stem' in Latin, used for the perfect participle and future participle. This is a purely form-based correspondence, because the meaning relation is difficult to characterize: the perfect participle is passive, but the future participle is active. The solution is to say that there is a third stem, which is an instance of a 'pure form' which can have different functions (Aronoff 1994: 37–9).

Other phenomena speak for the existence of morphological principles. These include inflectional classes, where different lexical items use different forms to realize the same morphosyntactic features. For instance, in Russian, there are four inflectional classes, shown in Table 22.1. Nouns belonging to inflectional class I are typically of masculine gender (i.e. take masculine agreement). Those which belong to class II are typically feminine (i.e. take feminine agreement), with the exception of a group of nouns which denote male human beings and therefore assign masculine gender, because semantics takes precedence. Nouns in inflectional class III are also feminine gender. Those in inflectional class IV are neuter gender. Consideration of inflectional classes II and III demonstrates that there is a degree of autonomy for morphology. Nouns belonging to these classes typically take feminine agreement, so the differences between them in terms of inflectional endings is irrelevant for syntax. Furthermore, because there are lexical items with semantically assigned masculine agreement belonging to inflectional class II, which typically assigns feminine gender, this shows that gender and inflectional class do not necessarily line up: one class may contain nouns of different genders, and conversely, one gender may correspond to different inflectional classes.

The most natural account of this is to treat inflectional classes as morphological entities. It should also be borne in mind that for Russian, once we progress beyond the assignment of gender on the basis of biological sex, it is difficult to isolate semantic principles of assignment, as illustrated by the examples of nouns with different genders but related semantics given in Corbett (1994: 1349–50). While the

Table 22.1. Russian noun inflectional classes (transliteration)

	I *stol* 'table'	II *ruk-a* 'hand'	III *kost'* 'bone'	IV *okno* 'window'
SG				
nom	*stol*	*ruk-a*	*kost'*	*okn-o*
acc	*stol*	*ruk-u*	*kost'*	*okn-o*
gen	*stol-a*	*ruk-i*	*kost-i*	*okn-a*
dat	*stol-u*	*ruk-e*	*kost-i*	*okn-u*
inst	*stol-om*	*ruk-oj*	*kost'-ju*	*okn-om*
prep	*stol-e*	*ruk-e*	*kost-i*	*okn-e*
PL				
nom	*stol-y*	*ruk-i*	*kost-i*	*okn-a*
acc	*stol-y*	*ruk-i*	*kost-i*	*okn-a*
gen	*stol-ov*	*ruk*	*kost-ej*	*okon*
dat	*stol-am*	*ruk-am*	*kost-jam*	*okn-am*
inst	*stol-ami*	*ruk-ami*	*kost-jami*	*okn-ami*
prep	*stol-ax*	*ruk-ax*	*kost-jax*	*okn-ax*

gender agreement properties of nouns which are not accounted for by biological sex are predictable on the basis of their inflection class membership, belonging to an inflection class is itself not exhaustively determinable by semantics. We are left with the conclusion that there are pure morphological entities, such as inflection classes.

Other examples of autonomous morphology can be found when looking at syncretism, where an inflected form corresponds to two or more morphosyntactic functions. There are at least two different types of syncretism: (a) syncretism which appears to line up with feature structure; (b) syncretism which does not line up with feature structure. The data in Table 22.2, showing the singular paradigm of Russian long-form adjectives, could be accounted for by assuming that a gender feature is underspecified in the oblique cases. In contrast, the syncretisms in the paradigm of the Dhaasanac verb in Tables 22.3 and 22.4 do not readily line up with feature structure.

For any verb, the B form is used for the second person singular, third person feminine singular, first person plural, and second person plural of the positive perfect and imperfect. The A form is used for the other person and number combinations. That the syncretism involved is systematic is indicated by the fact that verbs of different types have different A and B forms, as shown by the examples of stem alternations in Table 22.4 (from Tosco 2001: 123–206). Hence, these are systematic examples which cannot be tied directly to a specific feature structure.

Table 22.2. Russian long-form adjectives (transliteration)

novij 'new'

SG	masculine		neuter	feminine
nom	*nov-yj*		*nov-oe*	*nov-aja*
acc	*nov-yj/nov-ogo*		*nov-oe*	*nov-aju*
gen		*nov-ogo*		*nov-oj*
dat		*nov-omu*		*nov-oj*
inst		*nov-yin*		*nov-oj(u)*
prep		*nov-om*		*nov-oj*

Table 22.3. Syncretic patterns in Dhaasanac (based on Tosco 2001)

	SG	PL
1INCL	—	A
1	A	B
2	B	B
3F	B	A
3M	A	A

Table 22.4. Examples of stem alternation (Tosco 2001: 123-206)

A	B	
leeði	leeti	'fall down.PERF'
kufi	kuyyi	'die.PERF'
guurma	guuranna	'migrate.IMPERF'
?uufumi	?uufeeni	'cough.PERF'
seð	sieti	'walk.PERF'
yes	ces	'kill.PERF'

Examples such as these argue for an autonomous morphological structure (Baerman, Brown, and Corbett 2005: 169–70, 183–6).

Morphology's role is to interface between phonology and syntax. It can do this in a trivially straightforward manner by directly mapping between function and form, or there can be morphological rules which make this mapping less direct. This status of morphology has implications for typology. It is another way in which the world's languages can be typologized: in terms of how direct the mapping is between function and form, and what role, if any, pure morphological functions play.

We now go on to consider the variety of means by which morphology can perform the role of realizing morphosyntactic features.

2. MORPHOLOGY AS AN INTERFACE COMPONENT

Morphology is the interface component of grammar *par excellence*, and as such, the challenge which morphology presents for typology is at least twofold: (i) to account for the different ways in which languages realize syntactically relevant features; (ii) the extent to which morphology may have a life of its own, rather than being reduced to principles of other areas of grammar.

Affixation, and therefore concatenation, is a standard operation of morphology, and because of this it is easy to draw parallels with syntax, which also involves the linear ordering of linguistic material. While affixation may be the norm (Zwicky 1992: 346), there are other operations by which morphology realizes syntactic features. Hoeksema and Janda (1988) divide the universe of morphological operations up into four types: addition, metathesis, replacement, and subtraction. They treat affixation, infixation, circumfixation, and reduplication as subtypes of addition. Addition itself is either sensitive or not sensitive to phonological or morpholexical context. As Hoeksema and Janda (1988: 204) indicate, under many morphological models, addition which is not sensitive to context is taken as the normal case.[1] Because it may attach productively to verb stems, the English marker *-ing* is given as an example of this type. Although the syntactic category is relevant here, the affix is not sensitive to the morphological, phonological, or other properties of the lexical item in question.

Addition which is sensitive to context covers affixation, infixation, circumfixation, and reduplication. Affixation itself can be sensitive to the phonological properties of

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[1] Hoeksema and Janda (1988) use the terms 'context-free' and 'context-sensitive'. Being context-free here refers to lack of sensitivity to the phonological or morpholexical properties of the bases to which the morphological operations apply.

the stems to which it is attaching. For example, in Russian, nouns which would otherwise belong to the same declension will use different inflections for the genitive plural, depending on whether the noun stem is either non-palatalized/non-palatoalveolar (hard) or palatalized/palatoalveolar (soft). This is illustrated in (1) and (2).

(1) NOMINATIVE SINGULAR   GENITIVE PLURAL
    stol   *stol-ov*
    table[NOM.SG]   table-GEN.PL
    'table'   'of (the) tables'

(2) NOMINATIVE SINGULAR   GENITIVE PLURAL
    žitel'   *žitel-ej*
    inhabitant[NOM.SG]   inhabitant-GEN.PL
    'inhabitant'   'of (the) inhabitants'

The nouns *stol* 'table' in (1) and *žitel'* 'inhabitant' in (2) both belong to the same declension, with the exception that their forms for the genitive plural differ. As *žitel'* has a soft stem, its genitive plural inflection is *-ej*. In contrast, the genitive plural inflection for *stol*, which has a hard stem, is *-ov*. Phonological sensitivity is easy to spot. But affixation can be sensitive to other information associated with a lexical item. For example, as is well known, the form of the accusative in Russian depends in part on whether nouns are animate or inanimate.

Infixation is a well-known phenomenon in languages such as Chamorro, where the exponent *um* has a number of morphosyntactic functions, including marking singular agreement. In (3), the verb is singular, and the *um* is infixed after the initial consonant. In (4), we see the root prefixed by the plural marker *man*.

(3) (based on Topping 1973: 83)
     g<um>upu   yo'
     <SBJ.SG>fly   1SG.ABS
     'I flew'

(4) (based on Topping 1973: 83)[2]
     mang-gupu   siha
     SBJ.PL-fly   3PL.ABS
     'they flew'

The status of infixes as basic morphological entities is disputed. Prosodic morphology work within Optimality Theory, for instance, has treated infixation as an example of

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[2] It should be noted that morphological glossing for the infix and prefix in (3) and (4) is somewhat problematic. The infix *-um-* and prefix *man-* are associated with actor voice constructions—and may be glossed as ACT or ACTVOC—and have additional functions other than the ones I have given in the glosses of (3) and (4). For instance, *-um-* may also function to mark indefinite objecthood with transitive verbs. For detailed analyses, see Chung (1994), Donohue and Maclachlan (1999), and the entry for Chamorro in Baerman (2005). The actual morphological glossing is not material to the point being made here.

the interaction between alignment and prosodic constraints (McCarthy and Prince 1993), the claim being that infixation is the by-product of this interaction. In Chamorro, for example, the constraint which requires syllable onsets—i.e. 'ONSET'—is highly ranked, and this means that typically the affix *um* must be infixed (Klein 2005: 975–83). Klein (2005) argues that segmental phonology must also play a role. Irrespective of this, constraints formulated to account for phenomena of this type make use of some theoretical construct involving the edge of the word. For instance, within the categorial grammar tradition, Hoeksema and Janda (1988) applied Bach's (1984) wrapping rules to morphological phenomena of this type, as they can handle infixation in post-initial or pre-final position, which, it is claimed, can almost always be defined in direct relation to the marginal elements of a stem (Ultan 1975).

Circumfixation is another morphological operation which, it has been argued, is not basic. However, as Hoeksema and Janda (1988: 217) indicate, where there is a separation between the rules of morphology and the operations which realize morphosyntactic features, then circumfixation is merely the association of one morphological rule with multiple morphological operations (prefixation and suffixation). Crucially, this argument actually relies on a degree of separation of morphosyntax and its realization. This is a different view from one which tries to motivate each element as contributing discrete featural information (termed 'incremental' approaches by Stump 2001: 17–27). As a purely surface phenomenon, circumfixation can be found in Russian, for example, although it is limited there to word formation, as it is used to form new lexemes. Certain Russian verbs have a combination of some prefix and the so-called reflexive suffix *-sja*, where the combination without the suffix is unacceptable. This is illustrated in (5) and (6).

(5) a. *spat'*
        sleep.INF
        'to sleep'

     b. *vy-spat'-sja*
        OUT- sleep.INF-REFL
        'to sleep thoroughly'

     c. **vy-spat'*
        *OUT- sleep.INF

     d. *spat'-sja*
        sleep.INF-REFL
        'to sleep' (impersonal verb)

(6) a. *ždat'*
        wait.INF
        'to wait'

     b. *do-ždat'-sja*
        UPTO-wait.INF-REFL
        'to wait for a long time (with success)'

     c. **do-ždat'*
        *UPTO-wait.INF

     d. **ždat'-sja*
        * wait.INF-REFL

In (5d), there is a verb *spat'-sja* used as an impersonal verb with dative subject. It would therefore be possible to construct an argument that the prefix *vy-* is attached after the reflexive suffix. Note, however, that we run into a problem with the verb *do-ždat'-sja* (6b), as both intermediate stages in (6c) and (6d) are ruled out. Instead, the most reasonable interpretation is that the suffix and prefix contribute simultaneously to the formation of a new lexeme.

Reduplication usually involves the addition of a form based on part of the unreduplicated stem. There are many interesting examples from the literature (see Spencer 1991: 13, 150–56, Inkelas and Zoll 2005). Morphology allows in principle for operations sensitive to the phonology of the various elements involved—a characteristic which distinguishes it from syntax in general, and one which makes it attractive for dealing with reduplication. Indeed, if one treats morphology as a grammatical component in its own right, then this allows one to maintain a principle of phonology-free syntax.

The status of metathesis as a morphological operation is disputed. For instance, Stonham (1994) argues that metathesis does not mark grammatical features directly, and that it is therefore not part of morphology. Examples from Rotuman and Straits Salish come close, because metathesis appears to realize grammatical distinctions directly: the formation of the incomplete phase from the complete phase in Rotuman, and the formation of 'actual' aspect in Straits Salish. Blevins and Garrett (1998: 551) note: 'Synchronic metathesis continues to resist a unified and constrained theoretical account.' (For further information on metathesis, see Hume 2000.)

Replacement, such as vowel ablaut or gradation, comes about where the motivation for a phonological rule has been lost (Hoeksema and Janda 1988: 234–5). For instance, the forms *ring–rang–rung* involve replacement of the vowel depending on tense. There is no obvious synchronic phonological basis for this alternation, and so direct reference needs to be made to the grammatical feature values involved.

Subtraction is another potential operation associated with morphology, but its status depends very much on determining the base of the operation. In Russian, for example, adjectival formation using *-sk* might be analysed as involving subtraction if there would be a repetition of the form *-sk*.

(7) (Isačenko 1972, Aronoff 1976: 95)
     leningrád   →   *leningrád-sk-ij* (adjective)
     leningrad   leningrad-ADJ-SG.NOM.M
     'Leningrad' (noun)   'Leningrad' (adjective)

(8) (Isačenko 1972, Aronoff 1976: 95)
     tómsk (noun)   →   tómsk-ij   /   *tómsk-sk-ij
     tomsk   tomsk-SG.NOM.M   *tomsk-ADJ-SG.NOM.M
     'Tomsk' (noun)   'Tomsk' (adjective)

In (7), the suffix *-sk*, followed by the adjectival endings, is added to the place name *Leningrad*. In (8), because the place name *Tomsk* ends in the combination *sk* already, the suffix *-sk* could be viewed as deleted. However, there are a number of alternatives to this analysis. One could argue that the rule or constraint which derives adjectives of this type requires there to be an *-sk*, either one that is already present or one that is added. Or it could be argued that the lexical item in question has different stems, depending on the context in which it is used.

If one accepts that there are such things as inflectional or morphological classes (instances of pure morphology, such as indexes), it is also possible to treat apparent instances of subtraction as additive. In Murle, for example, it is argued that the last consonant of the base form is deleted in order to form the plural (Haspelmath 2002: 24, Arensen 1982: 40–41).

(9)   (Arensen 1982: 40–41, cited in Haspelmath 2002: 24)

    a. *nyoon*   *nyoo*
       lamb.SG   lamb.PL
       'lamb'   'lambs'

    b. *wawoc*   *wawo*
       white.heron.SG   white.heron.PL
       'white heron'   'white herons'

    c. *onyiit* *onyii*
       rib.SG   rib.PL
       'rib'   'ribs'

    d. *rottin*   *rotti*
       warrior.SG   warrior.PL
       'warrior'   'warriors'

Discussing these data in relation to a similar phenomenon in another language, Haspelmath (2002: 167) points out that examples such as (9) cannot be accounted for in terms of addition, because it is impossible to predict the form of the additional elements. However, if we consider the Russian inflectional classes back in Table 22.1, we could come to the same conclusion. For instance, in Table 22.1, all the stems to which the inflectional endings are added end in a consonant. Because the stems are associated with a particular inflectional class, we know which inflections to add. Equally, we could have considered a subtraction analysis for the Russian forms, but if we allow for the existence of purely morphological phenomena, such as inflectional classes, then it is probable that we can account for the subtraction examples in a similar way. The items in (9) could therefore be treated as belonging to different morphological classes, which are associated with different singular forms.[3]

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[3] Arensen (1982: 18) points out that the shortest form is not the most informative when it comes to determining the underlying root, as a voiceless final consonant could appear voiced before a suffix,
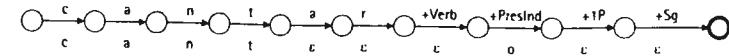
Figure 22.1. Finite-state network for analysing *canto* (Beesley and Karttunen 2003: 12–13)

There are a number of different ways in which languages realize syntactically relevant features. One approach seeks to reduce these operations to concatenation, with the others occurring as the by-product of concatenation and phonology. However, reduction of the inventory of morphological operations does not always lead away from morphology. For example, the most natural alternative to analyses based on subtraction is one based on morphological classes or indexes. From a typological perspective, there are, in particular, two different questions which need to be considered when looking at the morphology of a language. The first is whether there are features of the morphological system which are pure morphology, such as inflectional classes. The second is what morphological operations may be used to realize features in addition to concatenation.

3. DEFAULT INHERITANCE APPROACHES TO MORPHOLOGY

Morphological typology can benefit from input from computational linguistics, as modelling morphological systems enables us to make things explicit, including underlying assumptions which would otherwise go unnoticed. It is worth emphasizing that concatenative morphology can be modelled as finite-state networks, which have well-understood mathematical properties (Beesley and Karttunen 2003: 37). As their name suggests, finite-state networks consist of a finite number of states, often represented by using circles. The network is basically the set of states and transitions between states, the transitions being represented as arcs or arrows. The task of recognizing or generating morphology involves transitions from one state to another. In Figure 22.1, for example, the form *canto* of the Spanish verb *cantar* 'to sing' can be analysed by following the transitions from one state to the

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and this can have an effect on the height of the preceding vowel. But a similar issue arises for familiar languages with automatic word-final devoicing, where additive analyses are typically assumed.

next, reading the symbols on the underside of the network and outputting the symbols at the top, which results in the equivalent of a morphological gloss. Of note is the fact that the network requires the use of the epsilon symbol (ε), representing the empty string. While non-concatenative morphology is challenging to model using finite-state networks, it has been shown that it is possible to treat instances of it using finite-state techniques (see Beesley and Karttunen 2003: 375–420 and references therein).

There is an expectation that non-concatenative morphology will be found in parallel with concatenative morphology. A related assumption is that non-con-catenative morphology will be part of the less regular system of a language. If we are to examine this relationship between different areas of a language's morphology, we require the means for representing what generally holds within a language and what is more exceptional. Default inheritance networks are a good way of doing this, because they allow for information to be overridden and can therefore incorporate varying degrees of regularity. DATR is a language for representing default inheritance networks. These networks consist of nodes and connections between them. Information is inherited from higher nodes unless it is specifically overridden. In Figure 22.2, we present a simple default inheritance network, which covers a fragment of English. The diagram is based on a DATR example from Evans and Gazdar (1996: 176)[4].

In Figure 22.2, VERB, EN_VERB, Love, Do, Mow, Sew, and Be are all nodes in the network. The nodes Love, Do, and EN_VERB inherit from VERB. Mow, Sew, and Be inherit from EN_VERB and, therefore, also from VERB. Furthermore, the nodes Mow, Sew, and Be may also override information inherited from EN_VERB. The suppletive forms of the past tense of the verb 'to be' will have to be specified in its lexical entry. The nodes in Figure 22.2 are locations for information about the morphology of the items in question. As such, they generalize the information which classes of lexemes have in common. The relationships between nodes also make it possible to characterize the degree of exceptionality or lexical idiosyncrasy involved. The form of the past tense is generally -ed, but this can be overridden by particular items, such as do, whose past tense is did. Often, but not always, the past participle will have the same form as the past tense. There are also subregular classes, such as the one where the past participle is formed using -en. Default inheritance allows for a concise treatment of these facts. Evans and Gazdar (1996: 176) state the following at the node VERB in (10), where we have omitted some information, as indicated by the ellipsis. What is given in (10) is a representation of the information associated with the top node in Figure 22.2.

Figure 22.2. A default inheritance hierarchy for some English verbs (based on Evans and Gazard 1996)

(10)   VERB:
    <syn cat> == verb
    <syn type> == main
    <mor past> == "<mor root>" ed
    <mor passive> == "<mor past>"
    <mor present> == "<mor root>"
    <mor present participle> == "<mor root>" ing
    <mor present tense sing three> == "<mor root>" s
    [. . .]

The node name VERB is placed before the colon. Each line containing '==' is a DATR equation. Each left-hand side of a DATR equation contains paths. Paths contain a combination of ordered attributes. The right-hand side of the equation may contain values, such as 'verb'. Alternatively, it may contain paths or node names, or it may contain a combination of paths, values, and node names.

The first equation at VERB states that the syntactic category of items belonging to this class is 'verb'. The equation after this states that the syntactic type of verb is 'main' (i.e. a typical verb is a main verb rather than an auxiliary). The next equation says that the past is a concatenation of -ed onto what Evans and Gazdar call the morphological root. At the top node, the rules which directly realize the English past, the present participle, and the present tense involve concatenation. In addition to concatenation, there may be general statements which say, for instance, that the passive has the same form as the past. In principle, this statement is independent of whether the past is realized by concatenative or non-concatenative morphology. For the verb to do, of course, the passive participle and past participle will still be the same, as indicated by examples (11) and (12).

(11)   *I have done this.*

(12)   *This was done by John.*

In addition to the affixal morphology, phonologically the verb 'to do' changes its vowel quality in these forms, but the systematic identity in (11) and (12) is not dependent on the morphology which realizes it, as indicated by the examples which only involve concatenation of -*ed* to form the participles in (13) and (14).

(13)   *The man was killed by a lion.*

(14)   *The man has killed a lion.*

We see that, in English at least, the default rules for inflecting verbs involve concatenation. However, there are also more abstract relationships which need to be stated independently of the actual form, such as the default identity of the past participle and the passive participle. For this particular case, Blevins (2003: 761–2) argues that—although other morphological patterns can be found which do require that one set of morphosyntactic features be referred to another for their realization—the identity of the past and passive participle does not involve referrals of this kind. As is well known, this identity holds for all verbs in English. This indicates that there are high-level regularities in the morphology of languages which involve not just concatenation of affixes, but statements about the relationships between cells of paradigms. In their study of syncretism, Baerman, Brown, and Corbett (2005) argue that a variety of mechanisms are required to account for identities of form: underspecification, indexing, and referral. The first is uninformative but still involves morphosyntactic features. The second involves an autonomous morphological structure which cross-cuts morphosyntactic features. The third mechanism, referral, is both uninformative and autonomous, as it involves switching between paradigmatically opposed feature values.

4. INHERITANCE NETWORKS AS MORPHOLOGICAL TYPOLOGY

As indicated at the beginning of this chapter, the weakness of traditional morphological typology was its overly 'holistic' approach. However, given a default inheritance approach, it is possible to analyse different parts of the morphological system, and it is also possible to see what types of relationships hold between elements of that system in terms of inheritance structures. Among other things, a language may make use of a number of means to realize the same feature, and rules may be overridden.

Table 22.5. Non-future interrogatives in Hua (Haiman 1980: 47–8)

IMP	hu 'do!' (u-stem)			do 'eat!' (o-steam)			mi 'give!' (i-stem)		
	SG	DU	PL	SG	DU	PL	SG	DU	PL
1	huve	hu've	hupe	dove	do've	dope	muve	mu've	mupe
2	hope	ho've	have	dape	da've	dave	mipe	mi've	mive
3	hive	have	have	deve	da've	dave	mive	mi've	mive

In the Papuan language Hua, there are predesinential ablaut rules which work together with affixes to mark person and number in different tenses and moods (Haiman 1980: 47–52).[5] In Table 22.5, we give the three verbs to illustrate each of the stem types. The first row gives the imperative, and the rest of the table, the non-future interrogative forms. In the table, the person information for each verb is conveyed by changes in the stem vowel, and these combine with two non-future interrogative suffixes. One, -*pe*, is used for the first person plural or the second person singular, while the other, -*ve*, is the default suffix for non-future interrogatives in general. The apostrophe represents a glottal stop, which marks dual number.

The verbs in Table 22.5 each have a basic form, which is the same as the imperative (Haiman 1980: 48): *hu, do,* and *mi.* In the third person singular, the vowel of the basic stem is fronted (Haiman 1980: 50). For the second person and the rest of the third person, if the basic stem has a back vowel, it is lowered (Haiman 1980: 49). In the first person, the vowel of the basic stem is backed (Haiman 1980: 49). This will only affect verbs of the *mi* type, as the other two types illustrated in the table have back vowels in the basic form. It should be noted that non-future interrogative is just one of a number of tense and mood series which employ this system.

In Hua, it is a combination of affixal and non-affixal morphology which marks the person and number in each of the series. If one assumed that the affixes triggered the vowel alternations in the stems, then this would require a proliferation of homophonous affixes across each of the series.[6] For example, the suffix -*pe* realizes either

[5] I do not discuss all of the ablaut rules here: the presubjunctive and general ablaut rules are not discussed, nor is the issue of anticipatory desinences (see Haiman 1980: 54–8, 1998: 547). I was first introduced to the Hua data during Arnold Zwicky's course at the 1993 LSA Linguistic Institute at Ohio State University.

[6] Haiman (1998: 547) states that the 'three-fold desinences' involve systematic underspecification of person and number. He also says of the vowel alternation that it 'is not sensitive to the actual form of the personal desinence [. . .] but to its "PERSON", and also its identity as a threefold desinence [. . .]' (p. 548). There needs to be a way for the desinence for 2.SG or 1.PL not to trigger the backing associated with first person when 2.SG is realized. Either there are two identical desinences, or there is some degree of separation between the form of the desinence and the associated features.
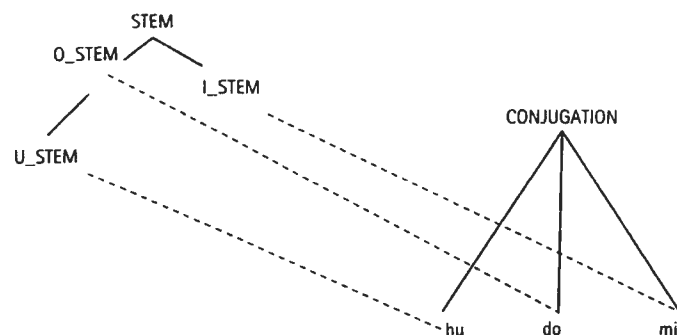
Figure 22.3. A partial network of Hua verbal morphology

first person plural or second person singular for the non-future interrogative, but the first person plural and second person singular are distinguished by different stem vowels. If the stem vowel alternation is to be treated as a by-product of affixation, then there must be two accidentally homophonous suffixes -*pe*. As we have noted, this system of marking is employed in a number of tense and moods, and so the problem is not limited to the non-future interrogative forms. And the problem is not just restricted to the sets of suffixes which individually realize either second person singular or first person plural. The default suffix would also have to be multiply associated with different vowel alternations if these were to be treated as determined by affixation, or one would be required to posit multiple zero affixes to do this work. Consequently, reducing the Hua phenomena to concatenation with associated alteration of the stem would make the systematic use of the suffixes for each tense and mood appear purely accidental.

The Hua data show that we can have two different types of morphological operation working in tandem to realize the appropriate grammatical features. Figure 22.3, which is an informal representation of an implemented analysis in DATR, gives a default inheritance network for the Hua system.[7] The individual verbs inherit their stem alternations from a hierarchy of stem types. The node CONJUGATION specifies how to put the stems and suffixes together in order to realize the appropriate forms. Approaches based on default inheritance allow us to test analyses to see if they work.

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[7] The DATR fragment hua.dtr is available from: http://www.datr.org/.

5. CONCLUSION

We started off this chapter by outlining the traditional 'holistic' morphological typology. We saw that this traditional system was already refined by Sapir, who proposed a distinction between formal processes and degree of synthesis. Theoretical morphology has come a long way since that time, but we are still exploring the ramifications of theoretical distinctions such as that between realizational theories and lexical theories (Stump 2001: 1–30). Pure morphology, inflectional classes, and the different mechanisms associated with phenomena such as syncretism suggest a variety of dimensions along which we can typologize the world's languages. For some languages, morphology will not prove to be particularly interesting, but for others, the role of morphology proves more intriguing. For languages traditionally associated with polysynthesis, there appears to be a greater role for morphology relative to syntax, and for other languages, where there is a greater role for inflection classes or other pure morphological phenomena, morphology may provide additional structure which does not mesh neatly with syntax.

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CHAPTER 23

SEMANTIC TYPOLOGY*

NICHOLAS EVANS

Nōmina debent nātūrae rērum congruere

(St Thomas Aquinas)

Among all the countless things and classes that there are, most are miscellaneous, gerrymandered, ill-demarcated. Only an elite minority are carved at the joints, so that their boundaries are established by objective sameness and difference in nature.

(David Lewis, 1984: 227)

1. INTRODUCTION

Semantic typology is that part of linguistic typology concerned with the expression of meaning in language and languages. It is thus the systematic cross-linguistic study of how languages express meaning by way of signs.[1] Like all branches of

linguistic typology, it is concerned with exploring the deep regularities which underlie the incredible diversity in how particular languages work.

The sets of signs found in the world's 6,000 languages represent the outcomes of a vast number of natural experiments in evolving named categories for apprehending the world. Spitzer (1947: 2) points out that 'of all linguistic branches, it is in semantics that the changes due to cultural development can best be seen at work, for "meaning" is the best barometer of cultural climate', and to a far greater extent than other aspects of language, semantic systems are moulded by the diverse cultures of their speakers.

But the categories so shaped must still fit comfortably with the minds, brains, and cultures of speakers, with the ontology of the natural world, and with the complex integrative demands of communication systems. Semantic typology thus lies directly on the fault lines between psychology, neuroscience, anthropology, the natural sciences, and general linguistics.[2]

Despite its centrality to debates on what is universal and what is culturally malleable, semantic typology has had a low profile compared to the flourishing and well-theorized fields of phonological, morphological, and syntactic typology (though see Weinreich 1966). Textbooks in typology typically say little or nothing about it as a field in its own right. Conversely, most textbooks on semantics fail to allocate chapters to specifically typological questions, even when they (e.g. Frawley 1992) draw on a wide range of languages to illustrate interesting semantic distinctions. Much key work for semantic typology has been carried out under the rubric of other disciplines, most importantly by anthropologists on the comparative study of kinship terminologies (section 1.3) and on systems of colour terms (2.4), and by ethnobiologists on taxonomic classifications of natural species (2.5). At the same time, many burgeoning new linguistic approaches, such as cognitive semantics, draw on cross-linguistic data but without overtly adopting the methods of argumentation and empirical testing found elsewhere in typology. The current chapter attempts to illustrate the advantages that result from integrating these various approaches into a broad and coherent research programme.

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[1] Cf. Lehrer's (1992: 249) definition of lexical typology as concerned with the 'characteristic ways in which language [. . .] packages semantic material into words'; indeed, some classic treatments have restricted their studies of 'semantic universals' to word meaning (e.g. Ullmann 1966: 219). But since words are only one type of sign, we consider lexical typology to be that sub-branch of semantic typology concerned with the lexicon.

[2] Talmy (2000) associates the 'conceptual approach' and more particularly 'cognitive semantics' with 'the patterns in which and the processes by which conceptual content is organized in language', and the question of 'how language structures conceptual content' (Talmy 2000: 2). Obviously, this is close to the goal I sketch here for semantic typology, but there is a difference in focus: 'cognitive semantics centers its research on conceptual organization, hence, on content experienced in consciousness. [. . .] [T]he main object of study itself is qualitative mental phenomena as they exist in awareness.' Semantic typology primarily studies the linguistic structures themselves and the meanings they express. These are social rather than individual phenomena. The relation to concepts used by individuals is a secondary though, of course, vitally important question.

1.1 The three-part sign

The most fundamental unit for semantic typology is the sign. In actual use, speakers and hearers draw on their pragmatic knowledge to enrich signs so that what is meant is more than what is said—by reasoning from what could have been said in addition, or instead, to generate meaning-enriching implicatures. For the most part, semantic typology is concerned with stable system-meaning, rather than context-specific utterance-meaning, so that pragmatic contributions are largely disregarded. We shall see in section 3.2, though, that pragmatic factors—including culturally modulated world-knowledge—need to be reckoned with, particularly in explaining patterns of polysemy and their origins.

Classical structuralist linguistics (Saussure 1922[1916]) saw signs as conventional pairings of a signifier (Fr. *signifiant*) or form, and a signified (Fr. *signifié*) or meaning. More recent scholars (Mel'čuk 1968, Pollard and Sag 1987: 51) have shown that signs really have three parts: in addition to their signifier and signified, they have a combinatorics that gives information about how they combine with other signs: the English noun and verb *kiss*, for example, have the same form and very similar meanings, but different combinatorics—the noun takes plural -*(e)s*, while the verb takes past -*ed*, participial -*ing*, etc. Semantic typology can abstract away from the signifier and combinatorics, concentrating just on the meaning (section 2), but there are also many questions where we need to take the signifier or combinatorics into account (section 3), such as in studies of iconicity, polysemy, and heterosemy. Semantic typology can also look at what is common to the meanings of signs with a common combinatorics (section 4), for example, adjectives, which are defined in particular languages by batteries of combinatoric tests.

1.2 Lexical, grammatical, and prosodic signs

All languages use at least the following three subsystems for expressing meaning: lexicon, syntax, and prosody (e.g. intonation). Most employ morphology as well, to different degrees and with different partitions between inflectional and derivational categories. In other words, signs can take the form of lexical items (*brother, eh*), morphemes (plural -*s*, negative *un*-), syntactic patterns (*John can come* for declarative, *Can John come?* for polar interrogative), or specifiable prosodic patterns (the question intonation in *John can come?*).

The division of labour between the above four systems varies substantially across languages. Interrogation can be shown intonationally; lexically, by particles like Japanese *ka*; morphologically, by special question forms of verbs (e.g. in Welsh); or syntactically, by word order inversion, as in English. Nonetheless, there are whole realms of meaning that we only find encoded in the lexicon, such as those pertaining to colour, smell, or biological species (see Allan 1977 on the fact that

colour is never a relevant semantic dimension in classifier systems). Signs may also assemble, into a single gestalt, elements from more than one subsystem—for example, the combination of subordinating conjunction plus clause-final verb position in German subordinate clauses, or negative particle plus irrealis in many languages to express negation.[3]

A central question for semantic typology is: which subsystems express which sorts of meanings? A prescient early discussion is Sapir (1921: 100–106). There is an increasing emphasis on developing an ontological inventory of meanings and linking it to computationally implemented descriptive standards (Eggers, Langendoen, and Lewis 2004). Our understanding is the least developed for prosody and the most advanced for inflectional morphology. Here, three fundamental articles (Jakobson 1971c[1957], Anderson 1985b, Mel'čuk 1991) plus a string of recent monographs have given us detailed cross-linguistic data for such topics as aspect, tense, mood/modality, and number, and developed appropriate analytic frameworks for accommodating them. Nonetheless, new categories are constantly being discovered and analyzed typologically. Consider the 'mirative', which marks sentences as containing information that is new or surprising to the hearer. After some earlier language-specific reports of the phenomenon, its first typological systematization was in DeLancey (1997). With regard to the lexicon, some areas—like kinship, colour, and ethnobiology—have been well explored, while others—like the classification of smell or of facial types—have been neglected.

The alignment of particular meanings with particular expressive subsystems means that the typical semantic domains studied by 'lexical typology' are different from those studied by typologies of inflectional meanings. But the main methodological problems are comparable across all subsystems. What is the relevant semantic field or cluster of closely linked categories? How do we establish valid cross-linguistic comparators? Can we set up implicational hierarchies that predict the order in which more specific meanings appear across languages, or semantic maps which use recurring formal similarities to establish conceptual similarity? How do we distinguish polysemy from monosemy and explain particular figurative uses? What set of cross-linguistically valid semantic components can be employed to derive language-specific meanings through different molecular configurations—or is this a quixotic task? Because these and other problems are essentially the same, whatever the subsystem, I will move back and forth between semantic subsystems in this chapter rather than having separate sections on 'lexical typology' and so forth.

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[3] Work from a Construction Grammar approach (Goldberg 1995), which from one angle can be viewed as studying complex signs whose meaning cannot be deduced from that of their parts, is particularly well adapted to examining these and other types of complex signs, but ensuring cross-linguistic comparability obviously becomes significantly more difficult as the comparanda become structurally more complex.

A complex issue that has barely begun to be tackled systematically is the question of semiotic ecology: how do semantic choices made in one subsystem affect those in others? For example, it is widely believed that languages with grammatical number will not employ numeral classifiers (as in many East Asian and Mayan languages), and vice versa. It has also been argued that languages with numeral classifiers will have a 'cookie-cutter' lexicon, where lexical stems range over material/stuff/fruit/tree, with the classifier then picking out the particular manifestation (tree, fruit, leaf) by stipulating its shape. The sort of lexical diversification one finds in French, with its regular pattern of distinguishing fruit from the tree that bears it (*olive, olivier*; *pomme, pommier*, etc.), would on this argument not be found in such languages. In other words, the claim is that three features would be linked—having numeral classifiers, not having grammatical number, and not having distinct terms for trees as opposed to their fruit. Arguments like this have not yet been subjected to careful typological scrutiny, though see Koch (1999) for a more nuanced discussion of tree/fruit polysemy, and Behrens and Sasse (2003) for a sensitive analysis of the interplay between grammatical typology and lexicon with regard to one lexical item, particularly regarding genericity.

1.3 The problem of cross-linguistic comparison of meaning

Any typology requires a language-independent yardstick against which the units under comparison can be measured (see Stassen, this volume). This problem is particularly acute in semantic typology for two reasons.

First, there is a long relativist tradition, particularly within anthropological linguistics, that stresses the incommensurability of different conceptual traditions and the unsatisfactory nature of translation equivalents across languages. Within structuralist traditions, the doctrine that 'the meaning of a sign is its place in the system' suggests one cannot compare signs which belong to different systems. However, with the advent of prototype semantics (see van der Auwera and Gast, this volume), it became possible to distinguish the question of a sign's prototypical referent from that of its full denotational range (section 2.4). And it turns out that in many cases, signs belonging to quite different systems—for example, colour terms in languages with just five basic terms, as against those in languages with many more—have directly comparable prototypical referents, even though the semantic ranges of terms in the small-set system are much greater than those in the larger one. Such findings show that we can make greater progress in comparing signs cross-linguistically than was believed during the structuralist era (this is, of course, true of most areas of linguistic structure).

Secondly, the field of semantics is extremely fragmented in its approaches to representing meaning. What is the relative contribution of the relation of sign to signified, on the one hand, and of the structural relations between signs, on the

other (antonymy, synonymy, etc.)? Should meanings be represented by a logic-based metalanguage (as in studies of quantifier meanings), by diagrams (as in cognitive semantic approaches), by abstract features, by natural language paraphrases (section 2.2), or by external standards (e.g. Munsell colour chip codes, biological species names)? Semanticists remain deeply divided on these issues, and there is no integrated representational system for all types of meaning. In practice, cross-linguistic comparisons draw on all these methods, according to the investigator and the semantic domain, so that semantic typology seems fated to representational eclecticism for some time to come.

A further key issue in semantic typology concerns the relative value of etic and emic characterizations in formulating meaning.[4] An etic characterization sets out all logically distinguishable possibilities regardless of whether or not individual languages group them together, while an emic one seeks to characterize what is common to all members of a category from within the perspective of a particular language. Consider sibling terms. It is possible to factorize the 'etic grid' of logically possible sibling types into three dimensions—relative age (older vs. younger), sex of referent (male or female), and sex of 'anchor', normally the speaker (again, male or female)[5]—and then to treat the meanings of sibling terms in any language as clusters of points in this eight-value grid. According to which of the eight points receives the same term, we can then typologize systems of sibling terms into 4,140

	♂ referent		♀ referent		
	♂ speaker	♀ speaker	♂ speaker	♀ speaker	
(elder)	1	3	5	7	Maximal
(younger)	2	4	6	8	
(elder)	brother		sister		English
(younger)					
(elder)					Indonesian
(younger)	adik				
(elder)	ani				Japanese
(younger)	imōto				

Figure 23.1. Some possible sibling term systems

[4] A parallel is sometimes formulated between intensional and emic, and extensional and etic, approaches. However, since sometimes both etic and emic formulations may be intensions (e.g. 'man's younger brother; woman's younger sister' vs. 'younger same-sex sibling', where the 'extension' would strictly speaking be the actual individuals being referred to), I will stick to the terms 'etic' and 'emic' here.

[5] In order to make this comparison, several analytic decisions were necessary; for example, not to include half-siblings, step-siblings ets., or types of cousin denoted by sibling terms in some languages, and not to pay attention to subdivisions between, for example, 'elder brother' and 'eldest brother'.

logical types (Nerlove and Romney 1967), of which several are illustrated in Figure 23.1. The data gathered in this way can be displayed and analysed solely with reference to a language-neutral etic grid. (An important point here is that some etic dimensions will only be forced upon the typologist once the sample reaches a certain size. With just Indonesian, Japanese, and European languages, the 'sex of speaker' dimension is unnecessary, but it is required once other languages are brought in, as we will see shortly.). By just focusing on this etic grid, Nerlove and Romney were able to achieve major findings, most importantly that only a very small fraction of the logically possible subtypes were attested across languages. Only fourteen of the 4,140 logically possible types appeared in more than one language of their 245-language sample.

But a disadvantage of concentrating on the etic is that it overlooks obvious elegances of characterization that appear once one gives emic formulations. Consider the Kayardild sibling system, which can be shown as in Figure 23.2. Focusing on *kularrind*, an etic characterization can merely note that it occurs in four cells, as shown. But this overlooks the more elegant characterization that can be given emically, namely, that it means 'opposite sex sibling' (i.e. brother of a female or sister of a male). Moreover, when we look more broadly at the Kayardild kinship system, we note that many further terminological choices depend on a distinction between same-sex and opposite-sex siblings at some point in the chain of relationship. The same-sex siblings of one's parents ('father's brother', 'mother's sister') are conflated terminologically with one's parents: *kanthathu* includes 'father' and 'father's brother'; *ngamathu* includes 'mother' and 'mother's sister'. And descending-generation terms are different according to the sex of the pivot: 'man's son' and 'woman's brother's son' are *kambinda*, while 'woman's son' and 'man's sister's son' are *kardu*. These and other facts pivot on the importance of the emically defined opposite-sex sibling concept, and suggest that typologies of kin-term systems will find correlations between choices in the sibling-term set and elsewhere in the system (parents/uncles/aunts, descending-generation terms), allowing implicational statements to generalize over sets of lexical items.

Despite these advantages to emic approaches, etically based comparisons remain more tractable and widely used in semantic typology, primarily because of the way they disaggregate the sets of real-world designata that the sign systems of different languages

	♂ referent		♀ referent	
	♂ speaker	♀ speaker	♂ speaker	♀ speaker
(elder)	thabuju	kularrind	kularrind	yakukathu
(younger)	duujind	kularrind	kularrind	duujind

Figure 23.2. The Kayardild sibling system

assemble into different emic groupings. The maximally differentiated elements that etic approaches employ can be more readily compared cross-linguistically, and in general it is possible to derive language-specific concepts later by considering what is in common to all denoted elements.

2. TYPOLOGIES OF THE SIGNIFIED

2.1 Denotational range of individual signs

In comparing the denotational range of signs across languages, we encounter three main issues:

(a) granularity – how many categories are there in a given domain?
(b) boundary location – where do the boundaries between categories lie?
(c) grouping and dissection – what counts as instances of the same category? which criterial sub-elements does the category treat as important?

We illustrate these three types of issue, drawing from research on one domain where investigation of referents is straightforward—body parts—and one where it is more problematic—events.

2.1.1. Granularity

Consider the way we can divide human bodies into partonomic trees, like the following examples from Andersen (1978). In each, we follow up a partonomic path from fingernail (or equivalent smallest part) to the claimed 'root' of the tree, namely, 'body'. English sometimes makes cuts that other languages don't (e.g. between arm and hand, merged as *ruka* in Serbo-Croatian) and at other times ignores divisions that other languages make (Serbo-Croatian *noktište* 'half-moon' for part of the fingernail). Quechua *maki* illustrates a common methodological quandary: how to decide when signs are polysemous? This problem plagues partonomies (aka meronymies), where it is frequent for the same term to be used for a part and the sub-part that remains when a distal element is removed: compare the different range of *arms* in *arms and hands* vs. *arms and legs*. Various tests can be used to distinguish multiple senses, such as the possibility of differential conjunction (*mind and body*, where *body* includes the *head*, vs. *beautiful face on an ugly body*, where *body* excludes it), differential negation (*her arm though not her hand* is OK, **her arm though not her elbow* is not), and distinctness of antonyms (*short₁ <=> tall, short₂ <=> long*). The need to use such tests shows that gathering data in semantic typology is not simply a matter of pinning labels to stimuli.

English	body	arm		hand	finger	fingernail	
Quechua	*kirpu*	*maki*	*maki* 'finger to elbow'	*maki*	*riru*	*silu*	
Serbo-Croatian	*tijelo*	*ruka* 'hand and arm'			*prst* 'digit'	*nokat* 'nail'	*noktište* 'half-moon'

Figure 23.3. Three partonomies, from fingernail to body

Granularity is equally relevant to event semantics. Event types can be analysed into smaller sub-events, and languages differ greatly in how far they bundle together a number of distinct event components into a single lexeme. English tends to lexicalize complex macro-events, whereas Highland Papuan languages break events down into their many constituent sub-events; for example, Kalam breaks 'gather (X:firewood)' into 'go hit get X come put' (Pawley 1993).

2.1.2 Boundary location

It might be thought that the universal architecture of the body, coupled with visual and functional discontinuities, would lead all cultures to place part boundaries alike. This is certainly a strong tendency, but there are exceptions (Enfield, Majid, and van Staden 2006): the Savosavo 'leg' category begins at the hip joint (and encompasses the foot), whereas Tidore *yohu*—roughly, 'leg'—cuts off three-quarters of the way up the thigh.

Instances like this are relatively rare in the realm of body-part terminology, but become much commoner when we pass to events, which as fleeting non-physical entities are much more amenable to culturally different construals. Consider events of *opening* in English and Korean, illustrated in Figure 23.4 (Bowerman and Choi 2001: 501). Here there is practically no line-up at all between the category boundaries given by English *open* and its various Korean near-equivalents. This example illustrates, again, the importance of fine-grained etic exemplars in doing typology: emic characterizations (like 'remove from tight fit' for *ppayta* vs. 'open') are too incompatible to allow direct comparison.

2.1.3 Grouping and dissection

Grouping involves determining what can be generalized over. Going back to our Serbo-Croatian example in Figure 23.3, note the terms *prst* and *nokat*, respectively, applied to 'finger' and 'fingernail'. While it is possible to draw their boundaries on a model of the hand, this would overlook the fact that they apply equally well to the corresponding parts of the feet and toenails: the translation 'digit' for *prst* can avoid
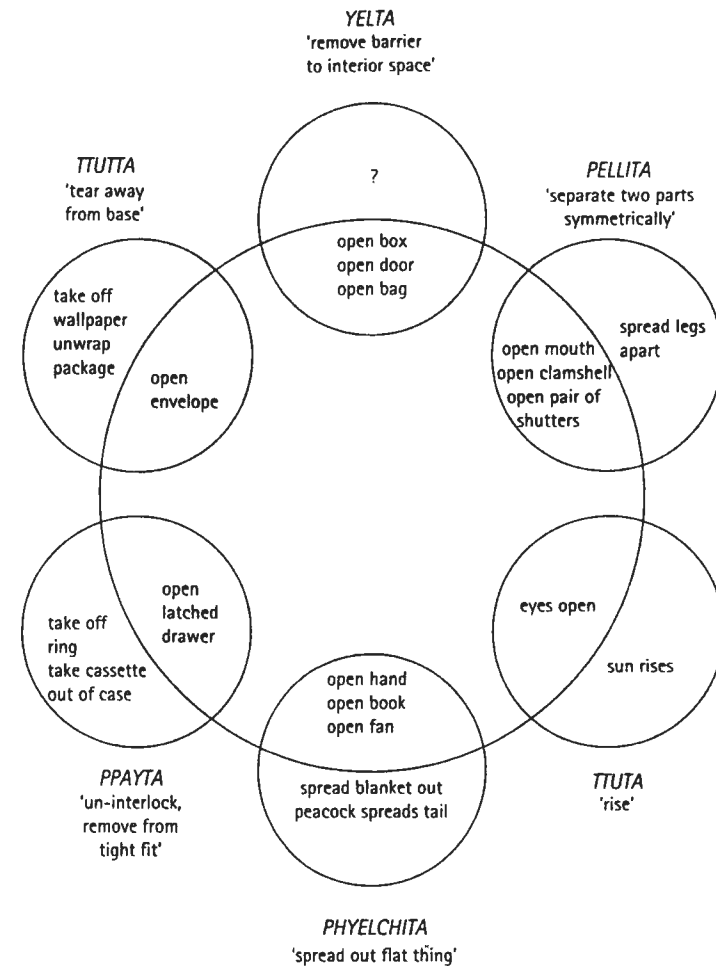
Figure 23.4. 'Open' and some Korean categories which overlap with it (Bowerman and Choi 2001)

the logical disjunction 'finger or toe' which implies a bicategorial structure we do not wish to import into Serbo-Croatian.

Groupings based on such parallel treatment of different body parts are also found elsewhere in the body. Brown (1976: 405) claimed that 'a labelled /leg (and foot)/ is never named by the same lexeme labelling /arm (and hand)/', and Andersen (1978: 352), that 'the categories HAND and FOOT [...] never share the same label'. But both claims have been falsified by more extensive data. Lavukaleve covers arms and legs (limbs) with a monosemous term, *tau* (Terrill 2006), part of a more general collapsing of upper and lower body-part terms, while Mawng (Hewett, Singer, Dineen, Stainsby, and Field 2005) subsumes 'foot' and 'hand' under the single term *yurnu* ('limb extremity').

The notion of grouping applies equally well to events. Most events have several identifiable phases, and languages may differ in which phase they take as type-defining. Consider the verb *xoj* in Tzotzil (De León 2001), which means 'cause an elongated object to end up encircled by a ring- or tube-shaped object': putting a ring *on* a pole, or a pole *through* a ring; putting an arm *into* a sleeve, or putting a coil of rope *over* a peg. Compared to English, this Tzotzil verb focuses on the end-state, but ignores the manner of producing it. Likewise, it ignores the question of which object needs to be moved to produce this end-state: the ring or the pole, the arm or the sleeve.

The link between grouping and dissection can be illustrated by considering holophrastic event expressions, found with ideophones or expressives in many languages. These present events as undifferentiated gestalts, like 'sound of rain on roof' or 'smell of rotten fruit fallen on ground'. Compared to English-style verbs like 'smell' or 'fall', which group event types in ways that generalize across the entities involved, expressives refrain from dissecting out the contributions of entity and event.

Dissection—the way complex phenomena are decomposed into parts—is also applicable to situations where languages make semantically consistent cuts to the fabric of possible phenomena. Since Talmy (1985), there has been extensive investigation of how languages dissect motion events into figure vs. ground, path, and manner.

Talmy showed that languages adopt consistent strategies in whether to code, by primary root, the manner (*floated into the cave*), the path (Spanish *entró a la cueva flotando*), or the figure (Atsugewi *-st'aq'-* 'runny icky material move/be located'). Now most languages can add back the other information by 'satellites', such as prepositional phrases in English (*into the cave*), gerundive phrases in Spanish (*flotando*), or directional prefixes in Atsugewi (*-ik-* 'on the ground', *-ic't-* 'into liquid'). However, the greater optionality of these expressions means that the dimensions dissected out by satellite strategy do not have equal status with the primary dimension, and are less likely to be encoded in texts or even visualized by hearers listening to narratives containing motion descriptions (Slobin 2003).

2.2 Features and primitives

As the above examples show, it is crucial to have elicitation tools that gather data in a language-independent way, but also representational methods able to state the meanings of each sign, in each language, in a way that avoids smuggling in denotational assumptions from a metropolitan language masquerading as a metalanguage. This leads semantic typology to the quest for basic units, in terms of which all meanings can be stated—what Leibniz called the 'alphabet of human thought'.

Much explicitly typological work in the 1960s and 1970s employed abstract features in componential analyses of structured semantic domains like kinship systems (see D'Andrade 1995). This approach was particularly favoured by cognitive anthropologists inspired by the use of features in phonology. The analyses of sibling-term semantics mentioned in section 1.3 are in this vein. Combinations of basic semantic components (male vs. female referent, older vs. younger, male vs. female anchor) can be used to generate an etic grid of all possible logical 'kin types'. The range of particular kin terms is then checked against this. Finally, particular kin-term meanings are characterized by configurations of features: {+ MALE REFER-ENT} for English *brother*, {+ ELDER} for Indonesian *kakak* 'older sibling', {+ MALE REFERENT, + ELDER} for Japanese *ani* 'older brother'. (Obviously, further features need to be added to restrict all these terms to siblings as against other kin.)

The appeal of these analyses lies in their economical use of a few components which combine to generate large numbers of terms, and their ability to give elegant, systematic accounts of semantic differences across languages. However, componential approaches have now largely been abandoned, for three main reasons:

(a) semantically uninterpreted features do not have determinable truth values without giving them a translation into some interpreted system;
(b) without a predicate-argument structure, features are unable to participate in standard logical relations, like entailment;
(c) while the components appear basic, many actually conceal complex semantic notions so that their use in defining some kin terms is circular (Wierzbicka 1986a).

Consider 'SAME GENERATION', used to pick out sibling terms from parents: this needs to be explicated in terms of generation, which brings in notions of parenthood, which must be characterized in terms of the relations 'mother' and 'father'—and 'father', in particular, is notoriously complex, since some cultures separate the roles of begetter, main male child-raiser, and mother's socially recognized partner.

An alternative approach (see Wierzbicka 1998) is to seek 'semantic primitives' (or 'semantic primes'): a meaningful subset of natural language elements which can be used to define all others. From a small set of basic undefined building-blocks, all definitions can then be crafted. This programme proceeds on two fronts:

(a) Internally to each language, successive attempts at reductive paraphrase can isolate which elements cannot be decomposed further. Selected words from the

language under study are used in definitions, on the principle that language can serve as its own metalanguage—hence the term Natural Semantic Meta-language (NSM) for this approach—rather than diagrams, logical symbols, or featural notation. Each semantic prime must also have its own distinct combinatorics, enabling the construction of more complex expressions according to a conventionalized grammar;

(b) Cross-linguistic comparison—ideally of the elements obtained in each language by (a), but since this is such a long-term task for little-studied languages, there has been an increasing tendency to compare directly terms obtained in 'canonical contexts' with those claimed to be primitives in well-studied languages.

This approach has produced a candidate list of around 60 elements, with parallel translations in a variety of languages. These include substantives (e.g. I, YOU, SOMEONE), attributives (e.g. GOOD, BAD), mental predicates (e.g. THINK, KNOW, SEE), and various others (Wierzbicka 1998). Considerable successes have been notched up in showing how a range of more complex words, that do not have exact equivalents in all languages, can be defined in terms of these primitives and cross-linguistic differences stated between words in many varied domains. However, it faces the following problems.

The first is empirical: some languages appear to lack exponents of certain putative primes. For example, Kayardild does not have a productively combinable exponent of 'want' (Evans 1994).

The second is the logical problem of whether all languages construct complex expressions from the same primes: it could happen that all languages have some set of primes, but that in fact they make up complex expressions in different ways. Consider the realm of terms for *think, know,* and *mind.* For the NSM approach, the first two are primitive concepts, while the third, *mind,* is derivative (roughly, *the part of a person that they think with*). But there are languages, like Dalabon (Evans 2007a), where *think* and *know* lack specific exponents, and both (along with 'remember') derive from a root *beng* whose meaning is close to English *mind.* A derivative *bengkan,* etymologically 'keep/carry in mind', covers both 'know' and 'think', with the exact sense coloured by aspect and context. Such examples raise the possibility that languages can take different roads to the same Rome of comprehensive expressivity.

The third problem has to do with representation: is verbal definition the most appropriate way of representing all meanings, including, for example, spatial relationships? Might it not be the case that the best representational system blends verbal and other elements (diagrams, gestures)?

NSM practitioners have produced a vast body of semantic analyses across dozens of languages, and at present can lay claim to having developed the approach that has gone deepest into the possibilities of setting up a cross-linguistically valid set of

basic semantic categories in which all meanings can be stated. However, until the above problems are solved, we are still left without a generally accepted method for stating the meanings we seek to compare.

2.3 Systematic relationships between meanings

So far, we have concentrated on problems of individual signs. However, the semiotic systems of languages exhibit many sorts of structures and connections linking signs together: semantic fields of signs sharing significant parts of their meanings, taxonomic groupings, and partonomies. In seeking wordings which invite implicatural enrichment, speakers weigh up the choice of one sign not against every other sign in the language, but against a set of plausible alternatives in the same field or network. Hearers, in assessing what a speaker meant, employ similar comparisons. The structuralist dictum that the meaning of a sign is its place in the system is thus more accurately restated as: the meaning of a sign is its place in the subsystem. Some of the most important work in semantic typology has involved the study of such subsystems, such as colour (section 2.4) and ethnobiological taxonomies (2.5).

2.4 Semantic fields and implicational relationships: the case of colour terms

The most influential work on cross-linguistic regularity of lexical subsystems has been the rich vein of research on basic colour terms, initiated by Brent Berlin and Paul Kay (1969) with their World Colour Survey (WCS) and extended and debated in a large number of publications since then (see Hardin and Maffi 1997). This work targeted a domain that had once been believed to be arbitrary, with languages free to come up with any lexicalized division: 'out there' in the world, the rainbow is intergraded rather than striped, since there is a continuous spectrum of wavelengths. The discovery of strict constraints on permissible colour-term systems thus indicates the important role played by universals of human neurocognition in marking out the joints at which the world is to be carved. The main findings are that:

(a) there is a restricted universal inventory of basic colour categories; and
(b) though the size of basic colour-term inventories varies (from two to eleven), the structure of such inventories is highly constrained, with terms being added in a strict overall order, which can be characterized by an implicational hierarchy.

Methodologically, this work proceeded by using the 330 Munsell Colour Chips as the elicitation set. Speakers were asked to name each chip, but also asked to give the best exemplar chip(s) for each term, thus identifying their prototype(s). This

second step is crucial: obviously, one will not find identical denotational ranges when comparing a language with five terms and a language with ten, but it is logically possible—as Berlin and Kay found—that the prototypes remain unchanged even as the number of terms vary. Famously, even where languages merge 'blue' and 'green' into a single term ('grue'), this term features a double prototype, corresponding to the prototypes for blue and green in those languages that distinguish them, rather than having a single relocated prototype at the heart of the expanded category.

A crucial methodological step involves deciding what to include as 'basic terms'. To qualify, terms must be monolexemic (excluding 'sky blue'), used by all speakers (excluding 'magenta'), refer to a wide class of objects (excluding 'blond'), and not be a hyponym of another colour term (excluding 'scarlet' as included in 'red'). Though there has been criticism about how 'natural' the resulting systems are (especially in societies where particular colours are closely linked to particular referents), these are necessary steps if cross-linguistically comparable data are to be obtained.

Berlin and Kay found that as colour-term systems expand, they always do so in the following order (Figure 23.5), which represents only a minute fraction of the theoretically possible systems of 2–11 terms. This is, logically, a distillation of a large number of more specific implicational statements (e.g. if there is a distinct term for 'blue', there is a distinct term for 'yellow').

The patterning of possible systems has been shown to be rooted in the neurophysiology of vision (Kay and McDaniel 1978) and in particular the maximal-response wavelengths of the three sets of colour receptors organized in the opponent pairs black/white, red/green, and blue/yellow. Colour-term research thus offers a canonical example of how semantic typology can make sense of patterned cross-linguistic variation and tie it back to our shared neurological make-up.

It would be wrong, though, to give the impression that all is signed and sealed in colour-term research. Despite its ambitious sample size, the WCS only examined around 5% of the world's languages, with some skewing towards the languages of larger groups, who tend to have more complex technologies which divorce colours from particular objects. As in all typology, every claim is provisional while there are undescribed languages.

White
Black   > Red >   { Green
                    Yellow }   > Blue > Brown >   Purple
                                                  Pink
                                                  Orange
                                                  Grey
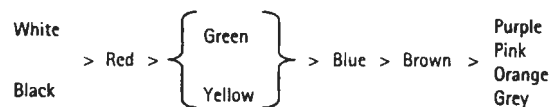
Figure 23.5. Berlin and Kay's implicational hierarchy for colour terms

First, individual studies continue to find basic terms that require some adjustment of the hierarchy: an example is Tsakhur, which possesses a basic term for turquoise (*alnti:k'a*), requiring some modification of the overall theory (Davies, Sosenskaja, and Corbett 1999).

Secondly, at least one language, Yélî-Dnye (Levinson 2000b), has been argued to lack any basic colour terms at all. Even the term for 'white' is a reduplication of 'white cockatoo', so it is not a clear basic term. More damagingly, there is incomplete coverage of the Munsell space. Some patches of colour are described with reference to exemplifying objects ('dried leaves', 'parrot'), but there are substantial intervening gaps not covered by any term. This suggests that some languages simply have no basic colour-term systems at all (Kay and Maffi 1999), so the implicational statements given above must then be restricted to those languages which have developed a domain of colour terms proper, as opposed to descriptors based on colour metaphors or limited to particular objects.

2.5 Taxonomies and ethnobiology

Whereas the cross-linguistic regularities found with colour terms are attributable to what is shared in speakers' heads—in the form of a common neurological apparatus—that found when we turn to systems of biological nomenclature is attributable to the ontology of what is in the world, in the form of objectively discernible clusterings of features which lead observers from different cultures to construct parallel systems of biological terms. As Berlin (1992: 8–9) put it,

> human beings everywhere are constrained in essentially the same ways—by nature's basic plan—in their conceptual recognition of the biological diversity of their natural environment. [...] When human beings function as ethnobiologists [...] they do not construct order, they discern it [...]. [G]roups of plants and animals present themselves to the human observer as a series of discontinuities whose structure and content are seen by all human beings in essentially the same ways.

The recurring regularities Berlin and his collaborators found are of three main types.

First, there are remarkable parallels in the boundaries that all cultures establish in the natural world, at least at the level of generic terms like 'oak' or 'horse', and these coincide closely with the category boundaries established by scientific classifications. The parallels diminish, though, when we pass to higher-order ('lifeform') groupings: just think of earlier stages of English, where whales were included as fish and bats as birds, or the Kayardild life-form categories *kunbulka* (large marine animal: sea turtle, dugong, whale) and *yarbuda* (non-marine animal: birds, reptiles, and insects).

Second, all languages organize their ethnobiological nomenclature into taxonomies, with inclusion relations holding between higher and lower nodes. In

contrast to scientific schemes, however, there are strong constraints on taxonomic depth, with a maximum of five levels: unique beginner (e.g. *plant, animal*), life-form (*tree, bird*), generic (*oak, parrot*), specific (*white oak, crimson rosella*), and varietal (*butter lima bean*). Terms at the generic level are the most numerous, and below that level, terms tend to be morphemically complex. Figure 23.6 gives a schematized taxonomy for English and Tzeltal. Note that the interpretation of the taxonomic system needs to allow for 'unaffiliated' generics, like Tzeltal *čenek'* 'bean' (which link directly to the unique beginner node, skipping a node at the life-form level). It also allows for covert categories at some levels, such as the recognition of an unnamed 'plant' category in Tzeltal on the basis that plant terms of all types can combine with the numeral classifier -*tehk* in examples like *oš-tehk teʔ* [three-plant tree] for 'three trees'.

Third, a crucial strand of ethnobiological research is to identify one level in this hierarchy as more basic, conceptually, developmentally, diachronically, and in terms of linguistic form. Work on basic-level categories, which 'are the categories that best mirror the correlational structure of the environment' (Rosch 1978: 31), has developed various experimental methods for determining basic category status

independently of linguistic form or meaning. In fact, these methods have produced equivocal results when used to determine basic category status in ethnobiological nomenclatures. Against the original hypothesis that basic-level categories would be at the level of the folk genus (e.g. Stross 1973), what counts as basic seems to reflect cultural familiarity and dominant lifestyle. Dougherty (1978) found that for American English speakers, their basic level of categorization is the life-form rather than the generic. But Boster (1980), examining manioc terms in Aguaruna, found differences between males, for whom the basic level is the generic, and females, for whom it is the specific or varietal, and attributed this to the fact that primary responsibility for horticultural activities lies with females. There thus appears to be significant cultural patterning in what counts as the basic level of categorization in ethnobiological taxonomies.

A fourth, more quantitative element of the findings in this research tradition is the mapping of the upper bounds of complexity for ethnobiological terminologies. For relatively complete ethnobiological descriptions, the number of named generic plant taxa ranged from 137 (Lillooet) to 956 (Hanunóo), and of generic animal taxa, from 186 (Ndumba) to 606 (Aguaruna). There were also significantly more named generic terms for traditional cultivators than for traditional non-cultivators (Berlin 1992: 98).
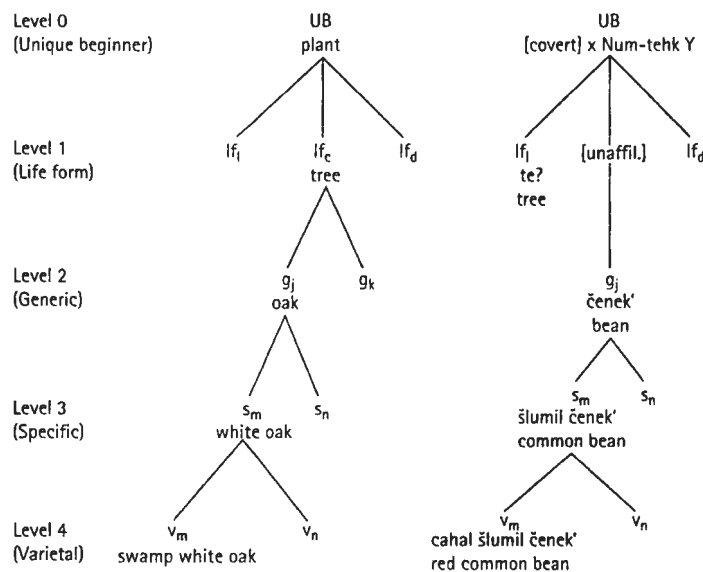
Figure 23.6. Fragments of the English and Tzeltal folk taxonomies (adapted from Berlin 1992: 16 and Berlin, Breedlove, and Raven 1973)

3. FACTORING IN THE REST OF THE SIGN

In this section, we examine three important issues for semantic typology that go beyond the mere range of the signified, or sets thereof: iconicity, where we need to look at the relation of signified to signifier; polysemy and heterosemy, where we examine the types of semantic relation between different signs sharing a common signifier; and covert semantic categories, where the common semantic elements span classes of signs sharing the same combinatorics.

3.1 Iconicity

Iconicity concerns the degree to which there is a relation between the form and meaning of signs, whether they are simple or complex. Interest in whether this relation is motivated or arbitrary goes back to the Greeks. The structuralist emphasis on the 'arbitrariness of the sign' implied that the form of the signifier would only rarely be motivated by what it signified, but recent work has reconquered considerable territory under the banner of iconicity (see Bybee, this volume, and Haiman, this volume).

The original debate, as formulated by the Greeks, concerned how far forms of signs directly mirrored characteristics of their referents, as in onomatopoeia or sound symbolism (see Hinton, Nichols, and Ohala 1994). But contemporary work on iconicity is equally concerned with diagrammatic iconicity: the link between semantic relations and formal structures.

One important manifestation of this concerns conceptual distance. In many languages, for example, different kinds of possession are distinguished by different kinds of structure (Chappell and McGregor 1996), distinguishing between inalienable possession (*my shoulder*) and alienable possession (*my house*). Given that the first type of possession is more direct, the claim is that if the language distinguishes the two types, inalienable possessions will show less formal distance between the possessor and the possessee than alienable ones. Thus Paamese (Crowley 1982) adds pronominal suffixes directly to inalienably possessed body parts (e.g. *mete-n* [eye-3SG] 'his/her eye') but with other types of possession adds the pronominal suffix to one of a series of 'possessive classifiers' following the possessed noun: *aisin mo-n* [clothes POSS-3SG] 'his/her clothes'.

A second manifestation concerns the meanings associated with zero elements (i.e., signs whose signifier is zero): consider the fact that according to the verb involved, the unexpressed object arguments of transitive verbs will variously be interpreted as generic (*they ate [food/*themselves/*each other]*), reflexive (*they shaved [themselves/ *customers/*each other]*), or reciprocal (*they kissed [each other/*people/*themselves]*). Given that the length of linguistic expressions is subject to Zipf's law, with more frequently used expressions being shorter, this particular phenomenon has often been attributed to the effects of frequency of use, but the fact that such economic motivations exist (see Haiman, this volume) does not prevent the phenomena from being conventional and language-specific, and hence worthy of typological study, since in other languages, the effects are not found in this form.

Isomorphisms between semantic and morphosyntactic structure have also been central in formal semantic approaches (section 4).

3.2 Polysemy and heterosemy

A common departure from the idealized situation where each signified gets a distinct signifier is for signifiers to have more than one signified, as in a case like 'head' (of body, of organization, of column, etc.). Polysemy is an important tool for typologists interested in mapping semantic space, since cross-linguistically recurrent identity of form is a guide to relatedness of meaning. Consider English *must*, which can have both a deontic meaning of obligation (*you must leave now*) and an epistemic meaning of confident inference (*John must be leaving right now*); this particular semantic development is widely attested cross-linguistically (Traugott and Dasher 2002).

There is a close logical connection between synchronic studies of polysemy and diachronic studies of semantic change (see Figure 23.7), since a semantic development from *p* to *q* will always involve an intermediate stage of polysemy, with both meanings *p* and *q* available for the same sign. Synchronically, that is, we can ask which meaning pairs {*p*, *q*} constitute known cases of polysemy; diachronically, we can ask whether *p* is known ever to develop into *q* (or whether *q* ever develops from *p*). Diachronic approaches, however, have the advantage that we can examine the direction of development. Wilkins (1996), for example, draws on diachronic data from Indo-European, Bantu, Tibeto-Burman, and Dravidian to demonstrate that terms for 'visible person-parts' regularly develop into the corresponding 'visible whole', but not vice versa: thus, 'thigh', 'shin/calf', and 'foot' may each develop to mean 'leg', but never the reverse.

For many years, semantic change, in contrast to sound change, was considered to be fundamentally irregular. While there is no denying the many idiosyncratic cases shaped by specific cultural circumstances, recent typological approaches to polysemy and semantic change have revealed the presence of a great deal more order than was previously believed.

A great deal of work on polysemy has been conducted under the ambit of cognitive semantics, which sees polysemy as a key to understanding how the human mind continually adapts and extends its conceptual apparatus. From the point of view of pragmatics, which examines the contribution of context to the interpretation of meaning by human users, polysemy results from the constant need to mean more than conventionalized signs allow us to say easily. As such, polysemy provides evidence of how conventional signs, contexts, and inferencing systems interact. Shared language structure emerges through 'invisible hand' effects—as an unintentional product of intentional communicative acts (Keller 1998)—and polysemy is a key site for studying the interplay of individual speaker attempts to communicate through figurative language, and the accommodation of these extended uses in a conventionalized language system as patterns of standardized polysemy. Figurative language and polysemy thus provide an important window on language evolution (and comparative reconstruction) in the semantic domain.

	Stage 1	Stage 2	Stage 3	Stage 4
	f has meaning *p*	*f* has meaning *p* and a common implicature *q*	*f* has two meanings *p* and *q*	*f* has meaning *q*
Form	*f*	*f*	*f*	*f*
Meaning	'*p*'	'*p*'(+>'*q*')	'*p*', '*q*'	'*q*'

Figure 23.7. Stages in semantic change (adapted from Enfield 2003: 29)

With polysemy, the sign's combinatorics remain unchanged; where a change in signified is accompanied by a change in combinatorics, this is known as heterosemy (Lichtenberk 1991). The combinatoric difference may be major, such as a shift in word class (e.g. from noun to transitive verb, in the case of English *fish/to fish*), or it may be minor, such as a change in gender (German *die See* [fem.] 'sea, ocean' vs. *der See* [masc.] 'lake'). In such minor cases, one language's heterosemy is often another's polysemy. The metonymic relationship between 'yamstick' and 'woman', widespread in Australian languages and based on the symbolism of 'yamstick' as the prototypical woman's implement, appears as polysemy in some languages (Warrgamay *gajin* 'yamstick, female') and as heterosemy in others (Dyirbal *bala gajin* [neuter] 'yamstick', *balan gajin* [fem.] 'girl'), reflecting the fact that Dyirbal has a gender system but Warrgamay does not (Evans 1992). For this reason, it is often useful to include data from both polysemy and heterosemy in cross-linguistic work, though it is also important to remember that the semantic increment between the two meanings may be contributed, wholly or partially, by the semantics associated with the combinatoric class (e.g. activity or process, in the case of English *to fish*).

Language-particular studies of polysemy need to ensure that we are not dealing simply with monosemy, in the form of categories which are unitary from an emic viewpoint but which happen to involve more than one translation equivalent into English or some other metropolitan language of investigation.

Imagine I come to the analysis of English 'uncle' either from the background of Latin, where paternal and maternal uncle are each distinguished from father, or of Kayardild, where only the mother's brother has a distinct term (*kakuju*) and the father's brother is grouped with the father as *kanthathu*. Our naive Latin-centric and Kayardild-centric linguists might be tempted to postulate polysemy of English 'uncle', such that it includes '1. mother's brother, 2. father's brother', adding (from the Kayardild perspective) that the second meaning is 'a type of *kanthathu* who has not begotten the anchor of the kin relation'. As English speakers, we would feel that this analysis is clearly foisting unnecessary distinctions on a single category, simply definable as 'brother of a parent'.

This gets back to the point, made in 1.3, that emic language-specific categories should always be sought, for the sake of parsimonious semantic characterization; heuristically, monosemous definitions should be seriously attempted before postulating polysemy. However, polysemy is so widespread in every human language that it is naive to assert, on trust, the existence of some currently unformulable common meaning, leading to the sort of relativistic position which simply lists a very wide range of meaning without giving a precise common formulation. It also happens often that claimed monosemist analyses make use of a great deal of fuzzy interpretive latitude in determining exactly which cases a definition is supposed to apply to.

Because not all sources have gone through the necessary analytic steps to demonstrate unquestionably whether monosemy or polysemy is involved—and because there is frequently debate on the best analysis—typological work often adopts the same methodological shortcut that we mentioned in section 1.3,

comparing the maximal etic set directly without worrying whether some of them can be packaged together into emic characterizations for some of the languages involved. In fact, the cumulative process of comparing semantic ranges of individual signs is probably the most powerful tool in the quest to produce a maximally differentiated map of all meaning distinctions made in human languages—a semantic etic grid—while at the same time showing which meanings are particularly close. (This is comparable to the task, in which we are much more advanced, of compiling an inventory of all attested phonetic distinctions.)

We illustrate with the case of indefinite pronouns like 'somewhere', 'anything', and 'nobody', drawing on Haspelmath (1997). One dimension of organization, which we ignore here, concerns the ontological type of the referent; for example, person (*someone*), thing (*something*), place (*somewhere*). The other dimension involves a complex mesh of functional types, involving speaker knowledge (or otherwise), existence, nonexistence, specificity, or free choice of the referent.

Although languages typically distinguish a number of these functional types, none yet known distinguishes all of them. For example, most of the distinctions made in the English system are neutralized in a language like Hindi: *koii* can translate *someone* (*koii has phoned*, for 'someone has phoned'), the negated uses expressed by *no one* (*no koii is at home*, for 'no one is at home'), and the question use expressed alternatively by *someone* or *anyone* (*did you see koii*, for 'did you see someone/anyone?').

Looking in the other direction—distinctions made in other languages but not in English—*somebody* fails to make the distinction made in Russian by the choice between the *koe* series for specific known (to the speaker) (1) and the *-to* series for specific unknown (to the speaker) (2):

(1) Russian
Maša	vstretilas'	koe	s	kem	okolo	universiteta
Masha	met	INDF	with	who	near	university
     'Masha met with someone (whose identity is known to me) near the university.'

(2) Russian
Maša	vstretilas'	s	kem-to	okolo	universiteta
Masha	met	with	who-INDF	near	university
     'Masha met with someone (whose identity is unknown to me) near the university.'

Likewise, English indefinite pronouns do not distinguish between specifics—involving a specific single referent—and non-specifics—which can involve a range of different referents, either under distribution or multiple occurrence. Consider the ambiguities between the specific (a) and non-specific (b) readings of (3) and (4):

(3) *Everybody is reading something.*

    a. the same thing is being read by everybody;

    b. each person is reading something, not necessarily the same thing

(4)   *On Saturdays someone from Derbent comes here.*

  a. it is always the same someone who comes

  b. a different someone from Derbent comes every time

A number of languages make this distinction formally: Lithuanian would express the specific reading of 'something' in (3) as *kaž-ką*, and the non-specific reading as *ką nors*, while Russian would express the specific reading of 'someone' in (4) as *kto-to*, and the non-specific reading as *kto-nibud'.*

Despite the very large number of systems one finds across the world's languages, each characterized by at least some polysemy, it is not the case that any given pair of meanings is equally amenable to expression by the same signifier. Rather, it is possible to construct a semantic map (see van der Auwera and Gast, this volume) which condenses a huge number of individual statements about possible shared forms in different languages into a single cross-linguistically integrated two-dimensional representation. In semantic maps, adjacency of two points (A and B) indicates that some language uses the same form to express both A and B. If points are non-adjacent, there will only be a form that expresses them both if it also takes in a complete sequence of intermediate points between them. (In this way, semantic maps can readily be translated into sets of implicational statements; see Haspelmath 1997: 62.) Haspelmath proposes the following semantic map for indefinite pronouns, based on his survey of 40 languages; on the map, I have superimposed the particular patterns of polysemy found in Hindi, Hausa, and English (Figure 23.8). Note that in this visual representation, direct semantic links are possible between 'close vertically adjacent' points (such as question and conditional) but not between 'distant vertically adjacent' ones (like free choice and direct negation).

The utility of semantic maps is not confined to the investigation of grammatical subsystems. They work equally well for representing meaning relatedness in lexical domains. Viberg's (1984) influential study of perception verbs found major cross-linguistic regularities: *see* may extend down to cover perception by other senses but not the reverse, and there is a bifurcation of downward extension between non-contact senses (hear, smell) and contact senses (touch, taste) such that *hear* can extend to smell but not to taste, while *touch* can extend to taste but not to smell. A complementary study by Williams (1976) investigated synaesthetic adjectives (e.g. the extension of *warm* from touch to colour, or of *sharp* from touch to hearing (in music)), and found an almost converse pattern: whereas verbs of sensory perception extend downwards from sight to the other senses, adjectives of sensation extend upwards from the lower senses (touch, taste) to the upper ones (sound, vision).

As these examples show, typologies of polysemy have now uncovered many wide-ranging cross-linguistic regularities (Traugott and Dasher 2002). Yet in other cases, scholars have discovered polysemic patterning that is highly specific to a particular culture area (see e.g. Matisoff 1978 on specific types of polysemy characteristic of Southeast Asia as a culture area), or even more specifically to
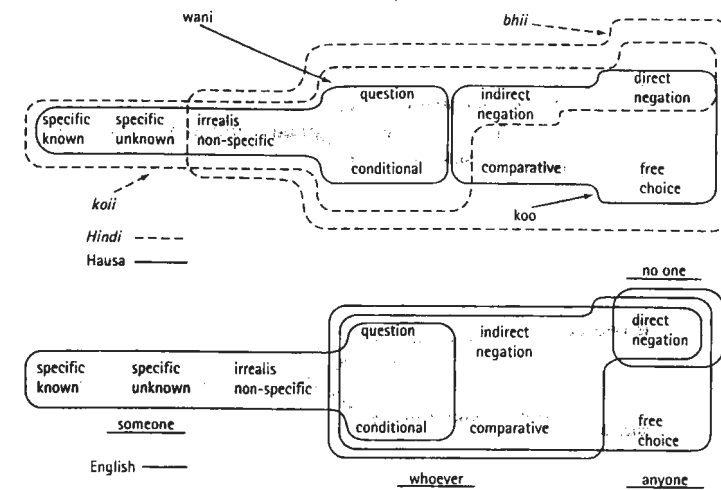
Figure 23.8. Semantic map of indefinite pronoun meaning-functions, in Hindi, Hausa, and English (adapted from Haspelmath 1997)

individual languages. For example, Sweetser (1990), in a study based on Indo-European languages, found only 'see', never 'hear', as the source of verbs for 'knowing' and 'understanding'. Yet a comparable examination of how perception maps metaphorically onto cognition in Australian languages (Evans and Wilkins 2000) found that 'hear' is the primary metaphorical source for verbs of understanding, thinking, and knowing, even though Australian languages parallel others in taking vision as the primary source for figurative extensions of perceptual verbs across sensory modalities. An example of the sort of context that promotes this particular extension is the Aboriginal practice of memorizing travel routes by learning sequences of place names (typically, in sung form). A Yidiny example illustrating how 'listen to' can generate the implicature 'remember/know' in a particular context is given in (5); the material in square brackets contains the non-literal implicatures as translated in this context.

(5)   *bamaan guwal jarral galiingal / garru binangalna bulmba wanyja galing*
   [Guyala replied:] 'People's names must be given to places all along the way. So that by-and-by [people] can listen to [and remember the sequence of place names along a route and know] where the places are going to.' (Dixon 1991)

Culturally patterned differences in polysemy thus arise as speakers of different languages appeal, in their figurative expressions, to culturally specific assumptions.

To the extent that their interlocutors share their assumptions, what starts out as a creative implicature in a particular 'bridging context' can become semanticized, losing its dependence on specific contexts for correct interpretation and entering the structured lexical system. In this way, studies of polysemy can be particularly revealing of the 'cultural scripts' that license particular figures of speech and other creative uses of language. This makes the study of polysemy an interesting meeting ground of general cognitive preferences and culture-specific modulations.

3.3 The semantics of covert categories

Rather than taking individual signs as our point of departure, we can set up classes of signs with comparable combinatorics and then examine what is common to their meanings. The unit with which we are associating the meaning is no longer a given sign with a given form, but a class of signs sharing the same combinatoric; it is in this sense that Whorf (1945) employed the term 'covert categories' (for him, defined by their 'reactance'), which we can usefully take over here.

Taking a word class like adjectives, for example, we can ask what range of signifieds is exhibited by members of the class under investigation. A classic example of this approach is Dixon's (1977) study of adjectives, which showed that if a language has an adjective class, it will include the words for 'big' and 'small', and 'good' and 'bad', before including words denoting human propensity ('intelligent', 'lazy', etc.). Similar approaches can be applied not just to the major word classes but also to subclasses like 'transitive verb' and so forth. An example of this approach is Kemmer's (1993) study of the middle voice, which includes a cross-linguistic comparison of which verb lexemes, when taken with a plural subject, give a reciprocal reading even without overt reciprocal encoding, of the type 'they fought (each other)' or 'they kissed (each other)' as opposed to 'they insulted *(each other)' or 'they stroked *(each other)'.

Work of this type has been able to show that even though the exact content of word classes varies cross-linguistically (thus, 'know' is expressed by a verb in English but by the predicative adjective *mungurru* in Kayardild), their core membership is stable, and it is only the peripheral members that vary across languages (see Bisang, this volume). It is also possible to turn the procedure around and see how semantically defined classes of lexemes map onto word classes, as in the study of kinship terms by Dahl and Koptjevskaja-Tamm (2001b), which demonstrates a number of distinctive combinatoric characteristics that mark them off from other nominals.

A particularly important line of research examining the semantics of combinatorically defined subclasses originated with work by the natural language philosopher Zeno Vendler (1967), then developed further by the formal semanticist David Dowty (1979). The essence of this approach is to define verbal subclasses—

Aktionsarten or 'types of actions', grouped by their inherent temporal properties—by using a battery of combinatorically defined tests. These tests may examine simple grammatical acceptability in certain morphosyntactic frames (e.g. 'be V-ing', which excludes stative verbs like *know*). Or they may look at entailments between variant syntactic environments (e.g. does 'John V-ed for an hour' entail 'John V-ed'), which works with 'activity' expressions like 'painted' but not with 'accomplishments' like 'painted a picture'. The crucial next step is to motivate the various combinatoric properties by showing how they interact with the internal semantic structure of the relevant verb, such as causative and inchoative elements. The study of a class's combinatoric properties thus becomes a major tool in effecting a partial semantic decomposition that represents the meaning common to all class members. Though the Vendler/Dowty work was primarily based on English and German, more recent work has sought to broaden the empirical base (e.g. Foley and Van Valin 1984, and Van Valin and LaPolla 1997). More sophisticated cross-linguistic work on aspect, which posits a more elaborate set of aspectual categories (Sasse 2002b), has shown that we need to increase the number of subclasses if we are to account for a fuller set of languages.

In fact, we can use a number of quite different combinatoric batteries to set up verbal subclasses on virtually orthogonal dimensions. We can use their interaction with valence-sensitive environments, defined by differences in voice and case frames, or with different types of complement clause to set up classes that are largely defined by argument structure. Two milestone language-specific studies are Apresjan (1974) for Russian and Levin (1993) for English. Or, in languages like Jaminjung (Schultze-Berndt 2000), whose rich set of auxiliary verbs makes these a sensitive test of verbal semantics, we can examine the covert classifications revealed by which auxiliary the lexical verb combines with (McGregor 2002). The initial findings from such studies indicate yet another semantic dimension of classification, having more to do with location, movement, and contact type. Again, though, combinatorically defined classes of the Jaminjung type have only been investigated in languages from one large-scale genetic grouping (Australian), and we lack a proper cross-linguistic systematization.

Event expressions, because of the internal complexity of their semantics and the great cross-linguistic variability in their lexicalization, are undoubtedly the most challenging domain for semantic typology. As indicated here, approaches sensitive to covert semantic categories are particularly fruitful in this domain. An integrated typological approach to the typology of event expressions will need to draw together the different sorts of classifications effected by combinatoric tests sensitive to internal aspectual structure, argument structure, and spatial disposition. This Herculean task has barely been articulated, let alone tackled in a systematic cross-linguistic fashion.

4. COMPOSITIONAL SEMANTICS

It is the ability to assemble signs recursively into complex structures which gives language the power to express an infinitude of meanings. The Principle of Compositionality posits that 'the meaning of an expression is a function of the meanings of its parts and of how they are syntactically combined' (Partee 1999: 739). Modelling this requires an apparatus capable of showing how semantic representations are built up alongside morphosyntactic assemblage. The most successful approaches to doing this have been carried out within the enterprise of formal semantics, which draws on the apparatus of logic to produce semantically interpreted versions of morphosyntactic structures.

Until relatively recently, formal semantics did not evince great interest in cross-linguistic variation, concentrating on English. Yet it is obvious that many of the phenomena discussed in formal semantic literature depend on contingent aspects of linguistic structure that happen to be present in English. Consider the well-known ambiguities of English sentences like *Every boy kissed someone here*, which disappear when this is translated into languages like Lithuanian or Russian which distinguish specific and non-specific indefinite pronouns (3.2). The last decade has seen an explosion of interest in what consequences linguistic diversity has for the way semantic composition should be formally modelled. As Faltz (1995: 271) put it, 'if we take the notion of compositionality seriously, we are going to have to allow for the possibility that major typological distinctions in syntax might demand fundamentally distinct kinds of semantic interpretive mechanisms'. An epochal collection of studies of quantification, drawn from a wide range of languages, is Bach, Jelinek, Kratzer, and Partee (1995); see also Matthewson (2001) for a more recent survey of how different languages deal with quantification, and Matthewson (2004) for issues in data collection.

To illustrate the interest of these issues, I will briefly mention work on one key question: whether the essential role of NPs in all languages is to express grammatical quantifiers over the domain of discourse.

In English and most familiar European languages, the normal position for quantifier placement is in the determiner slot of NPs—*all* the men, *each* woman, *some* children, *a* girl, etc.—even though this is not their position in the logical representation for sentences. Indeed, it is the centrality of quantifiers to this position that led to the terminological shift from 'NPs' to 'DPs' (Determiner Phrases) in more recent syntactic theories in the generative tradition. Such was the impact of English-type structures on conceptions of Universal Grammar that Barwise and Cooper (1981: 177) proposed the following 'NP-Quantifier Universal':

Every natural language has syntactic constituents (called 'noun-phrases') whose semantic function is to express generalized quantifiers over the domain of discourse.

Now the cross-linguistic evaluation of this claim depends on how it is interpreted. As Partee (1995: 542) points out, following Thijsse (1983), if this claim is taken to mean simply that 'all languages have NPs and all NPs *can* be analyzed as generalized quantifiers', it is unobjectionable, and perhaps unfalsifiable. However, if it is taken in the following, stronger form, it becomes empirically problematic:

All languages have essentially quantificational NPs, i.e. NPs which can be analysed as generalized quantifiers but not reasonably as referential (type e) or predicate (<e, t>). (Partee 1995: 542–3)

Challenges to this formulation come from languages where quantifiers do not form part of NP-like constituents. (Partee 1995 proposes the term 'D-quantifiers' for quantifiers which behave like determiners syntactically.) In Straits Salish, for example, quantifiers like mək'ʷ 'all' cannot plausibly be syntactically linked to any phrasal constituent, and exhibit a corresponding lack of selectivity in scope. An example is (6), where mək'ʷ can have scope over either of the arguments of the predicate, or indeed over the predicate itself.

(6)   Straits Salish (Jelinek 1995: 514)
      mək'ʷ=ł   'əw'   ŋa-t-ø   cə   xčenxʷ
      all=1PL.NOM   LNK   eat-TR-3ABS   DET   be.fish
      'We ate all the fish/we all ate fish/we ate the fish up completely.'

Jelinek (1995) links this scopal indeterminacy to the syntactic structure of Straits Salish, which she analyses as a language without a noun/verb distinction and with just one major word class (predicate), which extends even to proper names. Predicates are followed by clitics indexing the person and number of arguments. But fuller lexical specification that would be done in English by placing a noun in a NP (e.g. *the fish*) is accomplished by forming an adjoined clause whose predicate, here, would be xčenxʷ 'be fish', introduced by the determiner cə, whose role is to mark the following predicate as giving further information about the argument indexed in a higher clause (here by 3ABS -ø). As a result, Straits Salish lacks D-quantification 'since only pronouns and variables occupy argument positions' (Jelinek 1995: 530).

To accommodate cases like these, Partee (1995) proposes an expanded typology of quantifier types, adding a further type, 'A-quantifiers', where A stands for 'adverbial'. These do not form a syntactic constituent with NPs, and must therefore resort to other means, such as topic-focus articulation, to determine what is in their scope. Languages whose only quantifiers are of this type are problematic for Barwise and Perry's proposed Universal, and imply that, to model them successfully, we may need quite different types of compositional architecture. This task—a fundamental one for the most basic levels at which meaning is represented—will require much greater collaboration between typologists and formal semanticists than the field has seen so far.

5. CONCLUSION

In semantic typology, more than any other sub-field of typology, many of the major investigations have been carried out by investigators who did not see themselves as doing typology—including anthropologists of kinship, ethnobiologists, philosophers of language, formal semanticists, and cognitive semanticists looking at figurative speech. This, added to the deep fragmentation in fundamental assumptions that plagues the field of semantics, has retarded the growth of a systematized field of semantic typology. Nonetheless, the findings presented here should show how rich and varied the field is, how much it has to tell us about how humans think in language, and how the forces shaping language structure are tugged between the universal and the culturally specific—not to mention its implications for many other fields and endeavours, such as the design of the planned 'semantic web'.

Huge challenges still face the field: to extend its methods into new semantic domains, to develop a universal semantic grid in the form of an articulated ontology of possible referents that works for all domains in all languages, to chart a universal semantic map that links together the fragments that semantic typologists have begun to piece together (e.g. sensory verbs, indefinite pronouns), to balance systematization with a willingness to open up new lines of enquiry that discoveries in newly studied languages can throw up, and for logical approaches to develop a more flexible architecture of compositionality able to represent semantic differences across languages.

On the one hand, we need much more integration of existing findings stemming from other disciplines within the general conceptual framework of linguistic typology. But on the other, it is clear that semantic typology will continue to benefit, more than perhaps any other branch of typology, from the insights of other fields, including developmental psycholinguistics, concept formation, and neuro-cognition, which will enable us to see how the whole conceptual system and its connectivities is afforded by the human mind and brain.

To convey meaning is arguably the most basic goal any human language must achieve. At the same time, the ability of culture to shape many meaning categories makes semantics the domain of language which may prove to be more cross-linguistically variable than any other. This makes the quest to systematize and understand cross-linguistic differences in how languages organize meaning one of the most fundamental and challenging tasks not just for linguistic typology, but for humanistic scholarship and cognitive science.

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CHAPTER 24

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TYPOLOGY OF PHONOLOGICAL SYSTEMS

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IAN MADDIESON

1. INTRODUCTION

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Linguists construct phonological typologies as one way to understand how the sound patterns of languages vary, and in particular what limits there are on this variation. As is the case with other areas of linguistic typology, a very large number of possible factors can be used to construct typologies of phonological systems. Those most often examined relate to the inventory of sounds, the sequencing of sounds, and their occurrence in different structural positions. The phonological structure of syllables and words or other units, as well as the broad issue of prosodic patterning and the types of phonological processes observed, provide insightful bases for making typological distinctions (see Greenberg, Ferguson, and Moravcsik 1978). For many of the properties of interest, a set of distinct types can be quite readily established. The issues concern how many different categories occur and how frequent each of them is. For other properties, it makes more sense to recognize continuous or scalar variables. When more than one factor is considered at the same time, the questions of interest often concern which values of the variables most frequently occur together, compared to those combinations which are rare or absent. Ultimately, the goal must be to understand why the patterns of relative frequency and co-occurrence are as they are.

The pattern of voicing contrasts in obstruents may be taken as an example. Obstruents are the class of consonants produced with oral airflow and a significant constriction in the mouth, including principally plosives and fricatives. Many languages have a contrast between voiceless and voiced plosives, for example, in English *neat* and *need*, but somewhat fewer have a contrast between voiceless and voiced fricatives, as in English *niece* and *knees*. In a worldwide sample of 637 languages (an ongoing expansion of a sample first described in Maddieson 1984), 62% have a voicing distinction in plosives but only 35% have a voicing contrast in fricatives. In the vast majority of these cases, the absence of a voicing contrast is because only the voiceless category occurs; also all languages have plosives, but a few lack fricatives of any type.

The relative infrequency of fricative voicing can be understood as a consequence of conflicting demands placed on the speech production apparatus when the target is to produce a voiced fricative. In order to generate voicing, the vocal folds must be closed against each other and set in motion by a stream of air pushed out from the lungs. To generate the frication noise for a fricative, air must be forced through a narrow passage inside the oral cavity at a relatively high velocity. When the vocal folds are together, the flow of air from the lungs is reduced compared to when they are open as for a voiceless consonant, so it is harder to generate the required flow across the oral constriction and create the fricative noise. Furthermore, the presence of a narrow downstream constriction inside the mouth reduces the ability of air to flow between the vocal folds and keep them vibrating, since the onward flow of this air is impeded. Thus, combining voicing and frication is difficult (Ohala 1983).

The understanding of these aerodynamic factors in speech production provides a basis for accounting for the comparative rarity of voiced fricatives. However, when the patterns of co-occurrence of plosive and fricative voicing contrasts are considered, another fact emerges and this requires a different kind of account. Table 24.1 shows the relative frequency of the four types of languages established by the intersection of the two factors. As the table shows, the fricative voicing contrast predominantly occurs in languages that also have a voicing contrast in plosives. Of the 221 languages with fricative voicing in the sample of 637 languages mentioned earlier, 80% have both contrasts. Only 62% would be expected if fricative voicing was distributed independently of plosive voicing. There is thus a significant bias for a voicing contrast in fricatives to occur in languages together with a voicing contrast in plosives. A structural pattern such as this is often understood as resulting from a principle of economy. In most languages, the set of consonants used can be readily factored into a number of features or gestures that are recombined in different ways. The use of a given feature in several different consonants reduces the number of distinct motor and perceptual patterns that must be mastered by a speaker, compared to a situation in which every consonant would have a set of features unique to itself (Lindblom 1983, 2000).

Table 24.1. Plosive and fricative voicing contrasts (number of languages)

Plosive voicing	Fricative voicing		
	Yes	No	Total
Yes	177	218	395
No	44	198	242
Total	221	416	637

As this example shows, phonological typologies can be set up on the basis of a single factor or on the basis of the intersection of two or more factors. When two factors are considered, it may be possible to establish an implicational hierarchy, as is often done in language universals research (a related field to typological research). The observation above about obstruent voicing could be expressed as an implication: if a language has a fricative voicing contrast, then it is highly likely that it also has a plosive voicing contrast.

In the sections that follow, three classes of factors used to construct phonological typologies will be discussed, based respectively on prosodic patterns, segmental patterns, and the structures of longer elements such as syllables and words.

2. PROSODIC TYPOLOGY

Among the most-discussed phonological typologies are three based respectively on the 'prosodic' features of rhythm, stress, and tone. It is obvious that languages differ in their rhythmic patterns, and a well-established set of three labels is often applied to try to capture salient aspects of this difference: 'stress-timed', 'syllable-timed', and 'mora-timed'. Stress-timing is said to be characteristic of languages like English and German, in which there is a large difference in the prominence of stressed and unstressed syllables, and unstressed syllables are much reduced in duration. Speech rhythm in such languages gives the impression that it is primarily determined by the 'beats' of the stressed syllables, and both acoustic measurements and psycholinguistic experiments tend to provide some support for this idea (e.g. Uldall 1971, Allen 1972, but see Dauer 1983). Languages such as French and Spanish are said to be syllable-timed. In such languages, syllables are more nearly equal in duration, even if there is a distinction between stressed and unstressed syllables. Speech rhythm therefore gives the impression of being primarily governed by the

total number of syllables spoken in a given period of time, rather than by the number of stressed syllables. In the third category, mora-timed languages, it is the sub-syllabic units that give syllables metrical weight which primarily determine rhythm. The classic example is Japanese. A syllable with a short vowel and no final consonant has one mora. A long vowel or a final consonant in the syllable adds an additional mora. In mora-timed languages, the number of moras in an utterance is a good predictor of how long the total duration of the utterance will be. As well as Japanese, several Eastern Bantu languages, including KiNyambo and LuGanda, have been shown to have a very close correlation between the duration of an utterance and the number of moras it contains, rather than the number of syllables (Hubbard 1995). Stress-timing and syllable-timing remain rather impressionistic terms, and they have remained difficult to provide with precise interpretation, but they capture the fact that the languages so labelled do make distinct auditory impressions on a listener with respect to their rhythm, as is shown by perceptual experiments in which specific segmental information is filtered out from speech samples (see Pellegrino forthcoming for review). The distinction also seems to correlate with differences between languages with respect to how easily their speakers can identify a syllabic sub-part of a word: speakers of French can do this more readily than speakers of English (Cutler, Mehler, Norris, and Segui 1986). A more explicit rhythmic typology needs to be developed to classify languages in general, but promising work (e.g., Ramus, Nespor, and Mehler 1999, Grabe and Low 2002) suggests that including features such as the ratio of vocalic to consonantal intervals in speech, as well as measures of the variability of vocalic and consonantal intervals, may provide a basis for such an extension.

Languages also differ in the role played by stress, and this provides another typology. In some languages, such as Yoruba, there is no detectable difference in the stress given to different syllables. In others, the position where stresses fall can be predicted entirely (or almost so) from factors such as the position of a syllable or mora in a word, counting either from the beginning or the end of the word, or the weight of a syllable (with syllables having a long vowel or a coda consonant attracting stress), or the status of an element as a root or a specific stress-attracting affix. In Korean, stress falls on the first syllable of a word if that syllable is heavy, otherwise on the second syllable, a regularity which could be expressed by saying that stress falls on the syllable containing the second mora. In a number of Austronesian languages, including Sundanese and Lenakel, stress regularly goes on the penultimate syllable, although in Sundanese the stress goes to the final syllable if the penultimate syllable contains /ə/ and the final vowel is not /ə/. Thus, Sundanese /tʃɛŋkad/ 'quarrel' and /gənəp/ 'six' both have penultimate stress, but /tʃəŋkat/ 'stand up' has final stress. In Maricopa, stress goes on the final syllable of the root. From the number and types of elements counted, the direction of any counting, and the role of morphological categories, a quite elaborate typology of stress systems emerges (see Goedemans 1996, Goedemans, van der Hulst, and van

Zanten 2009). In addition, there are languages, such as English and Russian, in which there is more unpredictability in the position of stress. In Russian, for example, /úʒe/ (stress is marked by an acute accent) is the comparative form of the adjective /úʒkij/ 'narrow', but /uʒé/ means 'already'. Languages in this last group are said to have contrastive or lexical stress (Hyman 1977).

The largest proportion of the world's languages fall into the class of languages in which stress (or accent) is predictable—or almost predictable—from factors such as syllable or mora count or status as a root. In a sample of 461 languages from the larger sample mentioned earlier, 42% had essentially predictable stress placement. In these languages, the primary role of accentual prominence can be viewed as demarcating a unit, such as a word or root, or a phrase, including clitized elements, from its neighbours. The remaining languages divided equally into those where differences in accent placement distinguish lexical items and/or grammatical categories, and those for which no role for stress is mentioned in the description(s) available.

The third prosodically based distinction is that between tone languages and non-tonal languages, and within tone languages, between level and contour tone systems (see Yip 2002, Hyman 2001 for general reviews). All spoken languages make use of variations in pitch to communicate different meanings, but in some languages, aspects of the voice pitch are tied to particular lexical or grammatical forms, rather than being a property of a longer unit such as a sentence. About 40% of the world's languages use pitch in this way. In particular, the great majority of languages of Africa are tonal, apart from the Semitic and Berber families, as are many of the languages of East and Southeast Asia, and perhaps as many as one-third of the indigenous languages of the Americas. Most of the African tone languages form contrasts between pitch patterns where it only matters that one syllable reaches a higher or lower level than another. Such systems are called level tone systems. The tones can be described by simple labels, such as High and Low, or, if more than two levels are distinguished, by adding labels such as Mid, Extra High, and so on. For example, Yoruba has High, Mid, and Low tones, as in the verbs /lú/ 'mix', /lū/ 'beat', and /lù/ 'strike'. The highest number of levels known to be distinguished is five. Other languages have word-level pitch patterns that require a change in pitch between two or more target levels. Tones of this type are called contour tones (Pike 1945), and are described by terms such as Rising and Falling. Asian languages such as Thai, Vietnamese, and the many varieties of Chinese are among those which include contour tones in their inventory. For example, full syllables in Standard Thai can have High, Mid, or Low level tones or Falling or Rising contours, as in /ná:/ 'aunt', /nā:/ 'field', /nà:/ (a name), /nâ:/ 'face', and /nǎ:/ 'thick'. The correlation between tone system type and geographical area is quite strong (Maddieson 2005a), with systems containing contours prevalent in South-east Asia and Meso-America, but less common in tonal languages of Africa and the North and South American regions.

The presence of a lexical tone system does not exclude the presence of a clearly recognizable difference between stressed and unstressed syllables. Table 24.2 presents a breakdown of languages with and without tones in a sample of 461 languages for which the role of stress was determined. Although two-thirds of the tonal languages are reported to have no noticeable stress, there are a number of tonal languages that fall into the categories of languages with lexical or predictable stress placement. In languages of these types, what is often involved is a restriction on the full range of tonal contrasts, or on any tone contrast, to the syllables that bear stress. For example, in languages as different as Standard Thai and Copala Trique (an Oto-Manguean language of Mexico), word-final syllables have more tonal possibilities than preceding syllables, as well as richer consonantism and more vowel contrasts. The final syllables are clearly prosodically prominent and are therefore interpreted as bearing a stress. In a relatively small number of languages, the position of stress is not fixed and there are also tonal distinctions, though these in some cases only contrast on a stressed syllable. In the Hua (or Yagaria) language of New Guinea, the placement of stress is unpredictable and each syllable has a high, mid, or low tone level. However, there are extremely few pairs of words in which the stress placement is the same but the tones differ. Languages such as Lithuanian, often described as having 'pitch accents', can also be regarded as languages with both tone and lexical stress. In Lithuanian, long syllables can bear one of two contrasting pitch patterns, traditionally called acute and circumflex. Acute syllables are pronounced with a falling pitch pattern; circumflex syllables, with a rise in pitch (Blevins 1993). Which syllables will bear a tonal accent and where in a word the accent will fall is unpredictable. In contrast, in Yoruba, no syllable appears more prominent than any other, and each syllable bears its own tone.

Contour tones as well as the intonational patterns that are produced over a sentence or phrase can often insightfully be broken down into sequences of tone levels (Gussenhoven 2004). A rising intonation, which in many languages can be a mark that the sentence is a question, may therefore be represented as Low + High, but this LH sequence functions quite differently from a Rising LH contour or a simple sequence of Low and High level tones, which are properties of a word or

Table 24.2. Tone system and role of stress (number of lanuages)

Tone system	Role of stress			
	Lexical stress	Predictable stress	No stress	Total
Tonal	18	34	101	153
Non-tonal	113	161	34	308
Total	131	195	135	461

morpheme, as the intonational contour is not anchored to any particular lexical or grammatical form. Intonational typology is a relatively underdeveloped field of investigation, perhaps because of a lack of comparable models of description across languages (see Hirst and Di Cristo 1998, Jun 2005). However, the use of rising intonation as a mark of a question (typically, a polar or yes/no question) has often been regarded as a near-universal pattern, with perhaps a deep ethological basis behind it (Bolinger 1978, Ohala 1984). A substantial number of languages are now known to follow other types of prosodic marking of questions. These types have been particularly observed in a number of African languages belonging to different families (Rialland 2007). The patterns include the addition of a final low tone, the lengthening of a final vowel, and the addition of a non-lexical low vowel.

3. SEGMENTAL PATTERNS

A variety of other typological observations are based on the segmental structure of languages. Most phonological descriptions identify a set of contrasting sound types which distinguish one word from another, the *phonemes* or contrastive segments of the language. Languages have been described as having as few as eleven phonemes—for example, Rotokas (six consonants, five vowels) and Pirahã (eight consonants, three vowels)—but there are also languages which can be considered to have very large inventories—such as !Xóõ (Traill 1994), interpreted as having 128 consonants and 28 vowels, and Yélî Dnye, with 58 consonants and 34 vowels. However, there is often room to regard some of the complex phonetic events in such languages not as single segments but as a sequence of two or more units. One alternative analysis of !Xóõ reduces the number of consonants to 55—still a large number but considerably closer to the average. Typologies can be constructed based both on the number of these segments and on as the particular types present in the inventory.

The number of segments is obviously a scalar variable which can take a large range of values; however, an interesting division can be made between languages whose numbers of distinct consonants or vowels are close to the global average and those that fall notably above or below the average. In a survey of 566 languages (Maddieson 2005a), the average number of consonants was found to be a little under 23, with the modal number being 22. About 32% of the languages have between 19 and 25 consonants, considered close to the average (22 ± 3). About 30% have more than average and about 38% less, a distribution that is not very far from one-third in each class. What is interesting is how the size of the inventory relates to its content: larger inventories tend to include consonants that are inherently

more complex and are absent from smaller inventories (Lindblom and Maddieson 1988). Of a defined set of complex consonants (clicks, glottalized consonants, doubly articulated labial-velar stops, lateral fricatives and affricates, uvular and pharyngeal consonants, and dental or alveolar non-sibilant fricatives—similar to English 'th' sounds), only about a quarter (26%) of the languages with smaller than average consonant inventories have even one member of the set. About half the 'average' languages (51%) have at least one member, while over two-thirds of the languages (69%) with larger than average inventories have one or more of these sounds. There is no inevitability to this pattern; complex consonants might well constitute a constant proportion of any size consonant inventory.

Vowel inventories have most often been considered in terms of the set of basic qualities, which differ in the three primary vowel dimensions of height, backness, and lip rounding, rather than in terms of the entire set of vowel distinctions. Separate typologies may be established with regard to the role played by features such as length, nasalization, and phonation type in adding to basic vowel distinctions. It has long been recognized that the modal number of vowel qualities is five; the average number of distinct vowel qualities is very close to six. If the languages with five or six vowel qualities are regarded as average, more than half the languages included in Maddieson's (2005a) survey (51%) are average. About a third (33%) have larger than average vowel quality inventories and about a sixth (16%) have smaller than average vowel quality inventories. Smaller than average vowel quality inventories are thus much more typologically unusual compared to smaller than average consonant inventories.

There is no predictable relationship between the number of vowels and the number of consonants in an inventory. The frequencies of inventories with smaller than average, average, and larger than average numbers of consonants and basic vowels (as defined above) in a sample of 680 languages are given in Table 24.3. There are almost exactly as many languages possessing both small vowel and consonant inventories and possessing both large vowel and consonant inventories

Table 24.3. Size of consonant and vowel quality inventories (number of languages)

Consonant inventory	Vowel quality inventory			
	Small	Average	Large	Total
Small	47	153	65	265
Average	34	105	98	237
Large	34	87	57	178
Total	115	345	220	680

as would be predicted from the independent frequencies of the classes of vowel and consonant inventories in the sample. The largest deviation from expected values in this table is in the cell for a small consonant inventory combined with a large number of basic vowel qualities (65 found where 86 are predicted). It is often expected that a large consonant inventory will combine with a small vowel inventory and vice versa, but these data show that this typological expectation is incorrect (see Maddieson 2006 for further discussion).

Typological classifications at the segmental level can be based on the characteristics of segments as well as their number. The most common set of phonemic vowel qualities is /i e a o u/, as in languages such as Spanish, Māori, and Chichewa. Most languages with more than five basic vowels include these qualities. The three primary vowel parameters can be ranked with respect to each other, in that height contrasts take precedence over backness, which in turn take precedence over rounding. All languages have contrasts of vowel height, and some languages in the Northwest Caucasian, Arandic, and Chadic families can be interpreted as having no underlying contrasts other than height. The phonetic differences in backness and rounding of vowels that are heard in these languages are predictable from the consonantal environment. These so-called 'vertical' vowel systems, of which Kabardian is the best documented (Choi 1991, Gordon and Applebaum 2006), form a distinct, though unusual, class. Most languages also have a contrast in backness, although this is often confounded with rounding, since rounding can be predicted from backness and vice versa: front and central vowels are unrounded, and back vowels are rounded, as in the prototypical set /i e a o u/. However, no languages are known which contrast rounding alone without also having variation in backness. A small minority of languages have front or central rounded vowels and/or back unrounded vowels, thus an independent contrast in rounding seems to be the least-used parameter of the three. Other attributes of vowels—e.g. nasalization, pharyngealization, or phonation types other than normal voicing— tend to occur only when the overall vowel inventory is larger than the average size, often precisely because these additional dimensions of contrast appear with several or all of the 'plain' vowel qualities. No languages are known in which there are more distinct vowels in one of these 'additional' sets of vowels. For example, the set of nasalized vowels in an inventory will contain the same number as, or fewer than, the set of basic vowels.

In a number of languages, there are restrictions on the combinations of vowels that can occur within the span of a word or some other unit. This pattern is known as vowel harmony. Some of the best-known examples of vowel harmony are found in Uralic and Altaic languages such as Finnish, Hungarian, and Turkish. In these languages, the vowel harmony restrictions relate to vowel backness and rounding. In Turkish, for example, the vowels in a native root must either be all front or all back, and affixes change their vowels to harmonize. In addition, if a non-root-final vowel is rounded, subsequent vowels will also be rounded. Hence, some suffixes,

such as the genitive case marker, have four different forms, as shown in Table 24.4. Height does not play a role in this vowel harmony. Vowel harmony based on rounding or backness is also found elsewhere. For example, the Yokuts languages of California, the Australian language Warlpiri, the Chadic language Mada, and the Bantu language Punu have harmony based on rounding.

However, vowel harmony involving backness and/or rounding is much less common than another type that was initially named 'cross-height' vowel harmony. In such systems the vowels are divided into two sets, each of which contains vowels of various heights. The vowels of the two sets do not co-occur; in some cases, one or more vowels may be neutral to the harmony and able to occur with either set. For example, the standard dialect of Yoruba has the seven oral vowels /i, e, ɛ, a, ɔ, o, u/. The higher mid vowels /e, o/ and the lower mid vowels /ɛ, ɔ/ belong to different harmony sets and do not co-occur in a word. The remaining vowels /i, a, u/ may occur with either set. Physiological phonetic research has shown that—at least for some of the languages concerned, such as Akan, Igbo, Ndut, and DhoLuo—the distinction between the harmony sets lies in the size of the pharyngeal cavity at the back of the mouth (Hess 1998). In the majority of the world's languages, the size of this cavity makes no distinctive contribution to the vowel sounds and its dimensions can be predicted from the position of the tongue body. But in Akan and the other languages mentioned earlier, some vowels are produced with an expanded pharyngeal cavity created by pulling the root of the tongue forward and often also lowering the larynx. The advanced tongue-root (ATR) vowels form one set of vowels in the vowel harmony system of these languages. Although physiological measurements are only available for a few languages, auditory and acoustic observations suggest that many additional languages in the Niger-Congo and Nilo-Saharan families in Africa have vowel harmony based on tongue-root position (though this is probably no longer the case for Yoruba and a number of other languages which almost certainly had ATR harmony at an earlier stage), and it is also most likely the basis of the vowel harmony found in Khalkha Mongolian and Tungusic languages in Asia. Other languages around the world show harmony that is based on vowel height. For example, Itelmen, with the vowel set /i, e, a, o, u/, lowers /i/ and /u/ to /e/ and /o/ respectively when one of the set /e, a, o/ follows in the word and lowers /e/ to /a/ when /a/ follows. The Sotho-Tswana dialect group of

Table 24.4. Examples illustrating vowel harmony in Turkish

	Front unrounded	Front rounded	Back unrounded	Back rounded
High	ip-in 'rope'	gyl-yn 'rose'	kɯz-ɯn 'girl'	pul-un 'stamp'
Non-high	ev-in 'house'	gøz-yn 'eye'	kitɑb-ɯn 'book'	kol-un 'arm'

Bantu languages has a nine vowel inventory /i, ɪ, e, ɛ, a, ɔ, o, ʊ, u/ and harmony that raises /ɛ/ and /ɔ/ to /e/ and /o/ when a higher vowel immediately follows. In Nez Perce, with the vowel set /i, æ, a, o, u/, the higher members of the /æ, a/, /u, o/ pairs co-occur in stems, and affixes must harmonize by selecting the appropriate member of these pairs (but /i/ is neutral). Languages that lose harmony based on tongue-root position may replace it with harmony based only on vowel height, as seems to have happened with Yoruba.

Vowel harmony systems can be classified into types based not only on which features of the vowels are relevant but also according to the directionality of effects and which elements control the harmony. Harmony is always perseverative in Turkish and spreads from roots to suffixes, but in Warlpiri, harmony is anticipatory between a verb and a tense suffix but perseverative elsewhere. Most often, roots require affixes to harmonize with them, but Warlpiri illustrates a case where an affix controls harmony in a root.

As for a typology established by the specific content of consonant inventories, most languages include two series of stops, voiceless and voiced, with members at bilabial, coronal, and velar places of articulation (the coronals vary somewhat in place of articulation from language to language). Many also have a palato-alveolar affricate /tʃ/. Typically, there are also voiced nasals at the three places where the stops occur, and a palatal nasal is often found as well. Most typically, only voiceless fricatives occur. The most common fricative is a coronal sibilant—some kind of /s/. Many languages also have a labio-dental fricative and a palato-alveolar sibilant fricative. There are typically two 'liquids': one a voiced coronal lateral approximant, and one a rhotic ('r-sound'), most frequently an alveolar trill. Voiced palatal and labial-velar approximants occur in the great majority of languages, and two 'laryngeals' occur in many: the glottal stop, and the voiceless approximant /h/. Hence, a prototypical consonant inventory contains the following set of segments: /p, b, t, d, k, g, ʔ, tʃ, m, n, ŋ, f, s, ʃ, l, r, w, j, h/. As noted earlier, consonants with places and manners of articulation outside those represented in this set (e.g. with uvular or pharyngeal place of articulation, or with other laryngeal settings) tend only to occur in inventories with a larger total number of consonants. This tendency for more complex consonants to appear only in larger inventories has been named the 'size principle' (Lindblom and Maddieson 1988). There is also a general tendency for the proportion of consonants in the inventory to increase as the overall number of segments increases. This may simply reflect the fact that there are more potential dimensions of contrast between consonants of different types than between vowels.

Because phoneme inventories tend to be structured so that less common consonant or vowel types are added to a common core rather than replacing common segments, it is often possible to describe the relationship between rarer and more common sounds in terms of 'implicational statements'. These take the form 'If a language has x, it also has y', where x is a less common segment, phonetic feature, or

feature combination, and y, a more common one. For example, voiceless nasals only occur in languages with corresponding voiced ones, voiced fricatives only occur in languages with corresponding voiceless ones, and nasalized vowels only occur in languages with corresponding oral vowels. Few such statements are entirely without exception, but they do state patterns that seem to be typical of human languages. Attempts to find a general basis for these patterns have a considerable history whose major phases are traced in Anderson (1985a). They have been related to patterns in childhood language acquisition, to universal trends in diachronic change, to the inherent content of phonological features, and to the earliest evolution of spoken language. A widely accepted idea, however, is that they arise from pervasive pragmatic requirements for efficient communication: the more common element represents a better balance between two desirable traits—relative ease of articulation and relative perceptual salience—than does the competing element. A good discussion of this view can be found in the contributions to Lindblom, MacNeilage, and Studdert-Kennedy (1990).

4. LARGER UNITS

Consonants and vowels, of course, combine into larger structures, such as syllables and words. Patterns in the construction of these larger units provide other typologies. All languages seem to have syllables consisting of a single consonant (C) and vowel (V), and for some languages this is the most complex syllable structure permitted. Such languages include Fijian, Bambara, and Guarani, which have only syllables consisting of either a single vowel or a single onset consonant and a vowel, represented by the formula (C)V. Additionally, Yoruba has syllables consisting of a syllabic nasal. A few languages, such as Central Arrernte (Breen and Pensalfini 1999), have been argued to have VC rather than CV as their basic structure, but this claim is open to some debate. The majority of languages allow more elaborated syllables, but there seems to be an orderly progression in the expansion of syllabic complexity. An onset to a syllable is more likely to contain a consonant followed by a liquid—i.e. something likely to be written with <l> or <r>—or a glide—usually written <w> or <y> (IPA [j])—than it is to contain two consonants belonging to the obstruent class, and is more likely to contain only two onset consonants rather than more than two. Similar patterns apply to syllable codas. Most languages allow only one consonant at the end of a syllable, and the more elaborate syllable types only occur in languages in which the simpler types also occur. Languages such as English, Georgian, and the Tsimshian language of British Columbia which allow

strings of consonants in both the onset and the coda of a syllable are comparatively rare.

Syllabic typology can also be established on the basis of which elements are obligatory. In some languages, it appears that all syllables must begin with a consonant. The Mon-Khmer language family provides several examples, including Standard Khmer, Vietnamese, Khasi, and Nancowry Nicobarese. Most languages require that the nucleus of a syllable consists of a vowel (or diphthong), but a minority permit consonants to be the nucleus of a syllable. Yoruba has syllabic nasals. English allows both nasals and laterals to be syllabic consonants, as in words such as *bitten, hidden, little, riddle,* and the Standard American English pronunciation of words such as *first, term, burn,* and *worm* can be interpreted as containing a syllabic rhotic ('r-sound'). Syllabic rhotics certainly occur elsewhere, as in Yurok, a language of northern California. Czech allows laterals and rhotics to be syllabic, as in /vlk/ 'wolf' and /krk/ 'neck' and, more rarely, nasals, as in /sedm/ 'seven'. More unusual are languages such as Tashlhiyt Berber, in which even voiceless fricatives and stops can be syllabic. Dell and Elmedlaoui (1985) cite such examples as /k.kst. tʃ.ʃtt/ 'remove it and eat it' (where . marks a syllable boundary), in which /k, s, ʃ/, and /t/ are the peaks of the syllables.

Phonologically based word-level constraints vary considerably across languages (and in some languages, even the utility of the concept of word is questionable). Two important types concern minimal length requirements and word-marginality patterns. In many languages, a word (sometimes more accurately an utterance) is required to have at least a certain specified length. Common patterns are to require at least two syllables or at least two moras. Cantonese Chinese, for example, has long and short vowels, but short vowels can only occur with a final consonant so that a word always has at least two moras. Similar two-mora minima apply in languages as diverse as Cairene Arabic and the Australian language Gunin. At an earlier stage of English, a similar constraint governed lexical forms, and this has left its trace in restrictions on certain vowels, such as /i, ɛ, æ, ʊ/, which cannot occur without a following consonant as they are descended from earlier short vowels. Many languages in the Bantu subgroup of Niger-Congo illustrate a two-syllable word-minimality constraint. This is seen in Sotho and GiTonga, where if regular morphophonological processes would otherwise result in a monosyllabic word, a 'stabilizing' suffix vowel is added or an overt prefix occurs instead of a zero allomorph (Gowlett 2003). Special classes of words may be exempt from minimality constraints; for example, this is so for exclamations and ideophones in Sotho and GiTonga.

Word-level phonological differences between languages can involve more complex distributional patterns. For example, many languages have different segmental sequence possibilities at the margins of a word compared to in word-internal positions. English allows certain clusters of consonants in word-final position which do not occur word-medially. This is primarily because of the addition of

suffixes consisting of a single consonant, as in words such as *sixths, lengths.* But English word-internal strings of consonants can almost always be parsed into substrings that occur at word margins (Pierrehumbert 1994). In some other languages, the word-internal possibilities are richer than those at word margins. For example, in the Australian language Kayardild, there are no word-initial consonant clusters and all words end in a vowel, yet word-internally -CCC- strings occur, as in /pulmpa/ 'grasshopper' (Evans 1995). Richer word-internal than word-marginal patterns are relatively common among Australian languages, including in Garawa, Gunin, Bunaba, and Warrwa. The existence of this pattern means that it is not universally possible to explain word-internal structure from word-marginal structure. Further discussion of word structures can be found in Dixon and Aikhenvald (2002).

5. DIRECTIONS FOR TYPOLOGICAL RESEARCH

Views of the phonological structure of languages are beginning to turn to a perspective which suggests that a speaker's knowledge may be in the form of statistical generalizations over his or her experience of the language, rather than in the form of law-like statements about occurrence and distribution of segments and other structures (Johnson 2007). To simulate this notion of *exemplar-based* phonology requires the processing of substantial quantities of data on individual languages from which the outputs are statistical distributions. These then enable probabilities to be assigned to the occurrence of specific events, patterns, and structures. At present, comparatively few languages have been studied in this fashion, whereas the typological enterprise thrives best when a large number of languages can be compared. To date, phonological typology has therefore mainly been based on traditional structural linguistic data, such as a list of phonemes and their distribution, and rules for syllable structure. This information is available from almost all basic descriptions of a language.

The time when the phonology of a large number of languages can be characterized in the probabilistic way envisaged in new models may be some way off, or indeed may never be reached, since the quantity of data required to be processed may never be obtained for the majority of the world's languages. In the meantime, a useful approach may be to recognize that statistical patterns make significant typological distinctions. Two languages may have a given segment or syllable structure in common, but if the frequency of use is different, they are not truly similar (Maddieson 2009). For example, both Maybrat and Noon are languages in which the most elaborate syllable structure is reported as CVC. In Noon, this

is the predominant pattern (at least in the case of monosyllabic stems, which form a very large part of the vocabulary), whereas in Maybrat it is CV and not CVC which is the predominant syllable structure. A scale of syllabic elaboration based on both the syllabic structures and their relative frequency would therefore place Noon further toward the complex end than Maybrat. Typological studies that take into account at least some evaluation of the relative frequency of the elements of the analysis thus promise to provide more sensitive measures of some of the properties that are of interest.

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PART IV

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LINGUISTIC TYPOLOGY IN A WIDER CONTEXT

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LINGUISTIC TYPOLOGY AND HISTORICAL LINGUISTICS

KENNETH SHIELDS

1. INTRODUCTION

Historical linguistics constitutes the source of modern approaches to language study, especially through the efforts of the 19th-century Neogrammarians. However, it is clear that the field of historical linguistics as it exists today has been strongly shaped by the findings of its descendent linguistic disciplines, including linguistic typology. In fact, for a discipline which has blossomed so recently, linguistic typology has come to play an important, multifaceted role in the long-established field of historical linguistics. In general terms, this role manifests itself in three primary ways:

(i) linguistic typology provides historical linguists with a highly useful means of assessing the plausibility of their reconstructions;

(ii) linguistic typology can be utilized by historical linguists as an important methodological adjunct in the reconstruction process itself; and

(iii) linguistic typology is in itself a primary subject matter of historical linguistics in the form of what Fox (1995: 194) calls 'laws of language development', i.e. the general principles of how languages evolve.

In what follows, each of these manifestations of linguistic typology within historical linguistic study will be addressed. The examples chosen to illustrate these applications are drawn from Indo-European historical linguistics because this is the specialty area of the present writer and because the Indo-European family of languages has been, by far, the most intensively investigated linguistic stock from an historical point of view.

2. LINGUISTIC TYPOLOGY AND THE ASSESSMENT OF RECONSTRUCTIONS

As a means of drawing conclusions about the prehistorical stages of languages, historical linguists have employed two primary methodologies: the comparative method and the internal method. The former has been central to the reconstruction enterprise, systematically utilizing data from genetically related languages to draw conclusions about the sounds, morphemes, and syntactic patterns of the proto-language from which these languages derive. Internal methodology is much like the comparative, but the data come from a single language. The assumption underlying both the comparative and the internal methods is that linguistic prehistory can be recovered because largely regular linguistic changes leave behind structural traces, both in the cognate sets attested in sister languages and in the allomorphic and other variant patterns of individual languages. Internal reconstruction is especially useful in exploring the prehistory of language isolates or the still earlier sources of proto-languages reconstructed by the comparative method. Moreover, internal reconstruction can be applied to attested languages prior to the application of the comparative method so that the latter method utilizes data which permit it to project as far back as possible in time. The limitations of the internal method, however, are that it cannot recover structural information obscured by unconditioned changes and that it projects reconstructed structures back to indeterminate points in time. The comparative method, in contrast, can better recover structural information because its source of data involves multiple languages, one or more of which may reveal original patterns obscured by unconditioned changes in other sister languages; and it projects back in time to the point at which the descendent languages began to split from their proto-language. Still, it is well known that the comparative method can also 'lose information' about a proto-language because of changes occurring in all the descendent languages. The result of such a loss is a reconstruction which does not reflect the structural realities of the original proto-language. In some cases, the structural realities can never be recovered, but in others, linguistic typology can provide a useful tool to assess the plausibility of the posited reconstruction and to suggest alternative structural analyses in the event that a reconstruction is deemed typologically implausible.

Likewise, linguistic typology can assist in assessing competing reconstructions, for reconstruction methodology frequently provides divergent results. Proposed reconstructions which are typologically sound should have greater plausibility and, in turn, should be more highly valued than competing reconstructions which do not. Reconstructions derived from internal methodology can—and, because of the greater tendency of the internal method to lose information, should—be subjected to the same evaluative measures of typological plausibility.

Within the field of historical linguistics, the most famous instance of using typology as a tool for the assessment of reconstructions involves the so-called Glottalic Theory of Indo-European stop consonants.[1] The traditional Neogrammarian reconstruction of the Proto-Indo-European system of stop consonants posited four series of stops: a voiceless, a voiced, a voiced aspirated, and a voiceless aspirated. However, most Indo-Europeanists subsequently rejected the latter series, explaining it as a secondary development of Greek and Indo-Iranian from the sequence of a voiceless stop followed by a laryngeal consonant. As a result, the following inventory of fifteen stops has been widely assumed:

	Labial	Dental	Palatal	Velar	Labiovelar
Voiceless	$*p$	$*t$	$*k$	$*k$	$*k^w$
Voiced	$*b$	$*d$	$*g$	$*g$	$*g^w$
Voiced aspirated	$*b^h$	$*d^h$	$*g^h$	$*g^h$	$*g^{wh2}$

However, Jakobson (1971e[1958]: 528), in a seminal work regarding the application of typological insights to historical linguistics, observes: 'To my knowledge, no language adds to the pair /t/ – /d/ a voiced aspirate /d^h/ without having its voiceless counterpart /t^h/ [. . .]; therefore, theories operating with the three phonemes /t/– /d/–/d^h/ must reconsider the question of their phonemic essence.'[3] In more general terms, he (p. 531) concludes that 'typological verification raises the probability of reconstructed phonemic and morphological patterns, and permits changing the reconstruction from a mere numerical catalogue into a more realistic portrayal of

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[1] The present writer follows Salmons (1993: 2) in defining the 'Glottalic Theory' as 'the array of attempts to reconstruct PIE obstruents incorporating typological evidence as a control on comparative and internal reconstruction. The Glottalic Theory is, in that way, not strictly limited to the positing of a glottalic series for the traditional plain voiced series, although that is certainly central to almost every prominent proposal in the literature and is where the theory's name comes from.'

[2] Some scholars—e.g. Szemerényi (1989) and Joseph (1985)—have continued to advocate the original Neogrammarian formulation. Ignored here are debates about the relative phonemic status of the palatals, velars, and labio-velars within the Indo-European phonological system (see Szemerényi 1996: 59–68 for a summary of the primary issues).

[3] In his review of the history of the Glottalic Theory, Salmons (1993: 11–12) points out that a similar concern about the viability of the reconstructed Proto-Indo-European stops was expressed by Martinet (1955: 114–5), and that other scholars—among them Hirt (1927: 214–6) and Prokosch (1939: 39–41)—early expressed reservations about certain aspects of the traditional reconstruction.

the linguistic system'. Jakobson's influential observations provided new impetus for Pedersen's (1951: 12) earlier typological objection to the traditional system in the form of the apparent rarity of */b/ in the proto-language as evidenced by the few attested cognates which contain its reflexes. Pedersen points out that /b/s are not typically lost from sound inventories, although the phoneme /p/ is frequently subject to elimination. It was such typological concerns which ultimately prompted Gamkrelidze and Ivanov (1973) and, independently, Hopper (1973) to propose an alternative reconstruction. According to this typologically motivated alternative, Proto-Indo-European possessed a series of glottalized voiceless stops (or ejectives: *p', *t', *k') instead of the traditional series of voiced stops. The remaining two series of traditional stops (voiced aspirates and voiceless) are construed as a voiced series and a voiceless series, each with both aspirated and unaspirated allophones.[4] In addition to averting the concerns expressed by Jakobson, the typological naturalness of this proposal is enhanced by the fact that languages containing glottalized voiceless stops frequently lack /p' / (cf. traditional */b/), and that the apparently unmotivated constraint in Proto-Indo-European against roots with a CVC phonological pattern containing two traditional voiced stops (e.g. *ged-) can be similarly explained by parallels in languages containing glottalized voiceless stops, where only one such stop is permitted in CVC roots. Subsequent analyses have, for example, also ascribed to Proto-Indo-European implosives in place of traditional plain voiced stops, and voiced stops in place of voiced aspirated ones (cf. Haider 1985); lenis voiceless aspirated stops in place of traditional plain voiceless stops (cf. Hamp 1989); and voiceless stops in place of traditional voiced, voiced in place of voiced aspirated, and voiceless aspirated in place of voiceless (cf. Shevoroshkin and Markey 1986)—all as a means of rectifying the typological inconsistencies of the traditional reconstruction (cf. Salmons 1993: 24–31). Indeed, Zgusta (1998: 254) estimates that 'there are sixteen main variants of the glottalic theory', attesting, in his mind, to its status as a central focus of Indo-European studies in the second half of the 20th century.

From the late 1970s until the early 1990s, the Glottalic Theory came to have numerous adherents within the community of Indo-European scholars. However, criticisms of the theory have eroded its support in recent years (see Szemerényi 1989, Dunkel 1981, Back 1979, Meid 1989, Hock 1991: 621–6, Pickard 1995). These criticisms have centred on the fact that a voiced aspirate series can exist in languages without a corresponding voiceless aspirate series; that the phoneme */b/, though rare, did exist in Indo-European, so the reputed gap in the Indo-European phonological system did not actually exist; that phonological gaps involving /b/ can be found in attested

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[4] Unlike Gamkrelidze and Ivanov, Hopper (1973) retains in his reconstruction the traditional voiceless stops without aspiration and considers the traditional voiced aspirates to be a simple voiced series. He originally analysed the traditional voiced aspirates as murmured sounds—a position he has subsequently modified.

languages; that languages containing glottalized stops do indeed permit two such sounds in CVC roots; and that the shift of voiceless ejectives to voiced stops in many dialects is problematic in terms of phonological plausibility (see e.g., Job 1995, Pickard 1995). It is important to note, however, that such criticisms are generally empirical in nature, and that the recognition of the importance of the typological plausibility of reconstructions, which the Glottalic Theory most emphatically engendered through lively debates about its validity, has remained.[5] That is, the primary legacy of the Glottalic Theory has been the reinterpretation of the processes of reconstruction that are required to derive the sound systems of unattested languages—with typological assessment now an important part of these processes. To be sure, in his critique of the Glottalic Theory, Barrack (2002: 76) emphatically asserts that he objects to the theory precisely because Gamkrelidze and Ivanov's 'ejective system [. . .] is revealed to be a veritable typological isolate'.

Another example of the use of typology as a means of evaluating the plausibility of reconstructions involves Rumsey's assessment (1987) of proposals that Proto-Indo-European was originally an ergative language in light of Silverstein's Hierarchy (1976). The reconstruction of an original ergative structure for Proto-Indo-European was first endorsed by Uhlenbeck (1901) and subsequently adopted in various forms by such scholars as van Wijk (1902), Finck (1907), Kuryłowicz (1935), Vaillant (1936), Martinet (1962), Savčenko (1967), Haudry (1978), Shields (1978, 1979, 1982), Tchekoff (1978, 1980), and Schmidt (1979, 1984). Evidence for this reconstruction includes, for example, the fact that masculine and feminine nouns (which generally refer to animate beings) differentiate nominative and accusative cases, while neuter nouns (which generally refer to inanimate objects) do not, and that o-stem neuter nouns present a nominative–accusative singular suffix in *-m, the same form which serves as the exponent of the accusative singular in masculine–feminine declension. It would seem then that the nominative case of masculine–feminine nouns derives from an old ergative case and that the accusative of masculine–feminine nouns and the nominative–accusative of neuter nouns derive from an old absolute case. Rumsey points out that all the proposed reconstructions, with the exception of those devised by Shields and Kuryłowicz, require that only animate nouns were capable of assuming the ergative-case function. Unlike these so-called 'classical' theories of PIE ergativity, Shields's proposal includes a class of inanimates which could be marked for the ergative—a class of 'natural agents' like wind; and Kuryłowicz's hypothesis also assumes 'that the neuters did have an ergative case, which survives on them—as on other nouns—in the form of the genitive and other oblique cases' (Rumsey 1987: 24). Rumsey notes that ergative constructions are rarely unexceptional within languages of this type; instead, such languages show case-marking

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[5] Such endorsement of the typological plausibility of reconstructions is by no means universal. Dunkel (1981: 568–69), for example, maintains that reconstructed systems should not be subject to typological evaluation; rather, 'the proper course is to confidently accept the results of the comparative method, and to enter them into the typological data bank' (emphasis original).

splits between the ergative and the nominative–accusative type which conform to a universal hierarchy identified by Silverstein (1976):

1st/2nd-Person Pronouns > 3rd-Person Pronouns > Proper Nouns > Humans > Animates > Inanimates.

According to Silverstein's Hierarchy, 'if a language has ergative–absolutive case marking for some NP type, it also has ergative–absolutive case marking for all types which are lower on the scale' (i.e. to the right) (Rumsey 1987: 27). Since the 'classical' theories of Indo-European ergativity assume that ergative–absolutive marking was manifested in human and animate nouns but not in inanimates (these nouns were never marked with the ergative case), Rumsey (1987: 34) concludes that they are typologically untenable and that only the hypotheses of Kuryłowicz and Shields 'are typologically quite acceptable'.[6] Orr (2001: 424, cf. Trask 1979: 391–5, 399), however, rightfully points out that Silverstein's Hierarchy applies only to Type A ergative languages, not to Type B, which represent 'another type of split ergative [. . .] based on the *tense/aspect of the verb* [italics original]'. This fact opens up 'other possibilities for reconstructing ergativity for IE', in Orr's view.

A final illustration of the potentially significant evaluative role of typology in reconstruction concerns Aristar's assessment (1996) of Kuryłowicz's (1964: 190–97) positing an etymological affinity between the dative and locative cases of Proto-Indo-European. According to Kuryłowicz (1964: 190), the dative is 'genetically nothing else than an offshoot of the locative used with personal nouns'. His theory is based largely on formal similarities between reconstructed dative (*-ei) and locative (*-i) suffixes in addition to the alternation of the dative and locative in historical Indo-European dialects, with the locative form being assigned a dative function with personal nouns, and the appearance of new dative markers from locative forms in these dialects (cf. French *á*, with allative/locative and dative value). Aristar (1996) confirms the plausibility of Kuryłowicz's reconstruction (which is largely an internal reconstruction of comparatively reconstructed forms) through a careful and thorough typological analysis of data from a large number of languages, including those from Australian, Eurasian, and Amerind stocks. He concludes (p. 221): 'Though the evidence I have presented here does not prove that Kuryłowicz was correct, it does suggest that his hypothesis is typologically quite plausible.'

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[6] Rumsey (1987: 34–5) expresses reservations about these two remaining proposals supporting Indo-European ergativity, but these reservations arise 'for strictly comparative reasons'.

3. LINGUISTIC TYPOLOGY AS A METHODOLOGICAL ADJUNCT IN THE RECONSTRUCTION PROCESS

In addition to its role as a largely evaluative measure for the plausibility of reconstructions obtained from traditional methodology, linguistic typology has been employed by historical linguists as an integral part of the reconstruction process itself. This use has been especially evident when traditional reconstruction methodology cannot be routinely applied to a body of data. An important case in point involves the reconstruction of syntactic patterns in proto-languages. Although 'opinions are sharply divided concerning whether syntax is reconstructable by the comparative method' (Campbell 1998: 242), many (perhaps most) historical linguists are sceptical about comparative syntactic reconstruction because genuine correspondence sets—at the centre of phonological, morphological, and lexical reconstructions—are lacking.[7] Meillet (1967: 45–6) long ago pointed out that 'it is not with similarity of forms that we work when we compare languages of the same family but solely with rules of correspondence'. Jeffers and Lehiste (1982: 120) therefore observe:

In syntax[,] there does not exist a finite set of sentences occurring in a finite set of discourses that might serve as the basis for the establishment of correspondence sets. In syntax, only patterns can be compared, and patterns, in general, do not evolve the way sounds do. There is no series of one-to-one correspondences between the syntactic patterns of a language and the syntactic patterns of that language at some earlier point in its history, as there is for the sounds of a language between any two stages in its history. A straightforward transfer of the principles of the comparative method to the reconstruction of syntax is consequently quite difficult.

Anttila (1989: 257–63) provides an excellent extended discussion of the limitations of the comparative method to syntactic reconstruction, although he himself objects to the inclusion of typological insights in the process.

In an effort to overcome such reservations about conclusions drawn from comparative syntactic reconstruction, Lehmann (1974) turned to the typological insights provided by Greenberg (1966c) as a means of reconstructing the syntax of Proto-Indo-European. Greenberg (1966c) posited 45 morphosyntactic implicational universals whose status critically involved the ordering of subject, verb, and object sentential elements. Once Lehmann (1974) established through analysis of clause structures in the earliest attested Indo-European languages that Proto-Indo-European must have

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[7] Watkins (1976: 314), for example, asserts that syntactic reconstruction can and should utilize comparative methodology. He maintains that for correspondence sets one should employ the 'expression of similar thematic contexts in cognate traditions. Put another way, if we want to know how the Indo-Europeans talked, it can be useful to consider what they talked about.' Using insights from tagmemic analysis, Costello (1982, 1983) also argues that comparative methodology can be used to recover prehistoric syntactic patterns.

exhibited an OV word order typology,[8] he utilized the implicational structural patterns which correlate with this typology to draw conclusions about other aspects of Indo-European syntax. For example, on the basis of consistent OV typology, he (1974: 125) assumes an original postverbal position for the negative markers of the proto-language and derives common preverbal and sentence-initial patterns of the historical dialects 'from a late placement rule'; moreover, he (1974: 65) ascribes to Proto-Indo-European relative clauses preposed to the noun they modify and lacking a relative marker. Despite the potential significance of such proposed applications of typological insights to the reconstruction process, Lehmann's methodology has been subject to much criticism. Jeffers (1976) points out that analyses such as those for negative and relative clause structures are simply not supported by comparative data. Additionally, he argues that 'certain of Lehmann's claims about word order in the dialects are highly exaggerated. In early Greek, for example, the basic word order is not OV, as he claims. [...] Greek allows, perhaps, the greatest freedom within IE in the position of major sentence constituents' (p. 983). In this regard, apart from the Greek evidence, Lehmann is prone to use poetic and formulaic texts which frequently attest atypical syntactic patterns.[9] More fundamentally problematic, 'Lehmann's method for reconstruction [...] demands, at least as a working hypothesis, that the proto-language be considered typologically consistent'; and such consistency—even by his own admission—is 'an unrealistic assumption' (p. 987). Similarly, according to Jeffers, Lehmann's method 'is circular. [... A] construction in Latin or Germanic (be it productive or relic) is archaic, non-innovative, and demands no synchronic explanation, if only it is consistent with OV typology. At the same time, these very constructions are said to argue for the OV character of PIE' (p. 987).

Hawkins (1979, 1983) further notes that Lehmann's methodology, based on the simple correlation of verb placement and other morphosyntactic patterns, assumes that languages undergoing word-order changes will become typologically inconsistent as they evolve in the direction of the new word-order typology, and that the attempt to reintroduce consistency constitutes an explanation of subsequent linguistic changes. He (1979: 623; cf. 1983: 59–132) argues for the reformulation of Greenbergian implicational universals through 'the use of multi-valued correlations. Instead of correlating just two properties with one another, as Greenberg generally does (if a language has some single word order P, then it also has some single word order Q), Hawkins's statements involve at least three properties: e.g. if a language has some word order P, and if it has word order Q, then it will also have word order R'. On the basis of such reformulations, Hawkins (1979: 620) is able to account for (predict) apparent typological inconsistencies as permissible variants within universal patterns, and to demonstrate that at all stages of

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[8] In Lehmann's opinion, the position of the subject is irrelevant to the typology.

[9] Analyses similar to that of Lehmann produced at this time are proposals that Proto-Indo-European had an SVO dominant word order (Friedrich 1975) and a VSO dominant word order (Miller 1975).

development languages 'remain consistent with synchronic universal implications', i.e. they follow what he calls the Universal Consistency Hypothesis.[10] When Hawkins applies his reformulated implicational universals to early Indo-European dialects, his findings are borne out, although his reformulations admit greater complexity in the co-occurrence of syntactic structures. Since the earliest Indo-European dialects 'are fairly evenly divided among certain variation types' (Hawkins 1979: 630), it is difficult to determine the original pattern, but as Hawkins argues (p. 631), 'whichever variation type is chosen as the prototype should be that which is most compatible with all the subsequent variation'. He refers to this principle of choosing a prototype as the Logic

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[10] The application of word order typology to linguistic reconstruction has obviously engendered a secondary question of interest to historical linguists: what processes bring about changes in word order typology during the course of linguistic evolution? As Hawkins (1983: 232) points out, for a number of scholars—including Lehmann (1973, 1974, 1978c) and Vennemann (1972b, 1974a, 1974b, 1975), who attempts to capture generalizations among Greenberg's implicational universals of linear ordering by positing two broad linguistic types (operand–operator (head–adjunct) and operator–operand (head–adjunct))—historical word order changes are viewed 'as gradual, goal-directed movements from one word order type to another. [...] A change in type is "triggered" when a language evolves a word order inconsistent with that of its [...] [primary type, i.e. OV/VO or operand–operator or operator–operand], and consistency is then reintroduced by acquiring the chain of implicationally dependent word orders consistent with the serialization of the trigger word order'. Hawkins (1983: 234–5) maintains that such 'trigger-chain theories', as he calls them, 'are unworkable and internally contradictory' for a number of reasons, including the fact that the statistical implicational universals that constitute triggers can theoretically initiate change in the direction of opposite typologies. That is, if a language has a feature which is characteristic of OV typology and another feature which is characteristic of VO typology, either feature can trigger change in its direction. Therefore, trigger-chain theories explain nothing about causation. (See Hawkins 1983: 234–45 for a detailed critique of trigger-chain theories.)

Hawkins (1983: 242) does note that 'one can accept proposed explanations for a change in verb position, without accepting that the new verb position acquires the status of a trigger, converting inconsistent word orders into consistent ones', and that 'the explanations offered for [such] word order change are various': language contact, competing word orders in matrix and relative clauses, analogical extensions of postverbal adverbials and prepositional phrases, and perceptual difficulties precipitated by preposing of relative clauses in SOV languages. All of these explanations are viable, although it can be difficult to identify a particular causation in a particular circumstance. The potential of multiple explanation is quite familiar to historical linguists (cf. Shields 1992: 1 and Thomason 1993). However, Hawkins (1983: 243–4) rightfully notes that synchronic typological theory can at least define the boundaries of how changes in word order typology proceed or how likely certain changes are to occur. Thus, the Universal Consistency Hypothesis is able to constrain successive stages of change; and the Principle of Cross-Category Harmony, which 'asserts [...] that there is a quantifiable preference, across languages, for the ratio of preposed to postposed operators within one operand category to generalize to the other operand categories' (Hawkins 1979: 644–5), provides insight into the likelihood of changes in word order (see Hawkins 1983: 251–60). Clearly, predictions of this kind 'need to be borne out by empirical historical investigation' (Song 2001: 310), but Hawkins's framework represents a useful paradigm within which to develop and refine specific diachronic theories. The application of Hawkins's approach within historical linguistics has been deterred by the popularity of yet another framework within which to view syntactic change: the theory of parameter resetting devised by David Lightfoot and based on Noam Chomsky's universal grammar (cf. Lightfoot 1999, 2003: 495–500).

of Competing Variants Principle (1983: 265).[11] In his view, a pattern of co-occurrences containing prepositions—not postpositions—would be the most consistent with all the universal implicational types attested in the early Indo-European dialects, since even those early dialects which show postpositions (Tocharian, Sanskrit, Hittite) 'exhibit only those noun modifier co-occurrences which are also found in prepositional languages' (Hawkins 1983: 267). Therefore, his conclusion (1979: 631), on distributional grounds, is 'that the chances that PIE was an SOV language are less than 1 in 10' (only 8% of surveyed SOV languages are prepositional). Similarly, he (1983: 272) demonstrates that SOV word order 'is compatible neither with all nor with only' the implicational co-occurrence patterns involving adjective/noun and genitive/noun constructions in the early Indo-European dialects, while 'VSO is compatible with all and only the IE noun modifier co-occurrences [. . . and] SVO is compatible with all, but not only, the IE noun modifier co-occurrences'. Hence, he asserts (p. 273) that 'the implicational evidence [. . .] supports the distributional evidence that PIE had either VSO or SVO, but not SOV'.

Hawkins's refinements of the application of word order typology to syntactic reconstruction have had significant ramifications for Indo-European historical linguistics, giving such methodology greater viability and support within the scholarly community. Indeed, although most certainly not endorsing Hawkins's views on the typological reconstruction of syntax, Hock (1992: 118, n. 1) at least acknowledges that his criticisms of 'reconstruction and syntactic typology' are directed at the approach pioneered by Lehmann, not at Hawkins's 'very different approach, attempting to refine Greenberg's correlations'. However, Hawkins's conclusions have not been without their critics. Dryer (1988: 195, 206), for example, demonstrates convincingly with evidence from a sample of 316 languages that 'there is no correlation between the order of object and verb and the order of adjective and noun', and that Hawkins's Principle of Cross-Category Harmony, which predicts such a correlation based on head/dependent order, was devised from a sampling error attributable to Greenberg. Although Hawkins's formulation correctly predicts genitive/noun and relative/noun order in relation to verb/object order, Dryer (1988: 191) maintains that the failure of the Principle of Cross-Category Harmony to draw accurate inferences about adjective/noun and verb/object orders requires its replacement by the Branching Direction Theory, whereby

languages tend toward consistent left-branching or consistent right-branching. That is, languages tend toward one of two ideals, one in which branching categories *precede* nonbranching categories, the other in which branching categories *follow* nonbranching categories (Dryer 1988: 191; emphasis original)

(but see Song's chapter, this volume). The lack of correlation between adjective/noun and verb/object orders is thus a function of the fact that adjectives are non-branching, unlike genitives and relatives, which are branching. Moreover, the trend among historical linguists to deal with syntactic change from the viewpoint of child language acquisition via Universal Grammar and its parametric settings (see Lightfoot 1999) has limited the impact of Hawkins's work today.[12]

More recently, Indo-Europeanists, through work pioneered by Gamkrelidze and Ivanov (1995) and extensively developed by W. P. Lehmann (1995, 2002), have witnessed the application of another typological scheme to the process of syntactic reconstruction: that of Klimov (1977, 1983). According to Klimov, it is not the word order of a clause but what Nichols (1992: 8) has called the 'conceptual cast of a language's predications and its categorization of basic nominal and verbal notions' that is the most important basis for syntactic classification. In Klimov's typological scheme, there are four basic linguistic types: the accusative, which grammatically marks subject–object relationships; the ergative, which grammatically marks agent–object relationships; the active (or stative-active), which grammatically marks active/inactive or animate/inanimate nouns and verbs and generally pairs them in clause structure; and the class, which is 'based on referential properties of nominals and [has] well-developed gender or class inflection' (Nichols 1992: 8). Each type has associated with it an array of morphosyntactic phenomena. Employing a methodology reminiscent of word order typology reconstruction, Gamkrelidze and Ivanov (1995) identify a number of stative-active characteristics in early Indo-European dialects or in the traditionally reconstructed proto-language (e.g. pairs of nouns for such items as 'fire' and 'water' which can be viewed as dynamic or static entities; underdeveloped plural category in nouns; formal similarities between perfect and middle verbal paradigms, implying a common stative origin, as compared to the present–aorist paradigm, representing an original active inflection); and after ascribing this typology to the earliest reconstructable Proto-Indo-European, they use it to explain subsequent evolutionary developments. W. P. Lehmann (1995), for example, devises a unified explanation of apparently disparate data from the conjugations of Germanic languages

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[11] Hawkins (1983: 262) points out that the selection of a prototypic variant is 'based on an inferencing procedure' which 'draws on [. . . other] reconstruction criteria as well', including age (the older the daughter language, 'the more it is considered to approximate to the proto-language'), quantities (the more broadly a feature is attested, the more likely it can be ascribed to the proto-language), geographical location (contact with other languages may logically explain features of certain daughter languages), and proto-language consistency (the variant ascribed to the proto-language 'must be consistent with other properties that are independently reconstructable for the proto-language').

[12] Roberts (1993) is a useful attempt to integrate typological and parametric approaches to syntactic change. Hawkins himself has shifted his research focus away from issues of linguistic change. As Aitchison (2003: 742) observes, 'Hawkins's later work has less to say about how any changes are implemented. [. . . H]e has moved from proposing mechanisms for change to more general claims about why languages are the shape they are, which he relates to processing needs.' Some historical linguists have interpreted such developments quite negatively in terms of applications of typology to syntactic reconstruction. Fortson (2004: 140), for example, asserts that 'this approach (often called the typological approach) has led to an intellectual dead end'.

(e.g. the weak preterite, the present–preterite verbal paradigm, and the special character of the sixth and seventh classes of strong verbs), based on the assumption that the underlying typology of earliest Indo-European was active-stative, although Sihler (2004: 215, 217) maintains that Lehmann's evidence could 'have cropped up in the Indo-European languages as innovations, that is, they are not clues to history', and that 'loose ends abound', that is, counterexamples can easily be cited.

The typological studies of Klimov play a central role in another kind of methodological adjunct to the reconstruction process formulated by Nichols (1992). A major interest of historical linguists in recent years has been the establishment of macro-families through the identification of distant linguistic relationships. The best known of these macro-families are the Nostratic (embracing perhaps Indo-European, Afrasian, Elamo-Dravidian, Kartvelian, Uralic-Yukaghir, Altaic, Chukchi-Kamchatkan, Gilyak, and Eskimo-Aleut; cf. Bomhard 2002: 22) and the Eurasiatic (embracing Indo-European and the latter five groups; cf. Greenberg 2000: 2). Of course, these proposed macro-families are extremely controversial, since the time depths at which their proto-languages existed are great indeed, in the range of 20,000–15,000 years BC. Although the focus of comparative methodology is the reconstruction of proto-languages by means of regular correspondence sets of cognate forms supplied by related languages, the establishment of regular correspondence sets themselves in comparative methodology can be used as an indicator of linguistic relatedness. In other words, because the comparative method derives proto-forms from regular correspondences among cognates of related languages, the derivability of regular correspondence sets from assumed proto-forms can establish genetic relationships among the languages providing the cognates. It is widely, but by no means universally, assumed that such use of comparative methodology to establish genetic relatedness is limited by the fact that 'the comparative method when applied at time depths greater than its cut-off point of some 8,000 years gives no way of choosing between competing claims of relatedness', including the claims of relationship or no relationship among languages (Nichols 1992: 5–6). In short, beyond 8,000–10,000 years, too many changes have accrued to establish correspondence sets with any kind of certainty (see esp. Ringe 1995). However, Nichols (1992), combining linguistic typology and population genetics into an approach which she calls 'population typology', devises an analytic procedure whereby one can establish genetic and/or areal connections among linguistic groups at huge time depths, 30,000–60,000 years in her view. Surveying the distribution of twelve features of stative-active languages, according to Klimov's 'contentive' typological scheme (e.g. inclusive/exclusive pronominal distinction, SOV word order, alienable/inalienable possession distinction), in eight genetic stocks and nine areal groups, in addition to their overall morphological complexity, Nichols (1992: 11) quantitatively 'tests for correlations among alignment [accusative, ergative, or stative-active constructions], morphological marking type [head-marking, dependent-marking, or a mixed type], morphological complexity, and word order [SOV, etc.] as well as correlations between these and the other categories' within these genetic and areal linguistic communities. For each of the four primary criteria, she identifies three variant types and assigns each language investigated to a type based on

attested structural features. Some of the types are widely evident throughout an area with no relationship to genetic affiliation, while other types are correlated with genetic stock independent of area. Thus, alignment remains constant through time within genetic stocks; but word order typology correlates with area, not genetic affiliation. Although Nichols's methodology does not posit particular genetic relationships, it provides a means of assessing the significance of structural parallels between languages or groups of languages which are being considered as possible members of a common genetic stock. Similarities in alignment features, for example, are suggestive of ancient genetic affiliation, whereas similarities in word order are a much less reliable predictor of genetic relationship because they correlate instead with areal diffusion. The application of Nichols's approach to the verification of proposed macro-families has been limited, in part because of its speculative nature and in part because proponents of macro-comparison are generally satisfied that comparative methodology can be utilized at time-depths beyond 8,000–10,000 years (cf. Manaster Ramer, Michalove, Baertsch, and Adams 1998: 66–7 and Bomhard 2002: 17). Still, Donald Ringe, a noted opponent of macro-linguistic comparison (e.g. Ringe 1995b), sees promise in Nichols's work as 'a method that is likely to give nice, rigorous judgments on long-range comparisons' (Ringe 1995a: 26).

The richness of Nichols's findings extends beyond their role as a methodological adjunct in macro-linguistic comparison. The fact that word order typology is an unreliable indicator of genetic relatedness means that historical linguists

must therefore be cautious in attributing a particular word order to a proto-language or pre-language merely because it is present in later reflexes. On the other hand, the fact that alignment features appear to be genetically but not necessarily areally stable (that is, related languages are likely to retain the same alignment in spite of areal influences) should mean that the presence of a particular alignment type in daughter languages is a more reliable indicator of the type to be postulated for the proto-language. (Fox 1995: 297)

In this regard, population typology itself becomes another means of evaluating reconstructions devised through other methodologies.[13]

4. LINGUISTIC TYPOLOGY AS A PRIMARY SUBJECT MATTER OF HISTORICAL LINGUISTICS
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In addition to its evaluative and accessory roles in historical linguistics, linguistic typology is and has for some time been a primary subject matter of the field in the sense of what Fox (1995: 194) calls the identification of 'laws of language

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[13] Nichols (1992) also provides insight for historical linguists regarding the diffusion of linguistic features and the migrations of early human populations. See Song (2001: 312–17) for an excellent discussion of such contributions to the field.

development', i.e. the general principles that characterize the operation of linguistic evolution. Weinreich, Labov, and Herzog (1968: 183) emphasize that a central issue of historical linguistic theory is indeed the 'constraints problem', the determination of 'the set of possible changes and possible conditions for change'. For some time now, historical linguists have concerned themselves with identifying such 'natural' principles of linguistic change. Kuryłowicz (1945–9) and Mańczak (1958, 1978b), for example, proposed universal developments in the evolution of morphological structures. Such dicta of theirs as 'a bipartite morpheme tends to take over from a simple isofunctional morpheme; that is, the composite form prevails' (e.g. German *die Baume* 'the trees' > *die Bäume*) and 'zero endings are replaced by full endings more commonly than the converse' (e.g. English *word* 'words' > *words*) are common fare in even introductory courses in historical linguistics (cf. Collinge 1995: 249–53). In keeping with such interests, today within historical linguistics, a great deal of research is being devoted to understanding grammaticalization processes, 'the way grammatical forms arise and develop in space and time' (Heine 2003: 575). Although 'grammaticalization is frequently described as leading from lexical to grammatical (= functional) categories […] grammatical forms themselves can, and frequently do, give rise to even more grammatical forms' (Heine 2003: 575). Moreover, the study of grammaticalization processes also concerns the regular phonological changes which grammaticalized morphemes frequently undergo and the subsequent morphosyntactic developments to which these morphemes and the categories they express are subject (cf. Campbell 1998: 238–41). In short, grammaticalization involves 'an evolution whereby linguistic units lose in semantic complexity, pragmatic significance, syntactic freedom, and phonetic substance' (Heine and Reh 1984: 15). The connection between grammaticalization theory and historical linguistics was inherent in the famous slogan of one of the modern pioneers of such study: 'Today's morphology is yesterday's syntax' (Givón 1971: 12). Most certainly, Givón's views of grammaticalization embody a distinct historical perspective. The recently published *Handbook of Historical Linguistics* (2003), which promises to be a classic reference work, devotes no fewer than three major articles of over 70 pages to the topic of grammaticalization. In recent years, numerous specific 'pathways' which grammaticalization can take have been identified by researchers (see Heine 2003: 578 for an excellent summary). For example, case suffixes typically arise from the grammaticalization of postpositions; iterative aspect markers, from verbs meaning 'turn' or 'return'; quotative particles, from the verb 'say'; locative constructions, from body-part terms; and third person pronouns, from demonstratives. Once such 'diachronic laws' are established, they too can serve as a useful tool in the reconstruction of earlier stages of a language. Shields frequently utilizes 'diachronic laws' in his reconstructions of Proto-Indo-European. For example, on the basis of typological evidence that markers of the dual number category typically originate in the grammaticalization of the numeral 'two' (cf. Corbett 2000: 267–8) and that the word classes most likely to

mark the dual are personal and demonstrative pronouns (cf. Croft 1990: 100), Shields (2004) is able to ascribe the origin of the Proto-Indo-European dual to the grammaticalization of *de- 'two' and its variant *du-, which were affixed to first and second person personal pronouns—a development attested directly in Germanic (cf. e.g. Old English *wit* 'we two', *git* 'you two' < *we-de, *yu-de (with analogical replacement of the root vowel)) and Baltic (cf. e.g. Lithuanian *vèdu* 'we two', *jùdu* 'you two' < *we-du, *yu-du). He also suggests that the dual suffix *-e of demonstratives and nouns (cf. e.g. Greek *patére* 'two fathers', Sanskrit *māta-ra-* (in compounds) < *mātere 'two mothers' (cf. Bammesberger 1982: 245)) may represent a phonologically eroded form of *de 'two' (Shields 2004: 25–6). Likewise, on the basis of Jurafsky's finding (1996: 562) that 'a large number of diminutive morphemes develop historically from a word meaning "child" or "son" by way of the process of grammaticalization', Shields (2000) proposes that the nominal suffix *-lo-, which is traditionally reconstructed as an Indo-European diminutive marker (cf. Gothic *barnilō* 'little child'), may derive from the grammaticalization of the ancient etymon of the Hittite word for 'son'— DUMU-*la*. Although Hittite attests the root of this archaic word as a phonologically undecipherable logogram, the element -*la* is clearly represented by a syllabic sign.

Of course, the grammaticalization process would have resulted in this content word undergoing phonological erosion and semantic fading as it became an affix according to the 'universal path' (Bybee, Perkins, and Pagliuca 1994: 14) inherent in Jurafsky's 'panchronic law'. (Shields 2000: 140)

Finally, Shields (1995) utilizes a typological insight about the emergence of gender categories in explaining the appearance of the feminine gender in Proto-Indo-European. The late emergence of the feminine is suggested by such data as its absence in Hittite, an archaic Indo-European dialect. The relevant typological insight is that gender 'classification starts with the demonstrative and only sometimes ends up in the noun' (Greenberg 1978b: 80). After accounting for the development of a demonstrative in *sā- (cf. Sanskrit *sā*) through the contamination of the deictic/demonstrative stems *se- and *ā-, Shields (1995: 106) derives its specifically feminine value from the fortuitous homophony of its final element and the *-ā of such inherently female nouns as *gʷenā 'woman' (cf. Greek *guné*, Gothic *quinō*). That is, '*sā- was morphologically reanalyzed as a deictic/demonstrative with female reference and with a concord relationship (anaphoric and attributive) to nouns in *-ā' (Shields 1995: 106). This typologically based proposal incorporates the insight of Karl Brugmann (1897) that a reanalysis of the element *-ā of nouns like *gʷenā is important to the emergence of the feminine gender; however, it affords the demonstrative its proper central role in the process of creating the feminine gender category. Once again, however, caution must always be exercised in the application of panchronic laws of linguistic change because of the ambiguities inherent in the linguistic data themselves. Joseph (2003: 486–7) cites the case of the

potentially erroneous application of the well-known development of reduced (weak) forms of pronouns from unaccented strong pronouns (e.g. English *him* > *'im* [əm]) to the appearance of the weak third person plural form *'em*. Although *'em* appears to show an origin parallel with that of *'im* (from the strong form of third person plural *them*),

such is not the case, however, for *'em* represents a continuation of the Old English accusative pronoun [*hem*], but *them* is a borrowing from Scandinavian, replacing the native English pronominal form. The borrowing has created a synchronic situation that looks like the result of grammaticalization, yet the history is quite different.

In the final analysis, the exploration of linguistic prehistory is always a speculative enterprise.

5. CONCLUSION

Although an important multifaceted role for linguistic typology within historical linguistics is now firmly established, differences of theoretical opinion remain among historical linguists regarding how current typological formulations are to be applied to the prehistoric linguistic structures posited by historical linguists. According to Janda and Joseph (2003: 21–2), there are two schools of thought. The first

views typological gaps as constituting an interim report suggesting but not demonstrating the systematic absence of some phenomenon (or, conversely, the presence of some negative constraint). On this view, any qualitatively unique linguistic element or structure newly proposed for some language(s) is viewed with suspicion—since it has the defect of lacking independent motivation—but it is not treated as *a priori* impossible.

Support for this position comes from the observation that 'our knowledge of the world's languages is still fairly limited'. Since its inception, the field of linguistic typology has witnessed numerous revisions (and the abandonment) of proposed generalizations; and such developments promise to continue. Therefore, a typologically aberrant reconstruction may simply be so rare that it has not been observed instead of its being impossible (Hock 1991: 618). In contrast, the second—'absolutist'—position 'is tempted either to reject unique phenomena, almost out of hand [. . .], or to reanalyze each of them as a marked variant of an existing (more robustly motivated) phenomenon' (Janda and Joseph 2003: 21–2). Although the latter position has been adopted by such important scholars as Winfred Lehmann, Thomas Gamkrelidze, Vjačeslav Ivanov, and Joan Bybee (cf. 1988: 376), the non-absolutist application of linguistic typology to historical linguistics continues to predominate today.

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CHAPTER 26

LINGUISTIC TYPOLOGY AND LANGUAGE CONTACT

MARIA KOPTJEVSKAJA-TAMM

1. LANGUAGE CONTACT

As Thomason (2001a: 2) puts it, '[i]n the simplest definition, language contact is the use of more than one language in the same place at the same time' and, in the non-trivial sense, the term refers to contact situations in which at least some people use more than one language and where communication between speakers of different languages is necessary. A traditional view, akin to the ideology of linguistic typology, focuses primarily on language contact as 'the interplay of two or more linguistic systems. Research into language contact examines the potential consequences of this interplay in usage patterns as in the structure of language' (Matras

2001: 1). Of particular interest for the present volume are language contact phenomena, i.e. the 'different structural outcomes in the languages involved' in contact (Myers-Scotton 2002: 4), stretching from possible combinations of the elements from, say, two different languages (codes) in bilingual speech to the long-term consequences of bi- and multilingual encounters (contact-induced language change or interference).

The traditional niche for studies on language contact has been within historical linguistics, where contact is often invoked as a cause for linguistic change, especially when the change can be difficult to explain on a language-internal basis, and in particular when it obscures similarities among genetically related languages.

This chapter will focus on two domains in which linguistic typology and language contact can be related to each other: cross-linguistic research on contact-induced change and research on areal phenomena. Bilingual speech, code-mixing and code-switching, which have in recent years received steadily increasing attention in research (e.g. Myers-Scotton 2002, Muysken 2000), contact languages, and other domains where typology and contact linguistics have common interests will unfortunately be left out for considerations of space.

2. CROSS-LINGUISTIC RESEARCH ON CONTACT-INDUCED CHANGE

2.1 Introduction

According to Weinreich (1953: 86), the ultimate goal of research on contact-induced change, or on linguistic interference in his terminology, is '[t]o predict typical forms of interference from the sociolinguistic description of a bilingual community and a structural description of its languages'.

Let us take a hypothetical example: the emergence of the linguistic phenomenon X in a language A. The questions of general linguistic interest here could be as follows:

(a) Language contact as possible source: Can X arise due to contact-induced change at all?
(b) Correlations with other linguistic properties: Can this change affect any language, or is it restricted to a particular structural type of language (non-isolating languages or languages with a particular basic word order, etc.)? If this change in A is due to its contacts with B, are there any special structural properties in A that favour this process and any special requirements on the

initial congruity between the two languages? Can this change occur in isolation; i.e. is it possible that the emergence of X in A is the only change induced in it by the contacts with B, or does X's emergence imply any other particular changes in A due to the contacts with B?

(c) Correlations with other phenomena: to what extent is the emergence of X in A dependent on other factors, for example, on the sociolinguistic setting in which the contacts between A and B have taken place? and

(d) Predictability: Given the structural properties of A and B, is it possible to predict that A will develop X, and if not, why?

These core problems of contact linguistics, in fact, require systematic cross-linguistic comparison in the spirit of typology, which, in one of its main definitions, 'is the study of linguistic patterns that are found cross-linguistically, in particular, patterns that can be discovered solely by cross-linguistic comparison' (Croft 1990: 1). Outcomes of language contact (general restrictions on them, factors responsible for them, and their predictability) provide an excellent object for cross-linguistic research. The rest of this section will evaluate to what extent cross-linguistic research on contact phenomena lives up to the standards of the typological enterprise in general, which does not normally limit itself to discovering patterns, but also tries to find reasonable language-internal and language-external explanations for them.

2.2 Some useful distinctions

The prototypical contact-induced change, often called 'interference' (Thomason 2001a), involves direct importation or transfer of linguistic features from one language to another, with various possible modifications of the imported feature during this process. In borrowing situations, speakers maintain their native language but incorporate into it features of another language. A group of speakers can also shift to another language, which involves imperfect learning of the target language and the gradual spreading of the concomitant errors to the target language as a whole (shift-induced or substratum interference; see Thomason and Kaufman's influential book, 1988, for the various interference types). Johanson (2002: 8) proposes 'code copying' as the superordinate term, with 'adoption' and 'imposition' as two main types thereof.

Many contact situations, however, do not easily fit into this simple dichotomy: for example, linguistic exogamy, typical in the Vaupés multilingual region (Aikhenvald 2002) and in certain parts of Northern Australia (Rigsby 1997), whereby children always grow up with at least two languages—the language of the surrounding community and their mother's language. Various contact areas and languages bear traces of complex processes: the so-called Uzbek dialects of Northern Tajik (Iranian) are based on Turkic varieties with heavy borrowing from

Iranian, on Iranian–Turkic substratum varieties, as well as on various combinations of the two (Johanson 2002: 69).

Thomason's (2003: 688) definition of contact-induced change as any linguistic change 'that would have been unlikely, or at least less likely, to occur outside a specific contact situation' includes also more indirect change, for example, change appearing 'at a late stage of a chain-reaction process in which an initial instance of structural transfer sets off a series of other changes' (Thomason 2003: 688) and more or less covered by Heine and Kuteva's (2005) notion of contact-induced grammaticalization.

Some contact-induced changes do not change the typology of the receiving language, in that they either fit into the existing pattern or are too minor, while others do. Thomason (2001b) suggests further distinguishing between immediate and delayed contact-induced typological change, even though we normally have too little historical evidence for attributing a particular change to one or the other category. On the whole, non-typological vs. typological contact-induced changes are not always clearly opposed to each other, in that the former can gradually lead to the latter. Thus, contact-induced changes in the frequencies of distribution of the previously existing phenomena within a language (e.g. in the preference for a particular word order variant in a language with free word order) can pave the way for changes in its typological profile (e.g. the establishment of one basic word order).

2.3 Generalizations on contact-induced change

It is common to distinguish between direct transfer, or replication of phonetic substance—form and form–meaning units—and structural replication, sometimes called 'grammatical calquing', 'loanshift', and 'structural borrowing' (cf. 'direct diffusion' vs. 'indirect diffusion' in Aikhenvald 2002: 4, and 'replication of linguistic matter' vs. 'pattern replication' in Matras and Sakel 2007b). Johanson (2002: 9) distinguishes between global copying, whereby a language copies a whole 'block of material, combinational, semantic and frequential structural properties', and selective copying, where a language copies only selected properties of a block.

Curnow (2001) lists many different types of language units that can be transferred from one language to another, from phonetics and phonology via lexical and grammatical form and meaning to position of morphology (i.e. linear order of morphological elements), syntactic frames (e.g. alternation between various kinds of objects to a verb), clause-internal syntax, between-clause syntax, discourse types, and discourse organization. A possible addition to the list is contact-induced grammaticalization (Heine and Kuteva 2005).

Outcomes of language contact depend on linguistic factors (the nature of the linguistic phenomena involved and the degree of initial similarities between the languages in contact, or typological distance) and non-linguistic factors (type of interference, primarily borrowing vs. shift; an enormous complex of factors

subsumed under the cover term 'intensity of contact', cf. below; and types of groups involved, including speakers' attitudes). All this makes contact-induced change, in principle, unpredictable.

A widely discussed issue is whether different structural properties of languages vary in their propensity to be affected by contact-induced change. There is a long tradition of formulating general constraints as hierarchies, which primarily concern borrowing to the exclusion of shift-induced change, and primarily borrowing of form–meaning units (words and morphemes). It is generally held that borrowing and shift-induced change proceed differently, in that borrowing starts with the lexicon while shift-induced interference normally starts with phonology and syntax.

Muysken (2000: 74) summarizes some of the earlier suggestions concerning the relative ease with which words of different lexical categories can be borrowed: nouns > adjectives > verbs > prepositions > co-ordinating conjunctions > quantifiers > determiners > free pronouns > clitic pronouns > subordinating conjunctions. Moravcsik (1975: 110) suggests several constraints on borrowing, with the most general restriction formulated as 'no non-lexical language property can be borrowed unless the borrowing language already includes borrowed lexical items from the same source language'. Some of her other generalizations include borrowing of free morphemes before bound morphemes and derivation before inflection. In general, therefore, less tightly structured features are easier to borrow than features included in highly integrated closed structures.

Thomason and Kaufman (1988, later Thomason 2001a) postulate that anything can, in principle, be borrowed, but most probably in a certain order. The linguistically based order is correlated with the sociolinguistically based scale in intensity of contact, which is dependent on:

length of time—enough time for bilingualism to develop and for interference features to make their way into the borrowing language; many more source-language speakers than borrowing-language speakers; and either socio-political dominance of source-language speakers over borrowing-language speakers or intimate contact in mixed households and/or other social settings. (Thomason and Kaufman 1988: 72)

Thomason and Kaufman's (1988: 74–5, modified in Thomason 2001a: 70–1) 'borrowing scale' suggests the following broad categories:

(1) casual contact: lexical borrowing of non-basic content words;
(2) slightly more intense contact: borrowing of function words (e.g. discourse markers) and non-basic vocabulary, and minor structural borrowing;
(3) more intense contact: basic as well as non-basic vocabulary borrowed, moderate structural borrowing (e.g. word order, syntax of coordination and subordination; borrowed inflectional categories and affixes may be added to native words);
(4) intense contact: heavy lexical and structural borrowing.

Languages in contact can sometimes become structurally very similar to each other without sharing much of their vocabulary, which thus contradicts Moravcsik's and Thomason and Kaufman's hierarchies (the fact mentioned in Thomason 2001a). This kind of wholesale 'semantico-syntactic borrowing' has been termed 'metatypy' by Ross (e.g. 2001). Ross's own example is the restructuring of the Oceanic (Austronesian) language Takia after the model of its Papuan neighbour Waskia (both spoken on Karkar Island off the north coast of Papua New Guinea). Takia is Oceanic in its lexicon and in its bound morphology, but follows Waskia in phrasal and clausal syntax and in semantic organization, so 'that equivalent lexical items in Takia and Waskia have the same range of meaning, closed sets of morphemes have similar membership and semantic structure, and complex lexical items, whether compound words, phrases, or larger formulae[,] have been reformulated so that their component morphemes are the same as their Waskia equivalents' (Ross 2001: 144). Similar cases of a high degree of 'translatability' between languages are reported, for example, for the Indian village of Kupwar, where Urdu (Indic) and Kannada (Dravidian) are being remodelled mainly on the basis of Marathi (Indic) (Gumperz and Wilson 1971); for Tariana (Arawak), spoken in Brazil and remodelled on the basis of East Tucanoan (Aikhenvald 2002); and for the Australian Aboriginal languages of Princess Charlotte Bay on Cape York Peninsula (Rigsby 1997). Metatypy seems often to presuppose a high degree of bi- and multilingualism among the members of a group, with one variety being the 'in-group variety', peculiar to the group and normally emblematic of its speakers' identity, whereas 'out-group varieties' are used for external communication. A high degree of emblematicity lies behind the speakers' attitudes towards borrowing of forms, which is considered inappropriate; semantico-syntactic features, arising due to intensive contact, are less 'visible' for such attitudes and get more easily adopted.

In general, replication of linguistic matter and pattern replication are not straightforwardly correlated with each other: pattern replication does not presuppose replication of linguistic matter, even though the latter can lead to pattern replication. Relatively little has been suggested on potential ordering within pattern replication and on direct transfer of phonetics/phonology, which is fully understandable: imported lexical units and morphemes are much more easily recognizable than replication of either just form or just structure. One exception is Ross (2001, partly followed by Haig 2001), who suggests that semantic reorganization precedes restructuring of syntax, which proceeds from sentences to clauses to phrases to word-internal features. A similar scenario has been suggested in Stolz and Stolz (1996) for borrowing in general, based on the diffusion of Spanish conjunctions and discourse particles across the Mesoamerican languages.

It is generally held that borrowing is facilitated if the two languages are typologically similar or congruent to each other (cf. Thomason 2001). Haig (2001) shows that among the East Anatolian minority languages, Laz (Kartvelian) is in general much more influenced by Turkish than the Iranian languages, with certain dialects

(Ardeşen Laz) showing a complete restructuring of the nominal case system according to the Turkish pattern. Haig attributes this difference to a greater degree of initial structural compatibility between Turkish and Laz than between Turkish and Iranian languages. He adds, however, that inherited Iranian structural features are not obstacles to Turkish influence in an absolute sense, since Iranian–Turkic contacts elsewhere (e.g. Tajik-Uzbek; see below) have resulted in significant contact-induced change (see Johanson 2002 for examples). 'Typological distance' should probably be understood in a local sense, applying to particular linguistic domains rather than to languages on the whole: what counts in the Laz–Turkish example is the earlier existence of a nominal case paradigm in Laz vs. the absence of such in the Anatolian Iranian languages.

Another potential factor is 'markedness': typologically marked properties have sometimes been considered more difficult to borrow (similarly to the additional efforts they require in second language acquisition). Linguistic markedness has unfortunately been used in many different senses, for example, 'complexity', 'difficulty' and 'abnormity', or 'rarity' in various manifestations (see Haspelmath 2006). What should count for contact-induced change is the difficulty of a linguistic phenomenon rather than its rarity, which is not necessarily linked to it, as is sometimes assumed (see 3.3); evaluation of difficulty needs comparative psycholinguistic research, including research on second language acquisition. Taking this perspective, Johanson (2002) suggests several properties of linguistic expressions— for example, analytic constructions and easily recognizable, straightforward relationships between content and expression—that can make them particularly 'attractive' in language acquisition, contact-induced change, and other types of language change. Thus, Turkic agglutinative morphology has facilitated the borrowing of Turkic case suffixes into Northern Tajik (Iranian).

The contrast between Northern Tajik and the Iranian languages in Anatolia shows that the outcomes of language contact, even in situations that are comparable in terms of the origin and structure of the languages involved, can differ vastly. This diminishes the possibility of evaluating the role of structural factors in contact-induced change, in particular, the role of typological distance between the contacting languages.

2.4 Systematic cross-linguistic research on outcomes of language contact

Ideally, a desideratum for generalizations in historical linguistics will be the possibility of evaluating various linguistic phenomena according to the following criteria (see Nichols 2003):

- likelihood of inheritance;
- likelihood of acquisition via borrowing;

- likelihood of acquisition via substratal effects;
- likelihood of 'spontaneous' development (due to universals, considerations of markedness, etc.).

It is unclear to what degree this desideratum is achievable at all (see 3.2 for a couple of suggestions by Nichols herself). In Haig's (2001: 215) words, '[t]he literature on language contact is littered with disproved and discarded "structural universals of borrowing"'. However, what counts more is not the exceptions, but how well-founded the generalizations are to begin with.

A general problem here is the relative paucity of systematic data on 'borrowability', even with respect to the so-called 'basic vocabulary'. Consider the case of personal pronouns that are generally considered to belong to 'basic vocabulary', since they normally constitute a tightly structured closed paradigm deeply integrated into the language system. Thomason and Everett (2005) provide examples of borrowed personal pronouns in various languages. Many of them come from the languages of South Asia and the Pacific, where the pronouns often constitute more open systems than in familiar European languages, in that there may be dozens of pronouns for, say, 'I' and 'you'. As argued by Thomason and Everett, it is ultimately social factors rather than linguistic ones that determine whether personal pronouns will be borrowed or not.

Wichmann and Wohlgemuth (2008) is an example of a systematic cross-linguistic investigation on lexical borrowability. It is an overview of structural patterns involved in the transfer of a verb from one language to another based on 60 languages in 72 source–recipient combinations. Two of these patterns require additional markers for accommodating loan verbs into the recipient language— either a light verb (e.g. Turkish *isole etmek* 'to isolate, insulate', from French *isoler*) or an affix (e.g. *-ov* in Russian). Some languages allow loan verbs to be 'plugged' directly into their grammar (e.g. in borrowings by various Germanic and Romance languages from English), whereas in some rare cases, the verb is borrowed along with significant parts of the source language's verbal paradigm (e.g. in borrowing by Northern Russian Romani from Russian). This classification reminds one of Muysken's (2000: 184–220) overview of verbs occurring in bilingual speech, and partly runs counter to Moravcsik (1975), according to whom verbs cannot be borrowed as verbs (without any additional accommodation). Wichmann and Wohlgemuth suggest that the choice among the patterns depends both on the structural properties of the languages involved and on areal and sociolinguistic factors. Further research is needed for elaborating on these interactions and for understanding what lies behind the frequent use of 'indirect' borrowing strategies. As Curnow (2001: 416) notes, it is not always clear how a particular instance of non-borrowing (or, rather, of non-straightforward-borrowing) should count: 'a lack of borrowed "verbs" may simply reflect the tendency of verbs to be more often

inflected in language than nouns, or it may reflect the relative conceptual difficulty of borrowing a word for an action rather than a concrete object.'

Systematic cross-linguistic research on borrowability and on contact-induced change in general, accomplished according to the usual standards in typological investigations, should be based on maximally possible cross-linguistic identifiability and comparability of the investigated phenomena. For instance, different subclasses of nouns, verbs, adpositions, etc. obviously vary in their susceptibility to borrowing, and a reasonable comparison should break these classes into much smaller, homogeneous subclasses. An excellent illustration of this is found in Matras (1998), which discusses the borrowing of conjunctions (a subclass of discourse markers) across various contact constellations and suggests a tentative hierarchy {'but' > 'or' > 'and'} as well as an explanation for the hierarchy and for the special status of discourse markers based on language processing in bilinguals.

Two recent projects will hopefully be ground-breaking in systematic cross-linguistic research on borrowability: the project on 'Loanword Typology: toward the comparative study of lexical borrowability in the world's languages' at the Max Planck Institute for Evolutionary Anthropology (coordinated by Martin Haspelmath and Uri Tadmor, http://wold.livingsources.org), and the project on 'Grammatical Convergence and Linguistic Areas' at the University of Manchester (coordinated by Yaron Matras with Jeanette Sakel as research assistant: http://www.llc.manchester.ac.uk/research/projects/lcla). Each of the projects builds on collaboration with experts on about 40 genetically, typologically, areally, and sociolinguistically diverse languages who provide systematic data, both on lexical borrowing and borrowing in all areas of grammar and on the social and cultural setting in which the relevant language contact has taken place (Matras and Sakel 2007a, Haspelmath and Tadmor 2009).

An example of a grammatical phenomenon known to diffuse via language contact is evidentiality, which is an areal property of several well-established areas (Aikhenvald 2004). However, as mentioned above, the majority of the earlier suggested generalizations on copying have concerned, first, borrowing (rather than shift-induced interference) and, second, borrowing of form-meaning units, while generalizations on other types of phenomena are meagre. One obvious reason—and probably the main one—for this is the lower degree of certainty in the attribution of such phenomena to contact. Consider the initial stress in Latvian, which is considered to be due to Finnic influence, as opposed to the mobile stress of its relative, Lithuanian. However, partial stress reduction is attested even in those dialects of Lithuanian where the Finnic influence is doubtful. And certain facts within the Latvian system point to a gradual accent shift that might be accounted for by language-internal factors (see Koptjevskaja-Tamm and Wälchli 2001: 638–9 for details). The potential 'conserving effect' of contact on the retention of a certain phenomenon in a language is another problem for separating contact-induced phenomena from others. Historical linguistics currently holds that many linguistic phenomena have multiple

causes—both internal and external (contact)—and that contact-induced change is in many cases an 'extension' of language-internal phenomena (compare the recent suggestions for mechanisms of contact-induced grammaticalization and of pattern replication in Heine and Kuteva 2005, and in Matras and Sakel 2007b). This makes systematic research on contact-induced phenomena, outside of the form–meaning units, a very complicated enterprise, for which evidence should come from different sources. In the next section, we will look at several approaches to these issues within what has been called 'areal typology'.

3. AREAL TYPOLOGY

3.1 Areal linguistics vs. areal typology

Contact-induced change normally involves importation of features from one language to another. As a result, two or more languages can gradually become quite similar to each other or converge (in the literature, convergence sometimes refers to all such cases—e.g. Johanson 2002, Aikhenvald 2002: 6—but sometimes only to 'reciprocal' assimilation, to the exclusion of unidirectional change; Thomason 2001a: 262).

Linguistic features may often diffuse across several languages, with convergence being particularly spectacular when manifested by a group of languages within a geographical region—a Sprachbund or a linguistic area, a notion or perhaps two closely related notions that have been extensively discussed and criticized (see Campbell 2006 for a recent overview of the issue). Diffusion of structural features across linguistic boundaries, identification of convergence areas, and, in general, similarities between geographically contiguous languages have been traditional concerns of areal linguistics, which acknowledges the importance of typological considerations, in particular, for evaluating suggested isoglosses (cf. Masica 1976, Campbell, Kaufman, and Smith-Stark 1986, Campbell 1996).

Within modern typological research, the counterpart of areal linguistics is a relatively new but rapidly developing discipline of areal typology, whose concern is 'the study of patterns in the areal distribution of typologically relevant features of languages' (Dahl 2001: 1956). Areal typology has a noticeable change of focus compared to 'traditional' linguistic typology, whose primary goal consists of describing and explaining (im)possible cross-linguistic variation in general and in using these results for getting insights into possible vs. impossible human languages. Areal typology holds that it can be of limited value to search for a possible human language without simultaneously investigating its genetically and

areally determined manifestations and trying to uncover the possible historical reasons behind this variation. The important impetus for the emergence of areal typology as a separate direction within typology came, probably, from Dryer's (1989, 1992) studies of word order, Nichols's (1992) book on linguistic diversity, and the first large-scale collaborative project with an explicit areal-typological orientation, EUROTYP.[1]

3.2 Areal typology from the macro-perspective

Starting with Greenberg's work in the 1950s and 1960s, the primary motivation for doing typology has been to discover linguistic universals and to suggest explanations for them, such as various universal functional preferences. Since typological research is of necessity confined to a subset of the world's languages, much intellectual energy in the discipline has been put into discussions of sampling, with a view to unveiling 'non-accidental', linguistically motivated tendencies and minimizing the risk of accidental, i.e genetically and areally skewed, distributions of linguistic properties.

In contrast, both Dryer's (1989, 1992) and Nichols's (1992) investigations, based on large global samples of languages, bring some of the skewed distributions of linguistic properties to the fore and try to make sense of them. Their main method of discovering areal and genetic skewing is by having separate calculations for the whole sample and for the subsamples, each representing one of the predefined sub-areas or genetic groupings, 'area-by-area' and 'family-by-family' statistics. In the research referred to here, the sub-areas are defined so as to achieve the maximal independence from each other and basically to coincide with, or to be comparable to, the continents (see Bakker, this volume).

One of the main lessons from Dryer's numerous publications on word order (e.g. 1989, 1992) is that some of the 'classical' word order correlations (such as the relationship between object–verb and adjective–noun word order, or the division of languages into the 'typical' OV vs. VO languages) are an artefact of the earlier samples underlying them. 'Typical' OV languages are mainly found in central Eurasia, a large area extending 'from Turkey to Japan, and from south India to northern Russia to Siberia' (Dryer 1989), where the languages share several other striking similarities, often puzzling historical linguists, and which had earlier been viewed by Masica (1976) as a linguistic area.

Nichols (1992) aims at putting linguistic typology into a broader perspective of population sciences, for example, population biology and population genetics,

which analyze variation within and between populations of organisms and use the results for describing evolution. Viewing typology as a population science means shifting typology away from defining 'possible human language' and instead pursuing generalizations about the world's languages. (Nichols 1992: 2)

Nichols investigates the patterning of several features across the world's languages and uses statistical tests for checking emerging correlations that hold for the entire sample or only for some of its areal and/or genetic subsamples. This procedure is intended to distinguish among the main determinants of linguistic patterning: universal preferences, genetic stability (stability of a property within a family), and areal stability (consistency of an area with respect to a property). Thus, accusative alignment and verb-final order emerge as unmarked, most frequent, and therefore universal preferences; head/dependent marking has the greatest autonomy and the greatest ability to predict other features (e.g. alignment and word order), while alignment has the greatest genetic stability. In a later programmatic paper, Nichols (2003) evaluates several features with respect to their propensity to be inherited, acquired by borrowing or via substratum effects, or to develop spontaneously (by universal preferences). SOV word order is high on all criteria, while V-first word order and ergativity are low on most criteria, probably apart from substratum effects. There are, however, certain cases where ergativity seems to have developed due to language contact. Mithun (2005) suggests an interesting scenario for the development of the ergative pattern in three small American Indian language families of the Oregon Coast (Alsea, Siuslaw, and Coosan), with the main conclusion that what diffuses is probably not the category of ergativity itself, but rather the circumstances leading to its development (e.g. extensive use of passive constructions).[2]

Areality is omnipresent in Nichols's (1992) book, in that all the features in the sample show a large-scale geographical component to their distribution. Several properties show a pronounced east–west directionality (e.g. both inclusive/exclusive oppositions and inalienable possession are much more frequent in the New World and in the Pacific than in the Old World). Nichols's interpretation of skewing in the distributions of patterns is exciting and has far-reaching consequences. Thus, universal patterns are believed to pertain to human language on the whole. Other distributional patterns reflect the spread of languages after the end of glaciation, driven by economic and political prestige in connection with the rise of complex societies and large-scale economies (e.g. the spread of a single structural type—verb-final, dependent-marking, and accusative alignment—over most of Eurasia). Finally, global clines and features with macro-areally skewed distribution reflect human expansion between 30,000 and 60,000 years ago, 'out of the Old

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[1] The title of Haarman (1976), 'Aspekte der Arealtypologie: Die Problematik der europäischen Sprachbünde', probably contains one of the first attestations of the term 'areal typology'. Haarman's research, however, is quite different from what is currently meant by areal typology.

[2] In several articles, Mithun shows that some of the other properties suggested by Nichols as indicative of deep genetic relations are highly areal; e.g. agent/patient (a subtype of active), hierarchical systems, and head/dependent marking (Mithun 2007, 2008a, b, forthcoming).

World tropics to colonize Europe, inner Asia, New Guinea-Australia, and the New World' (Nichols 1992: 275). Obviously, the distinction between genetically determined and contact-induced similarities at such time depths becomes difficult to maintain (cf. Shields, this volume).

Since the 1990s, typology has been experiencing a growing interest in the global distribution of linguistic properties, in the issues of universal areality, and in the general tendency of many linguistic properties to cover large adjacent areas.

First of all, there is by now a steadily increasing number of large-scale cross-linguistic investigations of many different linguistic domains. Especially instrumental in stimulating, promoting, and systematizing such research has been the *WALS* project with its 142 chapters (Haspelmath, Dryer, Gil, and Comrie 2005) covering a broad range of phenomena within the 'core interest domains' of typology—phonology, morphology, and syntax, with lexicon, as usual, represented more modestly—and a few fresh additions (sign languages, writing systems, and paralinguistics). The enterprise, involving more than 50 linguists from many countries, is a milestone in general typology and also in areal typology, in spite of some of its drawbacks, including a low degree of language overlapping across the different chapters, lack of agreement in the criteria for classification and use of terms across some of the chapters, and a certain amount of oversimplified classifications, necessitated by the format of the book. The other impressive enterprise worth mentioning here is AUTOTYP (http://www.uni-leipzig.de/~autotyp/), an international network of typological linguistic databases, administered by Balthasar Bickel and Johanna Nichols and largely inspired by Nichols's earlier work. It is a large-scale research programme involving various thematically specific projects (e.g. grammatical markers, verb agreement, NP structure, word order, word domains), each of which uses a series of data and definition files linked together relationally.

Second, it is becoming more and more evident that cross-linguistic research needs good statistical methods for identifying and (dis)proving distributional universals vs. accidental distributions. The growing awareness of these needs and of the limitations posed by the nature of the investigated objects has been debated in the recent typological literature (e.g. Maslova 2000), while at the same time, more sophisticated statistical methods are making their way into cross-linguistic research in general and into discussions of universality vs. inheritance vs. areality in particular (cf. Janssen, Bickel, and Zúñiga 2006 and the *WALS*-based statistical experimenting on distributions of linguistic variables in Cysouw 2008).

Third, Nichols's work has inspired a lot of research on language 'diversity'. 'Diversity'—both genetic diversity ('the number of discrete lineages and the extent to which individual lineages have branched out', Nichols 1992: 232) and structural diversity ('the amount of disparity exhibited by a language or population of languages', Nichols 1992: 237)—is an important notion for Nichols. In connection with its uneven distribution over the world, Nichols identifies two recurrent types of areas, where

an area has to do with groups of contiguous languages as defined by a geographical, cultural/historical, and linguistic context. A residual zone (e.g. the Caucasus) is a dense grouping of genetically and structurally diverse languages in a sizeable area with ongoing accumulation of languages, increasing diversity (both genetic and structural) over a considerable time-depth, no lingua franca for the whole area, and no centre of innovation, whereas a spread zone (e.g. the Western Eurasian Steppe) combines relatively rapid language spread, language succession, and low genetic and structural density over some sizeable area. This distinction has obvious geographical correlates: mountains vs. plains, low vs. high latitude, coastal vs. island areas, high vs. low precipitation, 'colonized' areas vs. the Old World.

The uneven distribution of linguistic diversity of various kinds across the world, the different types of areas, and possible factors underlying or correlating with them have become a salient focus of interest in a number of studies. All of these topics are relevant to issues of typology and language contact inasmuch as they try to suggest and evaluate different scenarios for possible interaction among languages (e.g. Nettle's (1999a) calculations showing that the relative language diversity across the world is interlinked with society, economy, and ecology). In some studies, the connection to typology and contact is straightforward; thus, Dahl (2008) calculates the 'typological distance' across a subset of the *WALS* languages, i.e. the proportion of linguistic features where these languages have different values in the *WALS*. This method allows him to evaluate relative linguistic diversity across large areas, with the result that the languages in Mainland Southeast Asia are extremely similar to each other, the Americas and Australia come up as very diverse, and those in Papua New Guinea are modestly diverse. While the former result *per se* is hardly new (see Enfield 2005 on the Mainland Southeast Asia area), the contrast between Australia and Papua New Guinea is somewhat less expected. The distinction, according to Dahl, depends on the difference in the socio-geographical setting of the two groups of languages: the indigenous languages in Australia (and, with a few exceptions, in the Americas) are spoken in small communities in areas that are, or have until recently been, extremely sparsely populated, while those in Papua New Guinea are spoken in a relatively small and densely populated area. These differences lead to a high degree of language contact and a considerably high degree of linguistic convergence in the Papuan languages. Thus, the relative structural homogeneity of the Papuan languages, mainly spoken by horticulturalists, appears to be the other side of its language diversity.[3]

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[3] The following explanation for the Papuan language diversity, given in Nettle (1999: 74), implies, however, that structural diversity and language density should go hand in hand: 'In New Guinea language groups are very small because people's primary social networks are very small and localized. Secondary networks exist but are not an important enough part of people's lives to cause linguistic convergence. Groupings larger than the household are formed and maintained by ritual and exchange and seem to be motivated at least partly by the need for defensive alliances. Basically, however, the small extent of primary social networks is a product of the ecology of New Guinea: continuous rainfall

To conclude, the large-scale cross-linguistic research in recent years constantly confirms that linguistic properties are hardly ever evenly distributed across the languages of the world, and tries to use these skewed distributions as evidence for language contact and genetic relatedness at different historical depths. Breathtaking as many of these hypotheses are, they still remain hypotheses. As Thomason (2001a: 95) writes, a 'solid case' for contact-induced change requires that we identify a source language for the shared property and prove that the shared feature was not present in the receiving language(s) before it/they came into close contact with the source language, which did have this feature before the contact. For many contact situations, the last two requirements will probably never be satisfied. From this point of view, the areal-typological research on Europe and the Mediterranean region, discussed in the next section, has been in a particularly favourable position, given the relatively long documented history of many of their languages and the long tradition of descriptive and historical research on them.

3.3 Areal typology as a combination of micro- and macro-perspectives

Although typological considerations have long been present in traditional areal linguistics (see esp. Masica 1976), the research programme 'Typology of Languages in Europe' (EUROTYP) was in many respects ground-breaking in its explicit goal of combining areal and typological methods. EUROTYP, funded by the European Science Foundation (ESF) 1990–94, brought together more than 100 linguists from more than 20 European countries and the USA, and covered nine focal areas of research: pragmatic organization of discourse (Bernini and Schwartz 2006), constituent order (Siewierska 1998a), subordination and complementation, adverbial constructions (van der Auwera 1998), tense and aspect (Dahl 2000a), noun phrase structure (Plank 2003a), clitics (van Riemsdijk 1999), actancy and valency (Feuillet 1998), and word prosodic systems (van der Hulst 1999); cf. Haspelmath (1998). One of the original goals of the programme was 'to provide new insights into the specific properties of European languages and thus contribute to the characterization of Europe as a linguistic area (Sprachbund)' (König 1998: vi). The methods for working towards this particular goal differed grossly across the thematic groups on the whole and across the different researchers, but EUROTYP gave rise to several systematic investigations devoted to the distribution of various typologically

makes for continuous food production through the year, which in turn allows great self-sufficiency.' This explanation cannot be completely true, given the generally acknowledged fact that a large portion of New Guinean communities have seen language as highly emblematic but simultaneously place a high value on multilingualism, which favours metatypy (cf. 2.3) and thus supports Dahl's calculations. This example shows that great caution should be taken when trying to find a rationale for statistical observations on languages.

relevant linguistic properties both within Europe and, in comparison, between Europe and the rest of the world. Its general spirit and much of its methodology have been inherited by the two more local projects zooming in on two coastal areas on the European periphery: the circum-Baltic languages (Dahl and Koptjevskaja-Tamm 2001a) and the Mediterranean languages (Ramat and Stolz 2002).

Haspelmath (1998) provides a systematic account of eleven—cross-linguistically infrequent—syntactic features that distinguish the core European languages ('the Standard Average European languages' or SAE) from neighbouring languages, for example, a high frequency of definite and indefinite articles, have-perfects, dative external possessives, comparatives involving particles, verb fronting in polar questions. He then discusses the question of the historical circumstances behind these similarities, going through various scenarios against what is known about the temporal distribution of the SAE features. The most plausible scenario is that most of these features arose due to contact during 'the time of the great migrations at the transition between antiquity and the Middle Ages', but even here, the conclusions remain tentative.

Koptjevskaja-Tamm and Wälchli (2001) consider many potential areal features in the circum-Baltic area, both at the micro-level—by giving a detailed analysis of these phenomena, much in the spirit of dialectology, linguistic geography, historical linguistics, and traditional areal linguistics—and at the macro-level—by plotting the same phenomena against global and European cross-linguistic backgrounds, which both prove to be useful. Thus,

- some phenomena found in the circum-Baltic area are fairly infrequent cross-linguistically, e.g. the case alternations for marking 'total' vs. 'partial' objects or the complex morphosyntax of numeral constructions in Finnic, Baltic, and parts of Slavic;
- some phenomena found in the circum-Baltic area are fairly infrequent globally but relatively frequent in Europe, e.g. flexible SVO-order, comparatives involving particles, verb fronting in polar questions. And finally,
- some phenomena found in the circum-Baltic area are fairly frequent globally but infrequent in Europe, e.g. different markers for the 'instrument' and 'comitative' (cf. Russian *igrat's rebenkom* 'to play with a child' vs. *rezat'nožom* 'to cut with a knife'), predicative possession not based on 'have'-verb.

The results show that the circum-Baltic region forms a border zone between the Central Eurasian languages and the Standard Average European languages, that the highest concentration of typologically unusual areal properties is found in the eastern part of the region, and that the isoglosses pick up different subsets of the languages, in many cases also extending outside the circum-Baltic area proper. These results agree with what we know about the geographical, historical, cultural, and linguistic context of the area, which has witnessed intensive linguistic contact but has never been united. In this area, convergence 'reflects language contacts [sic] of groups of people and maximally, of two or three languages. Convergence that

comprises more than two or three languages, it seems, is always the result of the overlapping and superposition of different language contacts' (Koptjevskaja-Tamm and Wälchli 2001: 728).

The time period since the 1990s has seen several studies that in one or another way apply an areal-typological approach to specific areas and/or specific areal phenomena (Aikhenvald and Dixon 2001, Bisang 1996, Ramat 1998, Enfield 2003, 2005, Heine and Kuteva 2005, Matras, McMahon, and Vincent 2006). An optimal research strategy for an areal-typological characterization of a specific geographical region has the following desideratum:

- a systematic and detailed description of particular linguistic domains across as many language varieties in the region as possible, carried out with minute attention to the details in variation, and a resulting microtypology capturing both the essential linguistic similarities and differences among the language varieties under consideration, as well as the distribution of the types across the region;
- an evaluation of the microtypology against a broader typological background (e.g. a comparison with the global distribution of the same types); and
- an explanation for the observed similarities among the languages of the region, taking into account their linguistic, socio-political, historical, cultural, anthropological, and geographic setting.

Leaving the last step aside, let us look at some points where micro- and macro-perspectives on areal phenomena can complement each other.

3.3.1 Classification

Typological classifications are normally fairly subjective and done with a specific agenda in mind. Classifications of linguistic phenomena done for the purposes of large-scale typology are therefore not always optimal for the purposes of isogloss hunting on a lesser scale. Several kinds of problems can be discerned here. First, there is normally very little argumentation in typology about the rationale for 'lumping' phenomena into one category or for 'splitting' them into several categories. Large-scale typological categories can thus be too broad for identification of a specific contact phenomenon, which would require a finer degree of granularity. Consider the typology of predicative possession in Stassen (2005b), with five broad types: among others, Have-Possessives (built on the transitive verb 'to have') and Oblique Possessives (where the possessed NP functions as the subject of the sentence, while the possessor appears in some oblique form). As Stassen notes, this latter category could further be subdivided into the Locative Possessive ('A book exists at/on me') and the Dative Possessive ('A book exists to me'), but this is not done in the WALS. A large portion of European languages (including the SAE, Lithuanian, and most Slavic languages) has Have-Possessives, and western and central Europe is the core area of Have-Possessives in the world. Many Eurasian (including Uralic) and Northern African languages have Oblique

Possessives, and in Europe, this pattern is found in Finno-Ugric, and within the Indo-European, in the Celtic languages, Russian, and Latvian. 'Have'-verbs across Indo-European languages derive from different etyma and are thus an innovation, whereas Indo-European most likely had an Oblique Possessive. Following the broad classification in the WALS, all the Oblique Possessives in Europe are simply fringe phenomena, leftovers after the convergence of many European languages on Have-Possessives. However, a much more interesting picture emerges when the Locative and the Dative types are distinguished. Russian and the majority of Finno-Ugric languages show the Locative Possessive type, and the Russian construction is most probably a Finnic borrowing. In opposition to this, Latvian and its close Finnic neighbour Curonian Livonian have the Dative Possessive. Since the same type existed in Latin (*mihi est*-construction), Latvian has, most probably, retained the original Indo-European pattern and expanded it under Finnic influence, while the Curonian Livonian construction has, in turn, emerged under Latvian influence (see Koptjevskaja-Tamm and Wälchli 2001: 675–769).

Linguistic phenomena normally lend themselves to multiple classifications. Consider the case of so-called partitive and pseudo-partitive nominal constructions, such as 'a piece of the cake', referring to a part of something, vs. 'a sack of potatoes', indicating an amount of something. These are illustrated for Finnish, Russian, Swedish, and English (in translations) in (1) and (2).

(1) Partitive nominal constructions

    a. Finnish
        pala-Ø   [tä-stä   hyvä-stä   kaku-sta]
        bit-NOM [this-ELAT good-ELAT cake-ELAT]

    b. Russian
        kusok-Ø   [èt-ogo   vkusn-ogo   pirog-a]
        bit-NOM [this-GEN.SG.M good-GEN.SG.M cake-GEN]

    c. Swedish
        e-n   bit [av de-nna   god-a   kaka]
        a-SG.COM bit [of this-SG.COM good-DEF cake]
        'a bit of this good cake'

(2) Pseudo-partitive nominal constructions (PPCs)

    a. Finnish
        säkki-Ø   perun-oita
        sack-NOM potato-PART.PL

    b. Russian
        mešok-Ø   kartošk-i
        sack-NOM potato-GEN

c. Swedish

e-n   säck   potatis
a-SG.COM sack   potato
'a sack of potatoes'

These constructions can be classified in several ways, as, for example, in Table 26.1. Only the first of these classifications puts Finnish and Russian in the same category, which includes many Indo-European languages, and several Daghestanian languages, as well as Finnic and Eastern Sami within Uralic, but the type does not occur in the other Uralic languages and is a fairly unusual option worldwide. This may suggest that the Finnic construction is, at least, partly due to Indo-European influence.

Now, most of the languages in this category mark the quantified nominal with the genitive case or a preposition that makes pseudo-partitive constructions look quite similar to normal possessive NPs (cf. Russian *mešok kartoški*, sack potato: GEN = 'a sack of potato', and *mešok devočki*, sack girl:GEN = 'a girl's sack'). Finnic and Eastern Sami differ strikingly from all these languages in that the quantified nominal is marked with the partitive rather than with the genitive case. However, since the Finnic partitive case and the Slavic and Baltic genitive case share several other important functions, including marking objects and subjects, the Finnic pseudo-partitive constructions are in fact much closer to the Slavic and Baltic ones than what can be seen in any of the above-mentioned classifications (see Koptjevskaja-Tamm 2001 for details and Stolz 2006 for a similar point on classification in (areal) typology).

Table 26.1. Possible ways of classifying partitive and pseudo-partitive constructions in Finnish, Russian, Swedish, and English

	Finnish	Russian	Swedish	English
1. Expression format for the pseudo-partitive construction: juxtaposition vs. overt marker for the quantified nominal	Overt (case)	Overt (case)	Juxtaposition	Overt (preposition)
2. Expression format for the pseudo-partitive construction: similar to vs. distinct from possessive NPs (e.g., 'the sack of the boy')	Distinct	Similar	Distinct	Similar
3. Partitive vs. pseudo-partitive constructions: formally similar vs. formally distinct	Distinct	Similar	Distinct	Similar

3.3.2 Choice of language varieties

Large-scale typology can afford only a small number of sampling points in any chosen area, each of which has to be seen as representing 'an ideal speaker-listener, in a completely homogeneous speech-community' (Chomsky 1965: 3), even though people engaged in typological research will normally be reluctant to admit this and to accept the consequences of such an approach to language. Many languages are normally represented in typological samples by their standard variety, where the setting of norms can be a problem. E.g. as Anderwald and Kortmann (2002: 160) point out, the absence of double negation and the missing personal pronoun for the second person singular are hardly attested in non-standard English varieties, so that 'the standard variety may give us a false picture of what a given language is like in a particular domain of its grammar and may lead us astray when we try to find (natural) explanations for its behavior'. It is also well known within dialectology, and historical and contact linguistics, that language contact is most intensive in border dialects and minor languages—which are often excluded from large-scale typological research. Because of this, the panoramic view of large-scale typology runs the risk of missing areal phenomena (because the sample contains 'wrong' languages) or of 'over-interpreting' clusterings on a map as indicative of contact-induced shared properties.

Consider the order of adpositions and noun phrases. Languages having both prepositions and postpositions without either of them being dominant are cross-linguistically relatively rare (5% in Dryer 2005d). Some of them are found among the Iranian languages, which group areally into the northern, postpositional zone (e.g. Ossetic), often bordering with consistent SOV-languages from other families, the southern, prepositional zone (e.g. Persian), and two zones with mixed adpositions—in the west (e.g. Vafsi, Northern and Western Kurdish) and in the east (e.g. Pashto, Tajik dialects). These latter are 'buffer zones', sandwiched between two consistent adpositional areas, where two opposite isoglosses meet and where the languages adopt different strategies for solving the conflict between them (Stilo 1987). Buffer-zone phenomena of various kinds are well attested. Dahl (2004b) discusses the cross-linguistically unusual, not to say unique, pattern in Swedish definite NPs with attributes that combine a preposed and a postposed article together with the definite form of the adjective (*det stor-a hus-et* 'the big-DEF house-the' for 'the big house'). When seen against the background of the Continental Scandinavian dialect continuum, Standard Swedish appears to be in the buffer zone for two separate grammaticalization processes; the pattern involving postposed articles being already in place when the preposed articles spread from the south with a prestigious Scandinavian variety from Denmark. Normal-size typological samples will most surely miss these kinds of 'small-scale' clines that can sometimes provide clues for understanding cross-linguistically unusual

properties by anchoring them in areal tendencies (see Bisang 2004 for further examples).

Conversely, some areas that, with respect to a particular linguistic property, appear fairly homogeneous in a large-scale typological sample (and thus look like good candidates for convergence areas) on closer inspection turn out to be much more internally diverse. From the European perspective, the clustering of the consistent GN/SVO is found only in Baltic, Finnic and the two Finno-Ugric languages Komi and Mordvin, Swedish, and Danish. The beautiful picture of a compact North European areal phenomenon, to a large extent emanating from Finnic, breaks down when confronted with the impressive diversity in the structure of possessive NPs across the Continental Scandinavian vernaculars. The consistent GN order has, in fact, very few counterparts outside of the standard varieties (cf. Koptjevskaja-Tamm 2006).

3.3.3 Usual vs. unusual shared traits

Explanations for cross-linguistic similarities are particularly called for when the similarities are unique, rare, or at least unusual among the languages of the world. This is an important issue in much of the work of Nichols and Bickel on linguistic prehistory. Likewise, Gensler (1993) identifies a large number of cross-linguistically unusual syntactic parallels ('quirks') in the Celtic and Hamito-Semitic (Afro-Asiatic) languages and uses them as an argument for prehistoric contact, even though a concrete prehistoric scenario is still lacking. Most contact-induced change is, however, not particularly spectacular, and most isoglosses are probably neither unique to an area nor skewed in their distribution so much that they will 'betray' the area in a large-scale sample. Isoglosses rooted in language contact will, thus, often 'stand out' only within a particular area (say, within Europe) but will not necessarily be noticeable from a large-scale typological perspective.

Trying to combine detailed research on a particular area and large-scale typological research is challenging in many ways, and the two approaches have great potential for enriching each other. Large-scale typological research may draw attention to previously unnoticed shared traits among languages. Meanwhile, many linguistic phenomena that either have proved to have exciting areal distribution or are suspected to diffuse easily still await systematic cross-linguistic investigation. These phenomena include discourse organization, lexical organization—including cross-current polysemy patterns (see Enfield's 2003 careful study of 'acquire' in mainland Southeast Asia, Evans and Wilkins' 2000 study of verbs for hearing vs. seeing in Australian Aboriginal languages)—and prosody. Another challenge for typological research in general, and for areal-typological research in particular, would be a systematic exploitation of the insight that frequencies in the use patterns of various phenomena can be a powerful indicator of areal

relationships (see Wälchli 2005 on areality in the frequency patterns of co-compounds across the languages of Eurasia).

4. CONCLUSION

The domains of linguistic typology and language contact are related in various ways. Thus, they both share interest in languages as historical products. Research on language contact (which requires complex expertise) and on typology—in particular, on areal typology—can thus be seen as a window onto the history of language speakers and as:

a valuable opportunity to see language in its larger context, connecting to research in anthropology (ethnographic background, human socio-historical activity), sociology (diffusion of innovation, the micro-macro relation, ethnic identity), and psychology (the dynamic relation between large-scale public conventions and individual mental representations). (Enfield 2005: 198).

In addition, the domains of linguistic typology and language contact share interest in human language as a phenomenon. This interest has been an obvious driving force within typology. Contact linguists have argued that possible outcomes in contact phenomena are 'empirical windows on the structures of the language in general' (Myers-Scotton 2002: 5), or that '[l]anguage contact acts as a natural laboratory of language change where properties may become transparent that are otherwise obscure, and so it may allow deeper insights into the functions of grammatical structures and categories' (Matras 1998: 282). The core questions here are not only which linguistic properties tend to be more easily acquired via borrowing or via shift-effects than inherited, but even more importantly, why this should be so and how this is accomplished (see Matras 1998, 2007, Matras and Sakel 2007b, Ross 2001, Heine and Kuteva 2005 for various suggestions). The ultimate clue to these questions lies in a bilingual speaker who has to act in multilingual settings, and to whom languages are 'components of an overall repertoire of forms, constructions, experience and skills on which the speaker draws in order to communicate' (Matras 2007). Problems of stability vs. borrowability vs. acquisition via shift in various linguistic phenomena thus give researchers a valuable opportunity to test hypotheses on cognitive mechanisms involved in language acquisition and use in general, and on their peculiarities in different types of multilingual speakers.

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CHAPTER 27

LINGUISTIC TYPOLOGY AND FIRST LANGUAGE ACQUISITION

MELISSA BOWERMAN

1. INTRODUCTION

The goal of studying first language acquisition is to determine how children learn to talk and understand, while the goal of linguistic typology is to discover deep regularities in patterns of variation across languages. Despite their different objectives, the two fields have many points of contact.

From the developmental psycholinguist's point of view, an adequate account of language acquisition must explain how children can learn any human language. Linguistic typology alerts researchers to key dimensions of language variation that might make a difference to the acquisition process, and so helps promote explanations that do justice to this diversity. Typology also provides clues to forces that may influence language acquisition. The properties of natural languages are shaped and constrained by the perceptual, conceptual, communicative, and processing capacities of human language users—capacities that young humans share and presumably draw on in working out the structure of the language they hear. So

typology can give rise to testable hypotheses about the acquisition process and suggest possible interpretations of findings.

For linguists, interest in language acquisition is often motivated by the hope that acquisition holds clues to what is most fundamental to language. Children work on language over an extended period of time, and their developmental progressions and typical error patterns could plausibly reveal aspects of the human blueprint for language. For example, children might master cross-linguistically basic (unmarked, prototypical, etc.) elements earlier and with fewer errors than their less basic counter-parts, and errors might systematically deviate toward more basic structures and functions. Information about language acquisition can also help in adjudicating between competing theoretical accounts of adult linguistic knowledge. A linguistic analysis for which a plausible acquisition story can be told—one that is compatible with empirical evidence on order of acquisition and typical error patterns—is clearly preferable to an analysis that flies in the face of such evidence (Hawkins 1987).

For all their points of contact, the relationship between language acquisition and linguistic typology is at best indirect. On the one hand, acquisition is influenced by factors with no necessary bearing on adult language, such as the course of cognitive maturation and the pragmatic priorities of very small children, i.e. the kinds of interpersonal negotiations children want to carry out. On the other hand, wide-spread or universal patterns of adult language do not necessarily stem from deep-seated cognitive or perceptual propensities that toddlers might share; they could instead reflect recurrent environmental or social experiences, or psycholinguistic forces that operate only on fluent discourse between mature speakers (Slobin 1997c). At best, determinants of language structure and determinants of language acquisition overlap only partially, and disentangling them is a complex task.

In this chapter, I examine some ways in which linguistic typology and language acquisition research have come together (see also Slobin and Bowerman 2007). I start with a look at how cross-linguistically oriented language acquisition research has come to share certain core attitudes and methodological preferences with the field of linguistic typology, and then examine some major areas of investigation and key findings.

2. THE RISE OF TYPOLOGICALLY ORIENTED LANGUAGE ACQUISITION RESEARCH

The initial inspiration for the modern study of language acquisition came from Chomsky (1959, 1965), whose work galvanized linguists and psychologists in an era when the reigning theory of learning was behaviourism. According to the

behaviourist model, learning language is just like learning anything else, and is driven by simple and domain-general mechanisms such as imitation and reinforce-ment. Two of Chomsky's critiques of this model were particularly influential. First, he argued, mastering a language is not a question of memorization and small-scale surface generalizations, but entails internalizing a set of highly abstract rules underlying sentence construction. Second, all-purpose learning mechanisms are inadequate for this task; we must assume instead that children are guided by inborn knowledge of linguistic universals.

These proposals spurred a flood of new language acquisition research in the late 1960s and early 1970s, including studies of children learning different languages. The immediate goal of these early cross-linguistic studies was to compare acquisi-tion progressions in various languages, in search of universal features that would provide clues to the human capacity for language acquisition. Empirical general-izations began to appear about the early grammatical rules of children learning English, with a limited amount of cross-linguistic evidence hinting that the ob-served phenomena might be universal (e.g. Slobin 1970). But as work proceeded, it became clear that grammatical development was not going to give up its secrets so easily. Three initially promising hypotheses about early grammars—'telegraphic speech' (only content words, no functors), 'rigid word order' (an initially fixed order of subject, verb, and object, regardless of the flexibility of the input lan-guage), and 'pivot grammar' (a hypothesized simple grammar governing initial two-word combinations)—had to be abandoned. For instance, children learning languages with rich morphological systems, such as Turkish, turned out to use productive morphology already at the one-word stage, and children learning languages with flexible word orders, like Finnish, adopt flexible word order from the beginning (Aksu-Koç and Slobin 1985, Bowerman 1973).

At this point, child language scholars began to diverge along the emerging formal-ist/functionalist split still so characteristic of linguistics today. Followers of Chomsky looked for evidence that children are guided by inborn syntactic constructs and principles ('Universal Grammar', or UG; see Lust 2006 for a useful orientation and a discussion of the UG-style parameter-setting approach to pro-drop and head direction/branching direction, among other cross-linguistic differences). Others took a more learning-oriented tack. Although agreeing with Chomsky that children acquire an abstract rule system, they questioned whether this task required the assistance of innate, specifically linguistic knowledge. Behaviourist learning mechan-isms were not the only alternatives. In the early 1970s, there was a new openness to 'invisible' constructs and strategies which had long been scorned as unscientific. Perhaps children could acquire language without help from innate knowledge if they commanded a richer set of cognitive capabilities than behaviourists had granted them, like concepts, mental representations, communicative intentions, problem-solving strategies, and the ability to formulate and revise hypotheses.

It was in this new, cognitively and functionally minded climate that language acquisition research began to interact with the emerging study of linguistic typology, especially as inspired by Greenberg (1966b) and his followers. Developmentalists had to have a way to disentangle properties of children's early language that are universal—hence, plausibly determined by the basic capacity for language acquisition—from properties that are shaped by the learning environment, and especially by exposure to a language with a specific structure. Typology helped in this effort by orienting researchers to dimensions of cross-linguistic variation that might matter.

Running parallel to the events just described, a sea change was also taking place in the study of phonological development. Here, it was Jakobson (1968[1941]) who provided the initial inspiration, as well as a direct theoretical connection to linguistic typology. According to Jakobson, there is a fundamental discontinuity between children's early babbling and later phonological development: during the babbling period, infants produce a large inventory of sounds, but this inventory is sharply reduced when word learning begins; from there, the child's system of phonemic oppositions unfolds according to strict rules. Further, claimed Jakobson, the rules governing the acquisition of phonology are identical to those governing the phonological structure of adult languages. Jakobson termed these the 'laws of irreversible solidarity'; today, they would be called implicational universals.

These laws set out a universal hierarchy of features arranged in a strict pattern of successive dichotomous branchings based on the principle of maximum contrast, such that the use of a particular contrast presupposes the presence of all the contrasts above it (it is 'marked' relative to these contrasts). For example, the presence of voiced or aspirated stops in either adult or child language implies the presence of voiceless unaspirated stops, and the presence of fricatives presupposes the presence of the corresponding stops; vowels and consonants that are uncommon in adult languages should be among the last to be acquired by children, and they would initially often be replaced by elements above them in the hierarchy. In these claims, we encounter ideas that still influence thinking about the relationship between language acquisition and adult language, for example, the notion of a strict order of acquisition that is predictable from the study of adult languages— e.g. marked forms will be acquired later than unmarked forms—and the hypothesis that features that are rare across languages are more difficult to acquire.

From the late 1960s, researchers working on children's early phonology, like those studying early grammar, began to approach their subject in a new, more empirical way. Instead of testing models based on pre-existing theories like Jakobson's, they began to compare acquisition data directly across a range of languages. Much of this work took place in the context of the Stanford Child Phonology Project (1968–88), a project closely related to the Stanford Language Universals Project associated with Greenberg. The work revealed many deviations from the universals predicted by Jakobson (Ferguson and Farwell 1975); for example, there

was no sharp discontinuity between babbling and early word learning; there were extensive individual differences rather than a fixed order of acquisition of phonemes; and certain phonological patterns that are rare in adult language are common in child language, such as consonant harmony (e.g. /guk/ for 'duck') (see Edwards and Beckman 2008, Kiparsky and Menn 1977, and Vihman 1996 for overviews).

With these empirical outcomes, the 'implicit defining question' began to shift: instead of asking 'What linguistic theory will explain the order in which the various language behaviours develop?', researchers now began to ask 'What behavioral predispositions and abilities does the child bring to the task [. . .] and how does the individual go about solving the articulatory and phonological problems posed by the language to be learned?' (Menn 1983: 45). For phonology, just as for early child grammar, the idea gained force that children actively *construct* their own systems, albeit under constraints set by certain universal phonetic tendencies reflecting the physiology of the vocal tract (Ferguson and Farwell 1975).

In summary, in both grammar and phonology, there have been strong theoretical reasons to look for relationships between the structure of adult languages and children's language acquisition. But as work on language acquisition proceeded, it became increasingly clear that language development is influenced by a wide range of factors beyond those plausibly responsible for shaping adult language structure. How to distinguish these various influences remains a major theoretical challenge.

3. Establishing a framework for comparison: the Operating Principles approach

The initial wave of cross-linguistic research on grammatical development did not reveal invariants of early syntax, as had been anticipated from Chomsky's claims. The invariants that struck researchers instead were conceptual or semantic: all around the world, children's first word combinations revolved around a limited set of relational notions to do with agency, action, location, possession, and the existence, recurrence, nonexistence, and disappearance of objects (Bowerman 1973; Brown 1973; Slobin 1970, 1973). Where did these ubiquitous meanings come from? Nowadays, it is commonplace to trace them to universals of non-linguistic cognitive development, but this was not initially obvious: establishing a guiding role for cognition in early language development was one of the important research outcomes of the 1970s. A new hypothesis, often called 'the cognition hypothesis', arose: that language learning is a process of form–meaning mapping in which

children discover how to communicate by matching basic cognitive concepts established independently of language to the conventional forms of the input language (see Bowerman 2000 for a historical overview).

This hypothesis owed much of its popularity to its consistency with theoretical and empirical work on early conceptual and linguistic development by the Swiss developmentalist Piaget (1954), whose approach was enormously influential at the start of the cognitive revolution. Also important for linguistically minded child language scholars was the substantial overlap between the relational concepts expressed by children's early word combinations, as established by empirical cross-linguistic research, and the concepts Fillmore (1968) had posited as fundamental to syntax in his Case Grammar (e.g. Bowerman 1973). An understanding of the conceptual bedrock for the human language capacity appeared within sight.

The cognition hypothesis was central to the first comprehensive attempt to investigate child language within a cross-linguistic framework: Slobin's (1973) 'Operating Principles' approach. Slobin proposed that the semantic notions expressed in early child language are shaped by cognitive maturation, so they arise in children at the same rate and in the same order all around the world, regardless of the formal linguistic devices used in the local language to express them (e.g. word order vs. case endings for basic grammatical relations). If this is true, argued Slobin, 'we have a powerful research tool for probing the information processing devices used and developed by children to understand speech and to construct grammars' (1973: 187). In particular, we can measure the time lag between children's first often clumsy attempts to express a given meaning and their later mastery of the conventional linguistic form. By comparing this lag across different devices for expressing the same meanings, and by noting characteristic errors, we can also determine what is easy or difficult for learners, and so make inferences about the capacities, strategies, and starting assumptions that children bring to the task.

Using this strategy to compare children learning a wide range of languages (about 40, from fifteen major families, although the data from many of these were very sketchy), Slobin (1973) formulated a set of Operating Principles (OPs) for language acquisition. Arrived at inductively and phrased as self-instructions, the OPs were each motivated by a diverse set of phenomena. Some had to do with semantic coherence: for example, 'The use of grammatical markers should make semantic sense' and 'Avoid exceptions'. Others had to do with the surface forms of utterances: for example, 'Pay attention to the order of words and morphemes' (children make very few ordering errors, regardless of the input language), 'Avoid interruption or rearrangement of linguistic units' (structures requiring these operations give rise to many errors), and 'Pay attention to the ends of words' (children learn postpositions or suffixes to express any given meaning more easily than prepositions or prefixes). Still other OPs—especially as formulated by Peters (1985, 1997)—aimed at explaining how children segment and extract units from the speech stream for further analysis; here, prosody plays an important role.

OPs were seen as instantiations of more general perceptual and cognitive tendencies at work not only in language acquisition but also in language change, language contact, and creolization (Slobin 1977). For example, several OPs promote a one-to-one mapping between units of form and units of meaning, which typologists treat under rubrics like 'iconicity' and 'isomorphism'. Others promote processibility, along lines similar to those pursued in typology by Hawkins (this volume). These OPs were seen as especially important early in language development, as children at first tend away from synthesis, contraction, and deletion, and toward more analytic expressions. For example, an agglutinative system of inflectional morphology like that of Turkish is easier to acquire than a synthetic system like that of Serbo-Croatian (Slobin 1977).

Against the backdrop of the OP approach, Slobin and his associates carried out the Berkeley Four-Language Project, which 'may still be the largest single project aimed at specific typological comparisons in language development' (Slobin and Bowerman 2007: 218; this project is summarized in Slobin 1982). The languages investigated—English, Italian, Serbo-Croatian, and Turkish—contrast along a number of key dimensions: SVO vs. SOV; different degrees of word order flexibility; prepositional vs. postpositional; case-inflectional vs. non-case-inflectional; synthetic vs. agglutinative case inflections; regular morphology vs. various kinds of irregularity. Along with other cross-linguistic work of the same era (e.g. Bowerman 1973 on the acquisition of Finnish), this project established that children can readily acquire either word order or case-marking to express basic grammatical relations; that they adopt the word orders modelled in the input language with no starting preference for some hypothetical 'natural' order; that even before age 2, children learning flexible word order languages like Turkish can manipulate word order pragmatically to focus participants and take different perspectives; and that agglutinative inflections, as in Turkish, are easier for learners than fusional inflections, as in Serbo-Croatian (Slobin 1982).

The OP approach inspired researchers worldwide, fostering both a growing international community of cross-linguistically minded child language scholars and a tremendous amount of new work and theorizing (see Slobin's five edited volumes, 1985a, b, 1992, 1997a, b, on *The Crosslinguistic Study of Language Acquisition*, which describe and compare language acquisition in a wide range of typologically different languages). Although the approach is no longer actively pursued as such (see Bowerman 1985 for a critique of its strong and weak points), its empirical findings and much of its theoretical framework still stand, forming a shared history and set of background assumptions for researchers in this field. Two aspects of the approach are worth special emphasis.

First, the methodological problem that Slobin (1973) tackled in the realm of language acquisition is closely parallel to the one facing linguistic typologists, and he solved it in a similar way (see also Bates and MacWhinney 1982). For typology, the most important prerequisite for cross-linguistic comparison is to be able to

identify the same grammatical phenomenon across languages (Croft 2003a: 13). Structural criteria such as morphology or syntax alone cannot be used to equate phenomena, because languages differ in their application of these techniques. The ultimate solution is to identify a particular semantic/pragmatic/functional situation type, and then compare the morphosyntactic devices used by different languages to encode it (Croft 2003a: 13). Slobin used an analogous strategy in studying language acquisition—holding meanings roughly constant while comparing forms across children learning different languages—and this broke the stalemate of the initial failure to find substantive cross-linguistic universals of early grammatical development, such as fixed word order, and led to more fruitful comparisons.

The second aspect of the OP approach worth emphasizing is its inductivist, empiricist character, along with its orientation to substantial comparative databases. Here again, there is a close parallel to the typological approach to linguistics, as well as a strong contrast with the UG approach. Universals are not what you start out with as hypotheses to support deduction and hypothesis testing; rather, they are what you hope to end up with after careful analysis of data from a suitably large and diverse number of languages. In recent years, the empirically minded approach to language acquisition has, like linguistic typology, been inspired by, and also contributed to, usage-based, constructional approaches to language structure (e.g. Tomasello 1998, 2003a), and has tended to look for explanations of widespread patterns in factors 'external' to language, such as processing strategies, conceptual structure, and interaction patterns.

4. Children's semantic
preparedness for language
....

4.1 Emergent categories

The meanings stressed by early cross-linguistically minded child language researchers were general conceptual notions often discussed by developmentalists, such as 'agent', 'action', 'object acted on', 'location', and 'possessor'. But proposals soon became more specific to language structure. In particular, children's lexical and morphological errors were noted to be surprisingly well motivated, in the sense that they revealed a sensitivity to semantic categories and distinctions that are often important in languages, even if not for the form on which the child errs.

For example, Clark (1976) found striking similarities between children's overextensions of object words—e.g. *ball* for a pincushion—and the semantics of

numeral classifiers in languages around the world.[1] In both, 'objects are categorized primarily on the basis of shape, and the same properties of shape appear to be relevant in acquisition and in classifier systems'—roundness and length above all. Overextension patterns and classifier semantics are similar, hypothesized Clark, because both reflect fundamental properties of the human perceptual system. Parallels were also noted between children's acquisition of words for body parts and typological patterns in the lexical classification of the body (Andersen 1978, Bowerman 1980; see section 6.2.1). Clark (2001: 380) coined the term 'emergent categories' for semantic categories that receive no conventional expression in the target language, but that 'surface fleetingly in children's speech and then vanish again or evolve into something else'.

In some emergent-category errors, children extend forms across semantic boundaries that must be honoured in their own language, but are collapsed in many other languages. For instance, learners of English sometimes overextend spatial morphemes to temporal meanings (e.g. BEHIND *dinner* to mean AFTER *dinner*; *Do we have* ROOM *for*... to mean *Do we have* TIME *for*...) (Bowerman 1982). This is a pattern common in both polysemy and language change (Traugott 1978). Children also overextend the preposition *from*, associated most basically with spatial source, to mark agents of actions (*This fall down* FROM *me*—i.e. 'I dropped it'), possessors (*That's a finger* FROM *him*), and standards-of-comparison (*This ear is longer* FROM *the other ear*) (Clark 2001). The extension of an ablative marker to some or all of these meanings is conventional in many languages. In a third example, children sometimes interchange *make* and *let* in periphrastic causatives (e.g., MAKE [=LET] *me watch it*; *Don't* LET [= MAKE] *me go to bed*) (Bowerman 1978). In many languages, although not in English, there is a single causative morpheme that covers both active (*make*) causation and permissive (*let*) causation (Comrie 1981).

In other emergent-category errors, children sometimes briefly introduce distinctions that are not observed in their own language, but are common in other languages. For example, a learner of English used different adjectival derivations to contrast inherent properties with temporary ones (e.g., *crumb-y* for a crumbly cookie vs. *crumb-ed* for a foot covered with crumbs)—cf. the obligatory choice in adult Spanish between two copulas, *ser* and *estar*, which draw roughly the same distinction (Clark 2001).

As these various examples show, errors of both overextension and category subdivision are often surprisingly 'sensible', and suggest a semantic preparedness for language learning.

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[1] Numeral classifiers are elements that are obligatory in noun phrases in the context of quantifying objects (e.g. counting them or asking how many there are), for instance, 'two LONG.RIGID.CLASS pencil' (= two pencils). These forms often have anaphoric (pronoun-like) uses as well.

4.2 The 'grammaticized portion' of language

Strong claims about children's spontaneous organization of meanings have focused in particular on the meanings learners associate with the 'grammaticized portion' of language, such as case endings, verb inflections, and adpositions. Linguists have often argued that such meanings are special. Talmy (1983, 1988), for instance, proposed that grammatical meanings constitute an innate conceptual framework that scaffolds the conceptual material expressed in the cross-linguistically more variable open-class lexical items. Drawing on Talmy and on data from learners of a wide variety of languages, Slobin (1985c: 1161) argued that children orient toward a universal core set of meanings that are 'privileged' for mapping onto grammatical forms: although the surface forms vary, 'what is constant are the basic notions that first receive grammatical expression'. These 'basic notions', along with the regularities imposed on morphosyntax by the workings of the Operating Principles, meant, according to Slobin, that children's first grammars are essentially alike: they are all variants of a 'universally specified "Basic Child Grammar" which reflects an underlying ideal form of human language' (Slobin 1985c: 1160). A similar hypothesis was advanced by Bickerton (1981), who argued on the basis of creolization studies that children are guided by an innate 'Language Bioprogram' to introduce certain grammatical distinctions into their developing grammars even when these distinctions are not modelled in the input.

A domain of grammatical marking that has received particular attention in work on first language development is the expression of temporal relations. Drawing on research by various authors, Slobin (1985c) argued that the most salient temporal contrast for children everywhere is the distinction between 'result' (punctual, completive) and 'process' (non-punctual, non-completive, ongoing). The evidence is in children's selective collocation of certain temporal markers with verbs expressing certain classes of events; in particular, past tense or perfective forms (e.g. English -ed, Slavic perfective verb forms, Turkish 'witnessed' past -dI, Japanese -ta) with telic verbs like 'break' or 'drop' to comment on an immediately completed event with a visible change of state; and progressive, imperfective, or present forms (e.g. English -ing, Slavic imperfective verb forms, Turkish present tense -Iyor, Japanese -te i-) with atelic, durative verbs to comment on ongoing states of affairs. The result/process distinction is, suggested Slobin, neutral and superordinate to the categories needed for a particular language, such as perfective or preterite, imperfective, progressive, or iterative, but over time it can develop into them. In his Language Bioprogram hypothesis, Bickerton (1981) also stressed certain temporal distinctions as basic to children, although his proposed contrasts were process/state and punctual/non-punctual.

In general, accumulating evidence has favoured the salience of result/process over other temporal distinctions in children's early grammars (Shirai, Slobin, and Weist 1998). But at the same time, there has been a retreat from the claim that this or other

grammatical distinctions are programmed into the learner ahead of time, as opposed to learned on the basis of linguistic experience. There are several reasons for this shift.

One reason is research showing that the meanings of grammatical morphemes are less uniform across languages than had been thought, and that children are far more sensitive to the semantic organization of grammatical meanings in their local language than the Basic Child Grammar hypothesis predicts. Much of this evidence comes from the domain of space, where the meanings of early-learned grammatical morphemes such as English in and on—long assumed to reflect universal concepts such as 'containment' and 'support'—have been shown to be language-specific in both adult language (e.g. Bowerman and Pederson 1992, P. Brown 1994, Levinson and Meira 2003, Levinson and Wilkins 2006) and very early child language (Bowerman and Choi 2001, 2003, Choi and Bowerman 1991; see also section 6.2.3). But also in the domain of tense and aspect, children's use of grammatical markers has turned out to be language-specific. For example, in the early speech of children learning Japanese, just as in adult speech, the durative marker -te i- marks not only progressive aspect on activity verbs but also resultant states on achievement verbs; this is a different notion from the progressive notion marked by -ing in the speech of children learning English. (See Shirai, Slobin, and Weist 1998 and other papers in their special issue for this and further examples.)

Three further sets of findings have undermined the hypothesized role of special grammaticizable meanings in language acquisition. First, it has turned out that the association between tense–aspect morphology and verb classes is present not only in children's speech but also in child-directed adult speech, although less dramatically (Shirai et al. 1998). This suggests that children's usage patterns reflect not built-in semantic biases but rather an ability to pick up on—and a tendency to sharpen—statistical patterns in the input. Second, research on processes of grammaticalization has shown that closed-class forms arise gradually from open-class forms through piecemeal loss of syntactic flexibility, phonological erosion, and semantic bleaching; at any one time, a form may fall somewhere between being fully open and fully closed (Hopper and Traugott 1993). This finding weakens a theory of acquisition that assumes a strict dichotomy between open- and closed-class forms, and that appeals to fundamentally different learning procedures for forms of the two kinds. Finally, support for the notion of special grammaticizable meanings coming from Bickerton's Language Bioprogram hypothesis has been eroded by research showing that there is more generation-to-generation language transmission in creolization than Bickerton had assumed, and also more influence from substratum languages (Traugott and Dasher 2002).

After reviewing the mounting evidence along these various lines, Slobin (1997c) retracted his claim for Basic Child Grammar, in particular for meanings privileged for mapping onto grammatical morphemes. He now suggested that the seemingly special semantics of grammatical morphemes should be attributed not to children's starting semantic biases, but to psycholinguistic processes at work in the discourse of fluent speakers.

Despite these shifts in theorizing and interpretation, we should not lose sight of the 'emergent errors' discussed earlier in this section. Although toddlers are clearly semantically less biased and more sensitive to the input in their initial form–meaning mappings than was previously supposed, such errors remind us that children do not simply passively await the imprint of the input language; they have some good ideas of their own about the possible organization of meaning. Determining the nature of children's semantic predispositions, and how these interact with properties of the linguistic input, remain important priorities for further research.

5. LINKS BETWEEN SYNTAX AND SEMANTICS

Across languages, there are consistencies in the way semantic functions are linked to syntactic categories and relations; for example, words that name objects are typically nouns and elements that specify agents are often sentence subjects. The role of linking consistencies in language acquisition is controversial.

5.1 Are linking rules innate?

Recall that according to the 'cognition hypothesis' (section 3), children start out by mapping elements of language onto basic cognitive concepts. In this view, children at first know nothing about syntactic categories and relations. They start the learning process by associating the morphosyntactic properties of the nouns, verbs, subjects, and direct objects in the input to core meanings or prototypes like 'concrete object', 'action', 'agent', and 'patient', and then they gradually abstract away to the more formal grammatical constructs they need for their target language (e.g. Bowerman 1973, Tomasello 2003a). This view of the development of semantic–syntactic linking is compatible with modern constructivist approaches to linguistic typology, such as Croft's (2001) Radical Construction grammar.

A second approach, which follows UG logic, presupposes that the existence of linking regularities can best be explained by appealing to children's inborn capacity for language. If knowledge of linking is innate, it would be available to children to solve important acquisition puzzles. Two influential proposals along these lines are known as 'semantic bootstrapping' and 'syntactic bootstrapping'. Linguistic typology contributed initially to the rise of the bootstrapping hypotheses by suggesting that linking is cross-linguistically consistent enough to plausibly be considered innate. But typology has been recruited more recently to challenge the bootstrapping hypotheses.

5.1.1 Semantic bootstrapping

Theorists working in the UG tradition have long assumed that children come equipped with innate knowledge of word classes and syntactic relations. But, as Pinker (1984) noted, this knowledge would be useless unless learners have some way to identify concrete instances of these constructs in the speech stream. To solve this problem, Pinker proposed that for each syntactic construct, there is a semantic cue: for example, 'if a word names a person or thing, assume that it is a noun' and 'if a word names the agent of an action, assume that it is the sentence-subject' (similarly, for actions and verbs, patients and direct objects, and so on). These semantic-syntactic correspondences are imperfect in adult grammar, of course—for example, not all agents are subjects—but they are good enough, argued Pinker, to allow learners to establish the order of subject, verb, and object in their language, along with the morphology associated with nouns and verbs and other basic properties of phrase structure. These properties could then be used to identify further instances of the syntactic constructs even when the canonical semantics are absent. Pinker dubbed this use of meaning to predict syntax 'semantic bootstrapping'.

5.1.2 Syntactic bootstrapping

In syntactic bootstrapping, the posited inborn knowledge of semantic–syntactic correspondences is exploited the other way around—syntax is used to predict meaning (Gleitman 1990). The goal here is to explain how children home in quickly on the meanings of verbs despite the considerable ambiguity in typical contexts of use. If syntax and semantics are systematically linked, in the sense that a verb's meaning projects how many arguments it has and how these arguments are syntactically arranged, then a child could make a sensible first-pass prediction about the meaning of a novel verb by noticing the syntactic frames in which it occurs. For example, a verb with one argument (*Mary* GORPS) is likely to express a single-participant event (e.g. 'Mary laughs'); a verb with two arguments (*Mary* GORPS *John*) suggests a two-participant event, perhaps an event of contact or causation; a three-argument verb (*Mary* GORPS *the ball* to *John*) may well denote an event of transfer, such as 'put' or 'give'; while a verb with a clausal complement (e.g. *Mary* GORPS *that the ball is red*) is likely to be a verb of perception or cognition, such as 'see' or 'think'. Once the hypothesis space has been narrowed down in this way, observation of contexts of use can help the child identify the verb's more precise meaning.

By now there is considerable experimental evidence, mostly from learners of English, that young children can indeed use syntax to make sensible guesses about a new verb's meaning (see Fisher and Gleitman 2002 for a review). But whether the linking information on which this ability depends is innate or learned is controversial, for reasons we now examine (see Bowerman and Brown 2008b for a more detailed discussion).

5.2 Typological challenges to innate linking rules

A basic prerequisite for both of the bootstrapping hypotheses is that syntactic categories and relations, like noun, verb, subject, and object, must be universal. This issue has been hotly debated for many years (e.g. Croft 2003a, Dryer 1997a, Fillmore 1968), and we will not examine it further here. Instead, we can ask whether children behave as if they had a priori knowledge of linking regularities, and whether the specific linking assumptions that bootstrapping hypotheses rely on are viable in cross-linguistic perspective.

Bowerman (1990) hypothesized that if children have innate knowledge of syntactic linking rules, they should start to combine arguments earlier and more accurately with verbs that link relatively consistently across languages (e.g. proto-typical agent–patient verbs) than with verbs that link more variably (e.g. verbs of possession, cognition, and perception). In a detailed study of two English-speaking children, Bowerman found no advantage for canonically linked verbs: as soon as the children began to combine verbs with subject or object arguments at all, they did so equally accurately for verbs of all semantic types. Linking errors did eventually occur, especially with Experiencer and Stimulus arguments (e.g. *I saw a picture that enjoyed me* [= that I enjoyed]), but only at relatively late stages of language acquisition. Bowerman attributed these errors not to starting biases in linking but to the overgeneralization of a statistically predominant pattern of English whereby Stimulus arguments link to subject position (Talmy 1985: 99).

Challenges to the bootstrapping linking assumptions have also come from studies of relatively unfamiliar languages (see Bowerman and Brown 2008a). For example, (a) Danziger (2008) shows that in Mopan Maya (Belize), the predicted link between action word semantics and verbs is confounded: many everyday single-participant action concepts, such as 'run', 'fly', 'jump', 'yell', 'laugh', and 'move', are encoded as *nouns*, as in 'My <u>running</u> continues' (= 'I run'). (b) Wilkins (2008) discusses how Arrernte (an Arandic language of central Australia) violates the syntactic-bootstrapping expectation (Gleitman 1990) that verbs of object transfer, like 'put', will have different argument structures from verbs of perception, like 'see'—three arguments for 'put' and two for 'see'. In Arrernte, verbs of both classes share identical three-argument frames. (c) Essegbey (2008) shows that in Ewe (a Kwa language spoken in Ghana), the contrast between intransitive and transitive constructions is often associated not with one- vs. two-participant events, as syntactic bootstrapping presupposes, but with a single participant's degree of control over the action (one argument indicates lack of control, two indicates control). In their efforts to understand how such linking systems could be acquired, most of the authors in Bowerman and Brown (2008a) hypothesize that linking regularities are learned over time through an input-driven constructional process in which neither semantic nor syntactic information serves unilaterally to predict the other, but both are continually played off against each other.

5.3 Ergativity

The most celebrated challenge to the hypothesis that linking biases are innate is undoubtedly the phenomenon of ergativity. In an *ergative* pattern, the subject of an intransitive verb (S) is treated like the object of a transitive verb (O) (both being morphologically unmarked, typically), while the subject of a transitive verb (A) is treated distinctively (e.g. marked with ergative case). In the *accusative* pattern, in contrast, S and A are treated alike and O gets distinct treatment (e.g. marking with accusative case). Usually, it is only morphological marking that is affected by ergative patterning, and usually only under certain conditions ('split ergativity'), with the split between ergative and accusative marking conditioned by factors like person, tense–aspect, mood, clause type, or case-marking vs. verb agreement. When morphology is ergative, syntactic patterns such as control relations often remain accusative. But some languages are also syntactically ergative to varying degrees. Ergativity of either kind presents a problem for theories of language acquisition because it violates the often-postulated link in acquisition between agents (a concept that plausibly encompasses the initiators of both transitive actions, like 'killing', and intransitive actions, like 'walking') and subjects.

In his proposal for Basic Child Grammar (see section 4.2), Slobin (1985c) hypothesized that children crack into grammatical case-marking with an 'opening wedge' that is neutral between the accusative and ergative patterns. In particular, he argued that regardless of the input language, grammatical markers associated with transitivity are initially found in utterances encoding 'prototypical transitive events', in which an animate agent intentionally brings about a physical change of state or location in a patient by direct bodily contact or with an instrument. Initial evidence suggested that children learning an accusative language tend at first to restrict the accusative marker to the objects of verbs encoding such events (e.g. 'break', 'take', 'throw'), and extend it only later to the objects of less dynamic transitive verbs, such as 'see' or 'read'. Children learning morphologically ergative languages seemed to show a similar pattern, but in their case, it is the ergative marker on transitive subjects that is underextended. This pattern, noted Slobin, echoes synchronic and diachronic patterns of transitivity marking in adult languages (Hopper and Thompson 1980).[2]

Slobin's test cases were limited—only Russian for an accusative language and Kaluli for a (morphologically) ergative language. By now, data are available on the acquisition of several more languages with ergative or partially ergative patterning (e.g. K'iche' Maya, Georgian, West Greenlandic, and Warlpiri (all reported in Slobin 1992); Inuktitut (Allen 1996); Hindi (Narasimhan 2005)); and data from

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[2] Notice that this pattern is the one predicted by theories specifying that case-marking is associated with the semantic transitivity of the clause, rather than those positing that case-marking serves primarily to disambiguate agents and patients when they are potentially confusable, as when a direct object is animate or an agent argument is inanimate (see Mallinson and Blake 1981: 92ff. on the distinction).

learners of accusative languages have been studied in more detail. In general, these studies show that ergative morphology and accusative morphology are equally easy to learn, just as Slobin predicted, but that learning patterns are relatively error-free and hence language-specific from the beginning (for reviews and analysis, see Pye 1990 and Van Valin 1992). In particular, the predicted initial restriction of ergative and accusative case-markers to the A and O arguments of prototypical transitive verbs has not proved to be general. Nor is there any tendency for children learning morphologically ergative languages to inappropriately extend ergative markers to agentive intransitive subjects (e.g. 'Mommy-ERG walk'), as we might expect if children are working with a general cognitive notion of 'agency' (Narasimhan 2005).

These various studies also show that children are remarkably quick to home in on the factors that condition split ergativity in their language. This suggests that they are using a fine-grained distributional learning procedure rather than the coarser semantic and syntactic categories typically invoked both by the bootstrapping hypotheses and by the cognition hypothesis (Narasimhan 2005, Pye 1990, Van Valin 1992).

As yet, there has been little exploration of the acquisition of syntactically ergative patterns, but the available evidence suggests that syntactic ergativity—in contrast to morphological ergativity—is difficult and gives rise to errors (Pye 1990). Pye argues that a thoroughly syntactically ergative system would be unlearnable (see Marantz 1984 for a parameter-setting account of the acquisition of syntactic ergativity, which, according to Pye, is untenable). Pye suggests that all children construct a syntactically accusative phrase structure, and then acquire syntactically ergative constructions piecemeal as exceptions to this pattern.

6. SEMANTIC TYPOLOGY IN LANGUAGE DEVELOPMENT

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Semantic typology is 'the systematic cross-linguistic study of how languages express meaning by way of signs' (Evans, this volume). We have already considered a number of applications of semantic typology to language acquisition, although not explicitly by that name: for example, children's ready use of either word order or case-marking to express basic grammatical relations (section 3), explanations for toddlers' semantic overextensions and underextensions of words and bound morphemes (section 4), the meanings children associate with temporal and spatial markers (section 4), and the role of syntactic–semantic linking in language

acquisition (section 5). In this section, we consider some additional intersections between semantic typology and first language acquisition research, concentrating on issues of information packaging and lexicalization.[3]

6.1 Learning to talk about motion events

The jumping-off point for much research on the acquisition of lexicalization patterns is Talmy's (1991, 2000) well-known distinction between *satellite-framed languages* (S-languages) and *verb-framed languages* (V-languages). This distinction is based on how information about motion events is 'packaged' or distributed across a clause, especially where and how the Path of movement is characteristically expressed—in a particle, prefix, or other element associated with the main verb in S-languages like English, and in the verb itself in V-languages like Spanish. These differences are associated with a number of other differences, such as the morphosyntactic handling of information about the manner or cause of a motion.

In a pioneering cross-linguistic study of narrative development, Berman and Slobin (1994) compared how child and adult speakers of two S-languages (English, German) and three V-languages (Spanish, Hebrew, Turkish) told a picture-book story about a boy searching for his frog. Already by age 3, the youngest age group studied, learners of the two types of languages differed strikingly in their selection and organization of information about motion, in ways also characteristic of adult speakers. (This was also true of other semantic/functional domains, such as temporality, perspective-taking, and discourse connectivity.) These differences can be detected even earlier in children's spontaneous speech about motion: before the age of 2, or around the time of earliest word combinations, learners of S- and V-languages already differ systematically both in the information they select for encoding (e.g. much less attention is paid to manner of motion by V-language learners) and in their semantic categorization of Paths (Bowerman 1994, Bowerman, de León, and Choi 1995, Choi and Bowerman 1991, Slobin, Bowerman, Brown, Eisenbeiss, and Narasimhan forthcoming; also see section 6.2.3 on Path categories).

Berman and Slobin's frog story project inspired much further research, and adult and child frog stories have now been collected and compared across a broad range of languages (Strömqvist and Verhoeven 2004). This more recent work confirms that the typology of motion event packaging is a major determinant of narrative style, but goes on to show how typology interacts with many additional factors to shape style, including differences in the morphological expression of typologically

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[3] Other interesting semantic-typological work has looked at the acquisition of *spatial frames of reference* (relative vs. absolute; Brown and Levinson 2009); *epistemic markers* (Aksu-Koç 1988, Choi 1995, Öztürk and Papafragou 2008); and the notion of *time stability* (Stassen 1997) as a determinant of English-speaking children's use of adjectives as modifiers or predicates (Saylor 2000). The relevance of the *animacy hierarchy* to first language acquisition is considered in section 7.

equivalent Path elements (e.g. Germanic particles vs. Slavic verb prefixes as satellites), paralinguistic factors like voice quality and gesture, and cultural practices (Slobin 2004, Wilkins 1997).[4]

Two important theoretical constructs to come out of the frog story project are the notions of 'thinking for speaking' and 'typological bootstrapping'. Struck by the very different semantic demands that languages make on their speakers, Slobin (1996, 2003) argued that in acquiring a language, children also take on a particular way of 'thinking for speaking': they learn how to align their way of conceptualizing events with the linguistic frames and encoding devices available in their language. This proposal has sparked tremendous interest and debate, and led to a number of new findings about the relationship between language and cognition (see Slobin 2004 for a review, and Guo, Lieven, Ervin-Tripp, Budwig, Özçalışkan, and Nakamura 2009: part IV for recent work).

The notion of 'typological bootstrapping' was proposed by Slobin (1997c, d) to highlight the speed and ease with which children appear to home in on the typological characteristics of their language. The idea is that because individual languages are typologically relatively consistent in their handling of given semantic or morphosyntactic domains, children can use what they have already learned to make accurate predictions about what they have not yet learned. Typological bootstrapping was first applied to the learning of motion event encoding, but it is relevant to a number of other domains as well. For example, in lexical learning children seem to grasp very quickly whether newly encountered nominals are likely to refer to bounded objects or to the substance of which they are made (Gathercole and Min 1997: Spanish vs. Korean; Imai and Gentner 1997: English vs. Japanese). These studies were inspired by Lucy's (1992) claim that languages with and without numeral classifiers differ systematically in their nominal semantics. Typological bootstrapping also plays a role in morphological development: children exposed to richly inflected languages with large morphological paradigms acquire inflections and case endings strikingly earlier and faster than learners of poorly inflected languages, even though they have more to learn (Laaha and Gillis 2007, Voeikova and Dressler 2006).[5]

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[4] On the basis of this work, Slobin (2004) has proposed expanding Talmy's two-way typology with a third type: 'equipollently-framed' languages, which express Manner and Path with equivalent grammatical forms, such as bipartite verbs (as in Algonquian and Athapaskan), Manner or Path preverbs (as in Jaminjung), and serial or compound verb constructions (e.g. Sino-Tibetan). See Chen (2008) on the development of motion event expressions in the 'equipollent' language Mandarin.

[5] Just as we saw for motion event typology, the morphological 'type' of a language does not shape morphological development in isolation; rather, it interacts with other factors, such as individual differences in whether children orient more to the 'tune' or to the segmental properties of the input (Peters 1997).

6.2 Language specificity in lexical partitioning

Languages differ in how they semantically partition particular conceptual domains for expression with words. Work on how children master the partitioning of the input language has often asked whether acquisition is somehow related to linguistic typology.

6.2.1 Body parts

In an important early study along these lines, Andersen (1978) investigated the lexical structure of words for human body parts across languages, and found a limited set of patterns that also seemed to play a role in children's acquisition of body-part terminology (see also Schaefer 1985 on verbs of dressing). For example, she found that terms for upper body parts are linguistically unmarked relative to terms for lower body parts, and they are also acquired earlier. More recent typological work has challenged a number of Andersen's universals of body-part terminology (Majid, Enfield, and van Staden 2006; see Evans, this volume), but the implications of these challenges for language acquisition have not yet been explored. Recent cross-linguistic work on the acquisition of body-part terms has focused on a different question, also with typological relevance. In many languages, body-part terms have become grammaticized and serve as locative markers (e.g. 'belly' = 'in', 'foot' = 'under'). Do children learning such languages begin with the body-part meanings and only later—following the diachronic path—extend these forms to spatial relations? Evidence from Zapotec suggests that the answer to this question is no: locative meanings and body-part meanings are learned independently (Lillehaugen 2004). (See Slobin 1994 for a more general discussion and critique of the idea that children's progress through language often recapitulates a language's diachronic changes.)

6.2.2 Colour

Interest in the acquisition of colour terminology was sparked by Berlin and Kay's (1969) ground-breaking cross-linguistic work in this domain. Primary concerns are whether Berlin and Kay's implicational hierarchy, which specifies the order in which languages add colour terms, also accurately predicts the order of acquisition of colour words, and whether Berlin and Kay's 'focal colours' are especially salient to children. These questions have been studied repeatedly from the 1970s to the present, mostly with negative results. Roberson, Davidoff, Davies, and Shapiro (2004) provide a good recent review of this complex literature, along with new evidence from learners of English vs. Himba, a language of Namibia. Consistent with most earlier acquisition studies (e.g. Pitchford and Mullen 2002), neither the English nor the Himba speakers showed a predictable order of acquisition, nor was there an advantage for focal colours until the children had already acquired colour terms. Roberson and her colleagues conclude that colour categories are learned from the linguistic input, rather than unfolding along a biologically predetermined schedule.

6.2.3 Events and relationships

According to the cognition hypothesis (section 3), children map their early words onto universal categories that arise in non-linguistic cognition. This assumption has been challenged in recent cross-linguistic research, which focuses especially on variation in categories of events and spatial relationships and explores when and how children work out the categories of the local language. This work shows that, in general, children tune in to language-specific event classification remarkably early.

For example, toddlers show sensitivity to language-specific Path distinctions by 18 months to 2 years, with learners of English distinguishing between containment and support relations ([put] *in* vs. [put] *on*) and learners of Korean making a cross-cutting distinction between snug fit (*kkita* 'fit tightly together') and various kinds of 'looser fit' topological relations (Bowerman and Choi 2001, 2003; Choi and Bowerman 1991). By age 2, learners of English use verbs like *put on* (clothing), *eat*, *carry*, and *cut* productively for actions involving a wide range of objects. By the same age, learners of Korean and Japanese already observe several obligatory distinctions between putting clothing on different body parts; learners of Tzeltal Mayan distinguish appropriately between eating foods of different types (crunchy, squishy, grain-based); learners of Korean and Tzeltal Mayan use different verbs for carrying in different ways (in arms, on back, on shoulder, etc.); and learners of Mandarin and Dutch honour an obligatory distinction between cutting with a single-bladed tool, such as a knife, and a double-bladed tool, such as scissors. These studies suggest that even at a very young age, children are not limited to mapping words onto pre-established concepts. Rather, they are capable of *constructing* semantic categories—different for different languages—by observing how words are used by fluent speakers (see Bowerman 2005 for an overview, references, and discussion).

6.2.4 Semantic features and semantic maps

If children can construct categories, what do they construct them out of? This is a notoriously difficult question. According to an early influential answer, children compose word meanings bit by bit from smaller components based on cognitive/perceptual capacities shared by all human beings (the 'Semantic Features Hypothesis', Clark 1973). But this proposal ran into many theoretical and empirical difficulties and was eventually discarded (Clark 1983). A more recent approach that also assumes semantic primitives and procedures for combining them is Wierzbicka's (1996, Goddard and Wierzbicka 2002) 'Natural Semantic Metalanguage' (NSM; see Evans, this volume). NSM theorists regard NSM as applicable to first language acquisition, but there has not been much research yet along these lines.

An alternative to semantic primitives is the semantic map model, which is used increasingly in semantic typology (e.g. Croft 2003a, Haspelmath 2003, Majid, Bowerman, van Staden, and Boster 2007). In a semantic map, the extensions of language-specific forms are represented as bounded regions in a two- or

multidimensional conceptual space. The structure of the space is seen as universal, reflecting a set of shared conceptual gradients along which semantic similarity is computed, but the partitioning of the space—number of categories, placement of boundaries between them—is language-specific. So far, the semantic map model has been applied primarily to language acquisition to visually display variation in semantic categorization across languages and across age groups (Bowerman 1996, Bowerman et al. 1995, 2004, Chen 2008), but it can also be used to predict patterns of acquisition. (For an application to learning spatial prepositions in English and Dutch, see Gentner and Bowerman 2009, which also explores whether a cross-linguistically common partitioning is easier for children to learn than a rare one.)

7. First language acquisition and the role of iconicity, relevance, markedness, frequency, and implicational universals

Let us now look at two basic questions about first language acquisition that intersect centrally with the concerns of linguistic typologists: what determines the difficulty of different elements of language for children, and what guides the order in which a set of related forms is acquired?

One common hypothesis is that difficulty is conditioned by the cognitive complexity of the meanings expressed, with the order of acquisition largely paced by the cognitive maturation of these meanings (although it is also influenced by the relative difficulty of different formal devices for children; see section 3 on the Operating Principles approach). Cognitive maturation has been used to explain, for example, the order in which children learn spatial adpositions (Johnston and Slobin 1979) and conjunctions (Clancy, Jacobsen, and Silva 1976). A second proposal, which focuses on changes over time in how children apply a form they have learned (e.g. a word, tense–aspect marker, or case-marker), appeals to prototypicality: children will start out with more prototypical exemplars; for examples, see section 5.3 on prototypical transitive events and Taylor (2003). The pragmatic preoccupations of very young children can also play a role: forms that might be expected later on grounds of maturation or prototypicality are often learned surprisingly early if they are central to helping children accomplish their communicative goals (e.g. Demuth 1989 on the early emergence of the passive in Sesotho).

In addition to cognitive complexity, prototypicality, and communicative usefulness, researchers have often appealed to iconicity, relevance, markedness, frequency,

and implicational hierarchies—all notions of central importance to linguistic typology (Bowerman 1993).

7.1 Iconicity and relevance

According to the principle of iconicity, the structure of language should resemble the structure of experience as closely as possible. For example, each unit of meaning should be mapped onto a unit of form, the complexity of a form (word or construction) should reflect the complexity of its meaning, and the order in which events are mentioned should mirror the order in which they occur (Clark and Clark 1977, Croft 2003a). In adult speech, the principle of iconicity competes with the principle of economy (Croft 2003a): iconicity pulls for explicit marking, whereas economy pulls for minimizing expressions wherever possible. In language acquisition, iconicity and transparency often win out over economy. For example, if a semantic category such as plural, past tense, or transitive agent is marked only some of the time, children will at some point tend to replace the zero marking with an overt form (e.g. *sheep-s, put-ED*). To capture such phenomena, a number of Slobin's Operating Principles for early grammatical development promote a one-to-one mapping between form and meaning (see section 3). (Of course, what constitutes a unit of form or a unit of meaning for a child may change in the course of development—Slobin 1985c.) Another example of the influence of iconicity on language development is that children mention events in the order in which they occur, at least until they learn words like 'before' and 'after' (Clark and Clark 1977).

A special case of iconicity is the principle of relevance (Bybee 1985). This has to do with how much the meaning of a grammatical category affects the inherent meaning of the lexical stem with which it is associated: the more 'relevant' a category is for a stem, the closer to the stem it will be positioned. Slobin (1985c) applied this principle to language acquisition through an Operating Principle called 'Relevance'. According to OP:Relevance, 'If two or more functors apply to a content word, try to place them so that the more relevant the meaning of a functor is to the meaning of the content word, the closer it is placed to the content word'. This OP was used to explain certain ordering errors. For instance, in conditional sentences in Polish, the personal endings should be attached to the conditional particle, but Polish children often attach them to the verb instead. This is because, according to Slobin, the endings are more relevant to the meaning of the verb.[6]

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[6] Many of Slobin's examples of OP:Relevance are subject to a simpler explanation: competition in the child's grammar between alternative orders modelled in the input (Bowerman 1985). For example, personal endings do regularly affix to the verb in Polish unless there is a conditional particle, so children may simply be following this well-established pattern.

OP:Relevance has also been applied to children's acquisition of telicity entailments. Van Hout (2008) shows that learners of Polish and Russian understand the telicity entailments of sentences like 'The mouse ate cheese/ate the cheese' (did the mouse eat all the cheese?) at a younger age than learners of Dutch, English, and Finnish. Van Hout proposes that this is because in the Slavic languages, telicity is expressed directly in the verb (perfective vs. imperfective stems), a form for which it is semantically highly relevant, whereas in the other three languages, it is expressed compositionally on forms that are semantically less relevant—the direct object noun for Finnish (accusative vs. partitive case) and the article for Dutch and English.

7.2 Markedness and frequency

The notion of linguistic markedness first arose in the context of phonology, but was gradually extended to morphology, syntax, and semantics. Depending on the application and the theorist, the notion has been interpreted in different ways; it is often now taken to mean 'little more than unusual or not expected vs. usual or expected, both within a language and across languages' (Bybee, this volume). Whether defined precisely or in more general terms, markedness has often been invoked in the study of language acquisition: the expectation is that children will acquire unmarked forms before marked forms, and may initially substitute unmarked forms for marked forms (see also section 2 on the early influence of Jakobson).

This expectation is indeed usually met—for instance, learners of English acquire singular nouns before plurals, and they learn unmarked dimensional adjectives like *big* and *long* before their marked counterparts like *little* and *short* (Bybee, this volume, Clark and Clark 1977). But interpreting these findings is difficult. Children might learn unmarked forms first because they are conceptually or structurally easier or more natural, but they also might learn them first simply because they are more frequent in adult speech (see Bybee, this volume, and Croft 2003a on the relationship between markedness and frequency).

In the 1970s, input frequency was downplayed as an important determinant of order of acquisition, partly in a 'cognitive revolution' reaction to behaviourism, a theory in which frequency had played a major role, and partly because of an influential study (Brown 1973: 356–68) showing that frequency could not account for the order in which learners of English acquire grammatical morphemes such as plural -s, past tense -ed, and articles *a* and *the*. With the recent rise of usage-based approaches to language, however, frequency has been rehabilitated as an important determinant of both adult and child language (e.g. Bybee 2006), and it is now seen as a major influence on the order in which new forms enter children's speech (Rowland, Pine, Lieven, and Theakston 2003, Tomasello 2003a). Linguists must, of course, ponder why certain forms should be more frequent in adult speech than

others. But for children, higher frequency could simply mean more learning opportunities; i.e. the structural or conceptual differences between marked and unmarked forms could be irrelevant. The confounding between markedness and frequency in the input to children, along with renewed respect for the power of frequency to drive acquisition, has diminished the attractiveness of markedness as an independent explanatory principle in language acquisition research.[7]

7.3 Implicational hierarchies

Markedness relations stated in degrees form implicational hierarchies. These are implicational sequences constructed out of typological statements that are chained together (Corbett, this volume): for example, in the sequence $a > b > c > d > e$, the presence of property d in a language implies the presence of all the properties to its left (a, b, c), but not necessarily the property to its right (e). (Property d is more marked than a, b, c, but less marked than e.) Implicational hierarchies are one of the most powerful theoretical tools available to linguistic typologists (Corbett, this volume), and as Hawkins (1987: 454) points out, they 'incorporate intrinsic predictions for language acquisition'. For example, in the sequence $a > b > c > d > e$, property d is predicted to emerge in the child's speech either after c or at the same time, but not before. Thus, even when a learner's grammar differs from those of adult speakers, it should always fall within the set of attested language types.

Relatively few implicational hierarchies have been examined in any detail in research on first language acquisition, and findings are mixed. (Hierarchies have played a much larger role in second language acquisition research; see Eckman, this volume.) In section 6.2, we saw that the order in which languages add colour terms (Berlin and Kay 1969) does not successfully predict the order in which children learn these terms. Also disappointing as a predictor of first language acquisition is Keenan and Comrie's (1977) NP accessibility hierarchy, which specifies the relative accessibility to relativization of nouns with various syntactic roles within the relative clause (SUBJ > DO > IO > OBL > GEN; see Corbett and Eckman, both in this volume). For thorough reviews of this large and complex literature, see Song (2001a) and Clancy, Jacobsen, and Silva (1976), but the bottom line is that at best, the NP accessibility hierarchy plays a very minor role in children's acquisition of relative clauses.

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[7] Markedness still features importantly in first language acquisition research within the framework of Optimality Theory, an approach usually considered a development of generative grammar (see Croft 2003a: 84 on similarities and differences between OT and linguistic typology). OT research on language development, like OT research more generally, has focused primarily on phonology. Kager et al. (2004) provide a useful orientation. A paper in their volume of particular interest for readers of the present chapter might be Levelt and de Vijver (2004), which examines syllable types cross-linguistically and tests an OT model of acquisition against data from learners of Dutch.

A third important hierarchy to receive the attention of child language scholars is the animacy hierarchy (AH; see Comrie 1981, Corbett, this volume, Croft 2003a). The AH—which is actually a combination of several distinct but interacting dimensions—runs from 'more animate' to 'less animate' in the following order: first and second person pronouns > third person pronouns > proper names > human common nouns > non-human animate common nouns > inanimate common nouns. Across languages, this hierarchy constrains a large number of distinctions, such as agreement, plural marking, and treatment of direct objects, with the exact cut-off point between 'more' and 'less' animate being specific to the language or to the particular form within the language.

If children are sensitive to the AH, a straightforward prediction would be that if they sometimes use, say, plural marking or agreement when it is required by the adult grammar, but not yet always, their usage will conform to the hierarchy (Bowerman 1993). So if children apply plural marking to non-human animate common nouns such as 'dog', they should use it equally or more consistently for human common nouns ('girl'), to the left on the hierarchy, but possibly less consistently or not at all for inanimate common nouns ('cup'), to the right. To my knowledge, this simple prediction has never been tested. A more complex test of the AH has been carried out by Demuth, Machobane, Moloi, and Odato (2005) among learners of Sesotho. In this Bantu language, the order of NPs in double-object applicative constructions is governed by the AH (and not e.g. by thematic roles, as in 'benefactive precedes theme'). If the two nominals differ in relative animacy, the 'more animate' NP will occur after the verb and precede the 'less animate' one; if they do not differ (e.g. both refer to humans or to inanimate objects), either order is possible. Using a forced-choice elicited production task, Demuth et al. found that even the youngest children tested (4-year-olds) were sensitive, in making their choices, to the distinction between animate (human or animal) and inanimate NPs, and even to degrees of animacy (human vs. animal).

In other work that draws in part on the AH hierarchy, Gentner and Boroditsky (2001: 222) propose that the AH serves as a rough guide to 'individuability'—the ease with which humans can conceptualize an entity as an individual. They relate individuability in turn to ease of acquisition: by hypothesis, children learn nominals for 'more individuable' entities earlier than for 'less individuable' entities. Thus, children should learn nominals for highly individuable entities (e.g. humans, other animates, complex bounded inanimate objects) earlier and more readily than nominals for less individuable entities (simple bounded objects, substances). There is cross-linguistic evidence from both spontaneous speech and experiments in support of this hypothesis (Gentner and Boroditsky 2001, Imai and Gentner 1997; but see Carey 2001: 198–200 for a counterview).

8. CLOSING REMARKS

In a review chapter, many important and relevant topics and studies must be neglected, and I have inevitably made a selection based on both my sense of what is interesting and my own areas of expertise. Recent typologically relevant phonological work is not well represented, and the interested reader is referred to Edwards and Beckman (2008), Demuth (2006), and Vihman (1996), as well as to Kager, Pater, and Zonneveld (2004; see note 7 above). The reader may also wonder at the limited attention given to word order in this chapter, given its importance in the typological literature more generally. This is due not to neglect, however, but to children's remarkable ability to home in on the word orders displayed in their local language. Word order errors are relatively rare, and they show no clear relationship to typological generalizations.

As stressed in the introduction to this chapter, linguistic typology and first language acquisition show points of contact, but their relationship is indirect: each field has its own concerns and explanatory principles. So far, interactions between the two fields have been mostly one-way: child language researchers have benefited from the insights of typologists, but it is less clear what typologists have learned from developmental studies (Slobin and Bowerman 2007).

For child language scholars, the most important contribution of typology has been to call their attention to important dimensions of cross-linguistic variation, which helps them guard against parochial explanations of language acquisition and steers them toward theories that do justice to language diversity. Beyond this, developmentalists have also been inspired by the sense that patterns of language acquisition—for example, typical errors—are reminiscent of typological patterns. But with some notable exceptions, there have been few rigorous tests of the match between first language acquisition and typological findings; hits are attended to, but misses are less often noted.

An important goal for future research, then, is to clarify how much and what kind of correspondence there is between typological patterns in adult languages and patterns in the acquisition of a first language. The outcome of research along these lines could, in my view, make an important contribution to linguistic typology by helping to establish the causes of typological patterns (Bowerman 1993: 14). For example, typological patterns that are echoed in the progress of even very young children may well reflect basic human conceptual or communicative predispositions. In contrast, patterns with no reflection in first language acquisition are more likely to have causes that affect only fluent speakers, such as the requirements of language as a rapid, online system of communication.

FURTHER READING

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CHAPTER 28

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LINGUISTIC TYPOLOGY AND SECOND LANGUAGE ACQUISITION

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FRED R. ECKMAN

1. INTRODUCTION

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The goal of second language acquisition (SLA) theory is to explain the development of linguistic competence in an adult second language (L2) learner. Linguistic approaches to SLA have generally sought to account for the growth of such L2 competence by showing that the mental grammars (termed interlanguage grammars) of second language learners are subject to constraints on learnability. One of the domains which linguists have investigated as a possible source of such constraints is linguistic typology. The central thesis of this research programme is that the unidirectional, implicational generalizations formulated by typologists reflect constraints on human languages, and that it is reasonable to hypothesize that these same generalizations constrain the kinds of interlanguage grammars that L2 learners can acquire.

The central goal of this chapter is to present an overview of the role that typological generalizations have had over the last few decades in the explanation of facts about SLA. This general purpose will be pursued through several more specific aims. The first is to review and interpret some of the early work in SLA that used typological universals to explain various aspects of learning difficulty and native language transfer in adult L2 acquisition. The second aim is to present and motivate the construct of interlanguage, one of the important concepts that led to a shift in the research programme for linguistic approaches to SLA. The third aim in addressing the central goal of this chapter is to outline the findings of the research strand that seeks to explain why, in terms of typological universals, interlanguage grammars are the way they are. The chapter concludes with some suggestions about what appear to be fruitful avenues for future research.

The remainder of this chapter is structured into two main parts. The first will review some of the classical work on SLA that employed principles of typological markedness; the second will discuss more recent research that seeks to explain L2 learning in terms of constraints on the interlanguage grammars that learners acquire. The general hypothesis underlying this research programme is that implicational generalizations formulated on the basis of native languages hold also for second languages.

We turn first to earlier studies that employed typological markedness to explain learning difficulty and transfer in SLA.

2. STUDIES FOCUSING ON MARKEDNESS

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The earliest work invoking typological universals as explanatory principles sought to explain various aspects of learning difficulty and transfer in SLA. This approach grew out of the research paradigm at the time that was embodied in the Contrastive Analysis Hypothesis (CAH). The CAH attempted to explain L2 learning difficulty on the basis of differences between the native and target languages (Lado 1957, Stockwell and Bowen 1965). The claim was that L2 learners transferred much, if not all, of the structure of their native language (NL) to the learning of the target language (TL). Difficulty resulted when the NL and TL structures were different.

The major problems of the CAH were empirical. Because the hypothesis claimed that NL/TL differences were both necessary and sufficient to explain L2 difficulty, the prediction was that L2 learners should experience problems only in areas where the NL and TL differed. However, numerous studies showed that learners often produced errors in structures where the NL and TL did not differ, and that at times

learners had no difficulty with areas of contrast between the NL and TL (Dušková 1969, Gradman 1971).

Several independent proposals addressing the problems with the CAH invoked typological markedness. The first was the Markedness Differential Hypothesis (Eckman 1977), which claimed that the differences between the NL and TL were necessary to account for the errors of L2 learners, but that differences were not sufficient. What was needed in addition was a way of calibrating the difficulty inherent in the areas of contrast between the NL and TL. The second was a study by Gass (1979), in which she argued that the likelihood of NL transfer was linked to markedness. The third proposal using typological generalizations was a hypothesis by Hyltenstam (1984) claiming that the early stages of L2 learning were always characterized by the presence of unmarked structures. We take up each of these in turn.

The central claim embodied in the Markedness Differential Hypothesis (MDH) was that typological markedness reflected difficulty in second language acquisition (Eckman 1977). More specifically, the MDH asserted that marked structures are more difficult than the corresponding unmarked structures, and the degree of difficulty involved corresponded directly to the relative markedness of the structures in question. Although markedness has been characterized in a number of different ways in the literature (Moravcsik and Wirth 1986), for the purposes of the MDH, markedness is defined as in (1) in terms of unidirectional, implicational generalizations.

(1) A structure A in a language is marked relative to some other structure B, and conversely, B is unmarked relative to A if the presence of A in a language implies the presence of B, but the presence of B does not imply the presence of A.

The MDH addressed some of the empirical problems of the Contrastive Analysis Hypothesis by claiming that not all NL/TL differences would cause difficulty; rather, the prediction was that only those differences where a markedness relationship was involved would be difficult. The MDH further predicted that when a markedness relationship could be applied to the differences between two languages, there would be a directionality of difficulty involved in the learning, depending on which language was the NL and which was the TL. An oft-cited example of this situation is the difference in word-final obstruent voice contrasts between English and German. As is well known, English maintains a voice contrast in obstruents word-finally, whereas German does not. Because a word-final voice contrast in obstruents is marked relative to a voice contrast in non-word-final position, the prediction is that German speakers learning English would have greater difficulty in this area than would English speakers learning German, a prediction which has been borne out empirically. The CAH cannot explain this fact without additional assumptions or hypotheses.

There have been a number of studies in support of the claims made by the MDH, virtually all of them on L2 phonology (see Eckman 2004 for a review). It will suffice for present purposes to outline two: the studies by Anderson (1987) and by Carlisle

(1991). Anderson's study analysed the learning of onset and coda clusters in English for subjects from three NL backgrounds: Egyptian Arabic, Mandarin Chinese, and Amoy Chinese. The results supported the MDH in that the performance of the Chinese-speaking subjects was less target-like than that of the Arabic-speaking subjects on coda clusters, and the difference in performance correlated with the degree of markedness. In addition, marked final clusters caused more errors than the marked initial clusters.

The other study in support of the MDH was done by Carlisle (1991), and reported evidence showing that learners' performance on different TL structures can be explained only by invoking the markedness relationships that exist among the structures in question. In this study, the author analysed the production of complex onsets in English by native speakers of Spanish, using a reading task. Because the elicitation task involved the subjects' producing an oral text, the number of different environments for inserting the epenthetic vowel was increased by taking into account the final segments in the preceding word. The findings showed that the subjects modified the complex onsets by inserting an epenthetic vowel and that the likelihood of a given onset type being modified was a function of the relative degree of markedness of two factors: the cluster in question and the preceding sounds.

In addition to predicting difficulty in L2 acquisition, typological markedness was also used to explain certain facts about language transfer. A study by Gass (1979) focused on the learning of relative clauses and invoked the Noun Phrase Accessibility Hierarchy (NPAH), shown in (2).

(2) *Noun Phrase Accessibility Hierarchy (NPAH)*
    Subject > Direct Object > Indirect Object > Oblique > Genitive > Object of comparison

The NPAH was developed in work by Keenan and Comrie (1977), and represents an implicational generalization characterizing the systematic variation in relative clause types found among the languages in Keenan and Comrie's sample. The six points on the hierarchy denote the different relative clause types in terms of the grammatical positions that have been relativized to form the relative clause. In English, these positions correspond to the grammatical function of the relative pronoun in its own clause. English examples of the relative clause types characterized by the NPAH are shown in (3).

(3) a. There is the woman who is my sister. [Su]
     b. There is the woman who(m) I registered. [DO]
     c. There is the woman to whom I sent an application. [IO]
     d. There is the woman about whom I read in the newspaper. [OBL]
     e. There is the woman whose sister graduated last year. [Gen]
     f. There is the woman who I am older than. [Ocomp]

The facts are that not all languages have all kinds of relative clauses. Some languages (e.g. Malagasy, Toba Batak) can form only one type of relative clause, one in which the relative pronoun is the subject of its clause; no other relative clause type is allowed in these languages. Other languages, such as English, can form all of the relative clause types shown on the NPAH; still other languages, while allowing more than just the subject type, do not allow all of the relative clause types shown in the NPAH (e.g. Greek, Kinyarwanda, Persian). The generalization represented by this hierarchy is that if a language has a relative clause type represented by some position X on the NPAH, then that language necessarily has the relative clause types represented by all positions to the left of X on the hierarchy, but not necessarily by positions to the right of X. Thus, the hierarchy represents a markedness relationship, with the subject-type relative clause being the least marked and the object of comparison type being the most marked.

Relative clauses have been the focus of a number of studies involving second language acquisition and linguistic typology (Comrie 2003b): first, because it has been shown that languages differ widely with respect to relative clauses; and second, because it has been demonstrated that this variation can be characterized in terms of universal generalizations, such as the NPAH. In what follows, we first consider what can be called 'classical' studies on L2 relative clauses, and then turn to more recent work on these sentence types.

An important aspect of relative clauses that has been the focus of a number of L2 studies is the fact that some languages allow or require resumptive pronouns in these clauses (Hyltenstam 1984, Pavesi 1986). The sentences in (4) are examples of resumptive pronouns inserted into the English relative clauses in (3).

(4)   a. *There is the woman who she is my sister.
      b. *There is the woman who(m) I registered her.
      c. *There is the woman to whom I sent an application to her.
      d. *There is the woman whom I read in the newspaper about her.
      e. *There is the woman who her sister graduated last year.
      f. *There is the woman who I am older than her.

The occurrence of resumptive pronouns in relative clauses across different languages is systematic, and can be characterized by the NPAH such that if a language requires a resumptive pronoun in a relative clause of type X on the hierarchy, that language necessarily requires resumptive pronouns in all relative clause types to the right of X on the hierarchy, but not necessarily in relative clause types to the left of X.

As stated above, much of the SLA research on relative clauses has focused on resumptive pronouns. The study by Gass (1979) showed that L2 transfer in the learning of relative clauses—in particular, with respect to the use of resumptive pronouns in TL relative clauses—could be explained on the basis of markedness as represented by the NPAH. More specifically, she found that her subjects performed better on the less marked relative clause types than they did on those that were

more marked, and that the subjects were more likely to transfer NL relative clause structures that are less marked than those that are more marked.

The third proposal involving markedness as an explanatory principle for SLA was made by Hyltenstam (1984) and also dealt with the occurrence of resumptive pronouns in the learning of relative clauses. Hyltenstam's claim is best depicted by the table in (5), which lays out the constellation of the four logically possible markedness combinations between the NL and TL for the initial stages of acquisition for a given structure.

(5) | NL STRUCTURE | TL STRUCTURE | L2 STRUCTURE |
      | --- | --- | --- |
| a. | unmarked | unmarked | unmarked |
| b. | unmarked | marked | unmarked |
| c. | marked | unmarked | unmarked |
| d. | marked | marked | unmarked |

Rows (a)–(d) in (5) show the four logically possible combinations of marked and unmarked structures between the NL and TL. Of particular note in (5) is the fact that the L2 always has only the unmarked structure at the initial stages of learning, regardless of whether the NL and TL have one or both of the marked and unmarked structures.

An intriguing case exemplifying the situation in row (5d) involves the very data that Hyltenstam (1984) reports, namely, the pattern of occurrence of resumptive pronouns in the Swedish relative clauses produced by some of his subjects. As stated above, resumptive pronouns in relative clauses cross-linguistically adhere to the Noun Phrase Accessibility Hierarchy, and thus reflect a markedness relationship in which the occurrence of a resumptive pronoun in a relative clause represents the unmarked counterpart with respect to the corresponding relative clause type where the resumptive pronoun does not occur. Thus, when one of Hyltenstam's subjects produced a Swedish relative clause with a resumptive pronoun, that subject was producing a less marked construction in relation to the corresponding TL relative clause. What is interesting is that a number of Hyltenstam's subjects produced a pattern of resumptive pronouns in Swedish relative clauses where these L2 patterns adhered to the NPAH, and neither the NL nor the TL allows resumptive pronouns in relative clauses. This situation corresponds to that in row (5d) above, in which both the NL and TL evince only the marked structure, but the L2 grammar reflects the unmarked structure.

Hyltenstam's results are significant for two reasons. First, he was able to account for the pattern of errors in terms of a markedness relation. Second, the L2 pattern was independent of both the NL and TL, while still conforming to a universal generalization, the NPAH. This latter point will be pursued further below.

More recent studies on the acquisition of relative clauses have focused on lower positions on the NPAH (Cristofaro and Giacalone Ramat 2002) and on languages with what Comrie (1998) refers to as 'Japanese relative clauses', which differ from

English relative clauses in that the relative clause precedes the head phrase it modifies, and the relativized NP is replaced by a gap instead of the NP being extracted from its clause. O'Grady, Lee, and Choo (2003) studied the acquisition of Korean relative clauses by English-speaking L2 learners. In the research by Cristofaro and Giacalone Ramat, the authors looked at relative clauses in Italian involving certain obliques and circumstantials of time. The authors found that despite the apparent unmarked status of these relative clause types, they were not acquired as readily as one would have expected. As there was no readily available explanation for this finding, the authors suggest that the topic be studied further. The study by O'Grady et al. (2003) addressed hypotheses regarding whether the accessibility of the subject and object positions on the NPAH is better described in terms of the linear distance between the head phrase and the relativized position as opposed to measuring the distance in terms of the depth of bracketing. Korean has 'Japanese-type' relative clauses, and provides a good test of these hypotheses, because the word order is SOV and the embedded sentence precedes its head. Thus, other things being equal, a relativized subject is farther from its head in terms of linear distance than is a relativized object. However, in terms of bracketing, relativized objects are farther away from their heads—again, other things being equal—than are relativized subjects. This is depicted below in (6), where the relative clause in question modifies the subject of the main sentence and 'e' represents the gap of the relativized NP.

(6)   a.   [[e [O V]] S O V]   relativized subject
       b.   [[S [e V]] S O V]   relativized object

What O'Grady et al. found is that object relatives were more difficult for English L2 learners of Korean than were subject relatives, supporting the hypothesis that the depth of bracketing of the relativized NP is paramount.

While relative clauses have, over the years, constituted a viable domain for syntactic studies in L2 acquisition—first, because it has been shown that languages differ widely with respect to the kinds of relative clauses they have, and second, because it has been demonstrated that this variation among languages can be characterized in terms of typological markedness—syllable structure has been the most productive domain for L2 studies involving markedness in phonology. There seem to be several good reasons for this. First, the construct of the syllable itself, along with its structure, is relatively uncontroversial among linguists. It is generally agreed that syllables consist of two main parts: an onset and a rhyme, with the rhyme being further subdivided into a nucleus and coda (Kahn 1980, Blevins 1995). Second, there exist a number of robust, cross-linguistic generalizations which describe the ways in which languages differ widely, yet systematically, in the kinds of syllable structure they exhibit. All languages appear to have the least marked syllable consisting of a single onset consonant followed by a vowel (open syllable). Other languages evince more marked syllable types, consisting of up to

four consonants in the onset (e.g. Polish) and five consonants in the coda (e.g. German, Swedish). Despite the relative complexity of onsets and codas in various languages, there are principles and empirical generalizations that describe the systematicity of syllable structure in terms of markedness principles (Greenberg 1978c).

L2 linguists have been able to use the systematic differences among syllable structures across languages to test the viability of markedness as an explanatory principle in SLA. The mechanism for such a test is to study language contact situations in which the NL and TL contrast sharply in their allowable syllable types, in that the NL allows only relatively less marked syllable types whereas the TL has syllable types which are relatively more marked. As a number of these studies have been reviewed in Eckman (2004), only two will be considered here for the purposes of exemplification.

Tarone (1976, 1978) was the first to argue for the syllable as the domain of L2 phonological analysis and one of the first to appeal to the unmarked open syllable as a constraint on L2 phonology. Tarone (1980) conducted an empirical study using subjects from three NL backgrounds—Cantonese, Korean, and Portuguese—in a research design intended to sort out the effects of NL transfer and language universals as constraints on L2 acquisition. She argued that many of the subjects' errors could not be explained on the basis of transfer, because the learners erred on syllable types that the NL allowed, yet the modifications to the TL codas suggested the learners' preference for open syllables.

The second example is a study by Broselow (1983) in which she showed that the different patterns of errors involving English onset clusters made by speakers of Egyptian Arabic, on the one hand, and by speakers of Iraqi Arabic, on the other hand, can be explained in terms of NL rules which have the effect of making relatively marked English onsets less marked. The data showed that while speakers of Egyptian Arabic generally broke up onset clusters by epenthesizing a vowel between onset consonants, speakers of Iraqi Arabic inserted the epenthetic vowel word-initially, before the consonant cluster. Where the epenthetic vowel was inserted was predictable on the basis of the NL syllable structure, and the result always created a less marked syllable type.

To sum up this section, the rationale behind using markedness as a predictor of difficulty and transfer in L2 acquisition seems clear. If structural markedness is a language-independent indicator of how basic, natural, or common a structure is in the world's languages, then it is a small step to the position that markedness in second language learning is a measure of relative difficulty and ease of transferability. The less marked a structure is, the easier it is to learn, and the less marked a construction is, the more likely it is to be transferred from the native to the target language. Investigations of L2 syllable structure provided some of the earliest evidence of the interaction of NL transfer and principles of markedness acting as constraints on the second language grammar.

The goals of this research programme that seeks to explain SLA in terms of typological universals evolved along two lines. First, the investigations of L2 learning turned to explaining facts about the second language grammars of adult learners by relating these systems to primary language grammars. More specifically, the aim was to show that L2 grammars adhered to the same universal principles and markedness constraints as do primary languages. The interest, in other words, moved away from accounting for L2 difficulty and transfer, and turned to showing that the same set of universal markedness constraints held for both primary and secondary languages. The second strand that evolved from this research programme has sought to show on even stronger grounds that L2 grammars adhere to the same universals as primary languages by using the universals themselves as intervention strategies in the teaching of L2 structures. However, before we focus attention on this work, we need to describe a crucial concept in this research: the notion of a 'learner language'.

3.   UNIVERSAL GENERALIZATIONS AND INTERLANGUAGE GRAMMARS

3.1 Interlanguage

The theoretical construct of a learner language was proposed independently by three different scholars and labelled 'idiosyncratic dialect' by Corder (1971), 'approximative system' by Nemser (1971), and 'interlanguage' (or IL), the term that has endured, by Selinker (1972). The idea behind this concept is that L2 learners construct their own internal grammar of the target language. The three researchers who proposed the idea of a learner language did not present any empirical evidence in support of it, but motivated their proposals on theoretical grounds. The crucial argument for the postulation of an IL, however, is an empirical one. It requires providing evidence of what is generally acknowledged to be the most interesting of L2 data, namely, a pattern of utterances that does not derive from NL transfer, because the NL does not evince the regularity in question, and cannot be explained on the basis of TL input, because the TL does not exhibit the relevant pattern either. In other words, neither the NL nor the TL can account for the observed systematicity, but, as with all regularities, an explanation is required. Therefore, a principle or rule of some other system, namely, the interlanguage grammar, must be hypothesized to underlie the observed regularity. We will consider two examples of this kind of evidence: one from L2 syntax and the other from L2 phonology.

The first example is reflected in the L2 relative clause data collected by Hyltenstam. As outlined above in section 2, several of his Spanish-speaking subjects produced Swedish relative clauses with a pattern of resumptive pronouns. As neither the NL in this case nor the TL allows resumptive pronouns in relative clauses, the pattern cannot be accounted for in terms of either the NL or the TL. Rather, it is necessary to posit a separate principle, a rule of the interlanguage grammar, to explain the data.

The second example of this kind of evidence comes from L2 phonology, and involves the necessity for postulating a rule of word-final obstruent devoicing in two different language contact situations. In one, there is no motivation for the devoicing rule in the NL because of a dearth of word-final consonants, and in the other, there is no justification for a devoicing rule because the NL has a final voice contrast in obstruents. The first case is reported in Eckman (1981a, b), in which it was argued that speakers from Cantonese and Spanish NL backgrounds performed differently on English voiced obstruents in codas. The subjects devoiced the TL final obstruents via a rule of word-final devoicing, where such a rule was not motivated for either the NL or the TL grammar. This was true for the grammar of Spanish because there are no alternations between medial voiced and final voiceless obstruents, and in the case of Cantonese because there are no underlying voiced obstruent phonemes. The second case was reported in Altenberg and Vago (1983) for Hungarian-speaking learners of English. It was shown that the L2 learners in question regularly devoiced word-final obstruents; this is not motivated by the English facts, nor is such a rule defensible for Hungarian, because Hungarian has a word-final voice contrast in obstruents. In such cases, one would expect that the learners would be able to produce TL voice contrasts successfully by virtue of the contrast existing in the NL. This was not the case, however. But what is especially interesting in both of these instances is that the resultant IL grammars evidenced a rule that is found in the grammars of many other languages. These data thus represent an example of an IL pattern that is not attributable to either NL transfer or TL input, but is attested in other languages of the world.

To summarize this subsection, the concept of interlanguage led explicitly to the possibility that L2 patterns could emerge which were independent of both the NL and TL. This development allowed L2 researchers to question whether IL grammars obeyed universal principles, an idea which has underlain many of the research programmes in SLA over the last few decades and to which we now turn.

3.2 Universals as constraints on interlanguage grammars

The type of L2 data that led to a refocusing of the research programme in SLA theory was the kind reported by Hyltenstam (1984) on resumptive pronouns in relative clauses, as well as the devoicing of word-final obstruents outlined in

Altenberg and Vago (1983) and Eckman (1981a), in which the L2 patterns adhered to markedness principles but the constructions in question were not in an area of difference between the NL and TL. These findings supported the assertion that although universal generalizations may be necessary to explain L2 utterances, NL/TL differences may not be necessary. This idea is embodied explicitly in the Structural Conformity Hypothesis (SCH), stated as in (7) below (Eckman et al. 1989, Eckman, Moravcsik, and Wirth 1991).

(7) *The Structural Conformity Hypothesis* (Eckman 1991: 24)
     The universal generalizations that hold for primary languages hold also for interlanguages.

The primary motivation for the SCH is an L2 pattern in which the structures adhere to markedness principles, but the constructions in question are not in an area of difference between the NL and TL. Since the pattern does not arise in an area of NL/TL difference, it is not explained by the MDH, even though such patterns seem to fall under the spirit, if not the letter, of the MDH. One way to address this shortcoming was to eliminate NL/TL differences as a criterion for invoking markedness to explain the facts. Essentially, then, the SCH is the result of stripping NL/TL differences from the statement of the MDH. If we can assume that a learner will perform better on less marked structures relative to more marked structures, then the MDH can be seen as a special case of the SCH, namely, the case in which universal generalizations are obeyed by the IL in question, and the structures for which the generalizations hold are ones in which the NL and TL differ.

Most of the data that has been reported in testing the Structural Conformity Hypothesis has been in the area of L2 phonology, though there has been some work in syntax. The most interesting kind of evidence that bears on the hypothesis is an interlanguage pattern that is neither NL-like nor TL-like, but nevertheless obeys the kinds of universal patterns found in some of the world's languages. We consider first several studies as examples in the area of phonology (see Eckman 2004 for a more complete review) and then turn to syntax.

Within second language phonology, there has been a significant amount of work on syllable structure, in particular, consonant clusters in onsets and codas. These kinds of data have been reported in Eckman (1991), Carlisle (1997, 1998), and Eckman and Iverson (1994), to cite just a few. Each of these studies considered the case of consonant clusters in onsets or codas, where the TL allowed a greater number of clusters, as well as more marked clusters, than did the NL. In Eckman (1991), the data were obtained using several elicitation tasks, including a free-conversation interview, from eleven ESL learners—four speakers each of Japanese and Korean and three speakers of Cantonese. The speakers' performance was analysed using an 80%-threshold criterion to determine whether a given cluster type was part of a subject's IL grammar. This determination was then used to test the SCH using several universal generalizations about the co-occurrence of

consonant cluster types in a language. Out of over 500 such tests, the hypothesis was shown to hold in all but five cases. The studies by Carlisle (1997, 1998) also tested the occurrence of consonant clusters, but in the interlanguage grammars of Spanish-speaking learners of English. The specific hypotheses tested by Carlisle predicted that more marked clusters would be modified by the learners more frequently than related clusters that were less marked. Carlisle's studies supported the hypothesis in each case and also were consistent with the SCH, but had the additional advantage of supporting the predictions of the hypothesis without imposing a criterial threshold on the data. Finally, Eckman and Iverson (1994) analysed English complex codas as produced in free conversation by native speakers of Japanese, Korean, and Cantonese, none of which allow complex codas. The findings showed that the learners made more errors on the more marked codas, with the consequence that the respective IL grammars had the more marked cluster type only if it also exhibited the less marked type. A common thread running through these studies supporting the SCH is that the IL grammars contain cluster types that are more marked than those allowed by the NL, but not as marked as those required by the TL. In this respect, the IL grammars fall between the NL and TL, but always in a way that is in conformity with universal generalizations.

The L2 syntactic study that bears on the SCH considered the acquisition of English questions. Eckman et al. (1989) elicited yes/no questions and wh-questions from ESL learners who came from one of three NL backgrounds: Korean, Japanese, or Turkish. The relevant universal generalizations came from work by Greenberg (1963a) and are stated in (8).

(8) a. If a language has inversion of the subject and verb (auxiliary) in yes/no questions, that language will also have inversion in wh-questions, but not vice versa.

     b. If a language has inversion in wh-questions, it will have sentence-initial wh-words.

Subjects from Korean, Japanese, and Turkish NL backgrounds were chosen because none of these languages forms questions with inversion, nor do they require that wh-words be sentence-initial. The results showed that the generalization in (8b) was upheld by all fourteen IL grammars, while (8a) was confirmed by thirteen of the subjects and disconfirmed by one, who systematically inverted subjects and auxiliaries in yes/no questions, but inverted these elements in only about half of the wh-questions. As no explanation could be found for the violation of the universal in (8a), the authors concluded that the SCH was generally supported, but not as strongly as one would like.

To summarize, the research programme that began by invoking principles of markedness moved away from attempting to account for various aspects of learning difficulty and NL influence to trying to explain in terms of universal

generalizations why interlanguage grammars are the way they are. The goal was to show that IL grammars had the properties they did because they were specific instances of a more general phenomenon, namely, a human language. As such, ILs should adhere to the same universal generalizations as primary languages. Another strand of this approach to SLA attempted to support the SCH on even stronger grounds by showing that implicational generalizations could be used as strategies for intervening in the learning of second languages. This work is taken up in the next section.

3.3 Universals as strategies for intervention in interlanguage grammars

The approach to testing the SCH by using typological universals as principles for teaching second languages has been used in L2 syntax and has focused exclusively on relative clauses. The rationale for the intervention strategy is to take advantage of the implication embodied in the markedness relationship. By teaching the learner only one of two or more structures that are in a markedness relationship, the goal was to enforce the universal constraints on the developing L2 system in such a way as to enhance generalization of learning. In short, the strategy is to attempt to teach a relative clause system containing, say, only the oblique (object of a preposition) relative clause type, a system which is prohibited by the Noun Phrase Accessibility Hierarchy. The anticipated result of this intervention is that the learner would not acquire the forbidden targeted system, but would instead generalize the formation of relative clauses to other positions on the NPAH, such as the indirect object, direct object, and subject, thereby acquiring a system that is sanctioned by the hierarchy. In other words, using implicational universals as an intervention strategy has the aim of causing the learners to generalize their learning from the structure being taught to structures which are not being taught. Indeed, if the SCH is correct, and if the learners acquire the structure being taught (in this example, oblique relative clauses), then the learners would generalize in the direction from more marked structures to less marked structures, but not necessarily from less marked structures to more marked ones. There have been three studies in this area, each of which will be discussed in turn.

The first study using this general strategy was Gass (1982), which used a control group and one experimental group. Both the experimental and the control group were being taught English relative clauses using the same textbook. After the two groups were given the pre-test measures, the control group was taught three kinds of relative clauses—subject, direct object, and oblique—using only the lessons in the text, which presented the different relative clauses beginning with the least marked and proceeding to the most marked. The experimental group received instruction on only the oblique-type relative clause. The instruction for each group

was carried out over three days. Results showed that neither group possessed much identifiable knowledge of relative clauses on the pre-test, which yielded scores on the pre-test that were not statistically significant between the two groups. The results on the post-test, however, showed that only the experimental group's scores, and not those of the control group, were significantly different from the pre-test.

This study was replicated and extended by Eckman et al. (1988), in which one control group and three experimental groups were used. The subjects were given a pre-test that required them to combine two sentences into one sentence containing a relative clause. The subjects were then randomly assigned to one of four groups that were balanced on the basis of the pre-test and native-language background. Each of the experimental groups was subsequently given a one-hour lesson on relative clause formation in which only one relative clause type was taught: one group was instructed on how to form only subject relative clauses; the second group was taught how to form only direct-object relative clause types; and the last group was instructed on only oblique relative clauses. The control group was given a lesson on something other than relative clauses. Three days after the instruction, the post-test was administered. The results showed that the students in the control group did not perform any differently than they did on the pre-test. The subjects who were trained on the subject relative clause learned only that relative clause type, and did not successfully generalize the instruction to the direct-object or oblique type of relative clause. Those who were instructed on the direct-object relative clause generalized this instruction to subject relative clauses, but not to the oblique type; and finally, the students who received instruction only on the oblique relative clause generalized to both the subject and direct-object relative clauses. In short, the hypothesis that generalization of instruction would proceed unidirectionally from more marked structures to less marked structures was supported.

The third study on using the principle behind the Noun Phrase Accessibility Hierarchy to intervene in the instruction of relative clauses was by Doughty (1991). Her research investigated the performance of students who were trained on English relative clauses using computer-assisted instruction. Along with the markedness of the relative clause type used for training, Doughty also investigated whether rule-based or meaning-based instruction had an effect on the learning. Her results showed that subjects learned equally well under both types of instruction, and that the subjects' generalization of learning went in the direction from the more marked to the less marked relative clause type, not the reverse.

One possible explanation for these results has been suggested in terms of the relative difficulty needed for a subject to process relative clauses formed by relativizing positions lower on the NPAH versus what is required in processing relative clauses formed on the basis of positions higher on the hierarchy. This kind of explanation has been made explicit in work by Wolfe-Quintero (1992), who postulated that relative clause types that are lower on the NPAH involve a relative pronoun whose position in its own clause is included by more structural brackets

than those higher on the hierarchy do (see Hawkins, this volume). That is to say, relative clauses in which an oblique NP is relativized involve moving an NP to the front of the relative clause from a position which is more embedded in terms of phrase structure brackets than does the relativization of an NP which is higher on the NPAH and therefore included within fewer such brackets.

As discussed above in section 2, this kind of explanation was explicitly tested by O'Grady et al. (2003), who investigated the acquisition of Korean relative clauses by native speakers of English. The acquisition of Korean relative clauses is a good test for this explanation; first, because Korean has subject–object–verb canonical word order; and second, because Korean has pre-nominal relative clauses.

To summarize, the three studies that have employed the implicational generalizations underlying the Noun Phrase Accessibility Hierarchy as intervention strategies have shown that L2 learners will necessarily generalize from more marked structures to less marked structures, but not vice versa. We conclude this chapter with a brief discussion of what appears to be a fruitful avenue for future SLA research using typological generalizations.

4. FUTURE RESEARCH

Although a number of areas may be potentially fruitful for future research on second language acquisition and linguistic typology, limitations of space will allow citation of only three.

The first area for future research is actually a continuation of a strand of work that is ongoing, namely, the gathering, reporting, and analysing of L2 regularities which cannot be derived from NL influence and cannot be accounted for on the basis of TL input, but which nevertheless are attested in the grammars of other languages of the world, and further, which obey universal generalizations. Such data test on some of the strongest possible grounds the claim embodied in the Structural Conformity Hypothesis that IL grammars obey the same universal principles as do the grammars of primary languages.

It is worth noting that the importance of this kind of L2 data cuts across different approaches to SLA theory. For example, there is a significant literature on the role that Universal Grammar (UG) plays in constraining IL grammars. Much of this work attempts to gather L2 data that bears on a principle of UG to see whether the IL grammar in question adheres to the UG principle or violates it. Schwartz and Sprouse (2000) point out the fact that, in many cases, the results of the L2 research become moot because generative linguists make new proposals regarding UG constructs, and these proposals, when defensible, often obviate the principle that

was brought to bear on the IL grammar. Schwartz and Sprouse advocate, as a way of avoiding the situation where the UG construct being tested is superseded, that researchers should attempt to report L2 patterns that are not attributable to NL influence or TL input, but are attested in the grammars of other languages. The authors argue, in effect, that in whatever way UG ultimately characterizes these patterns for primary languages, the same principles can be employed to explain the IL data.

The second area that appears to be fertile ground to explore is L2 acquisition studies using a TL other than English. There is some recent research in this area, especially the papers appearing in Giacalone Ramat (2003), in which studies involving the acquisition of Chinese, French, German, Italian, and Swedish are published.

And finally, the third area which would likely bear fruit for research on SLA and linguistic typology involves studies on the acquisition of constructions that have not yet been widely analysed in the L2 arena. There are a number of such constructions, again, in Giacalone Ramat (2003), including the L2 acquisition of indefinite pronouns, possessives, gerunds, and left dislocation.

FURTHER READING

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CHAPTER 29

LINGUISTIC TYPOLOGY AND LANGUAGE DOCUMENTATION

PATIENCE EPPS

1. INTRODUCTION

Linguistic typology and language documentation are closely aligned, even symbiotic endeavours. In its search to define the limits, patterns, and explanations that characterize cross-linguistic variation, typology's commitment to an empirical approach gives it a crucial dependence on the linguistic enterprise that provides these data. This is language documentation, the process of creating records of individual languages—i.e. gathering a sample of data that represents a given language as fully as possible, and making this accessible to others, most notably non-speakers. In turn, the activities of documentation—determining the type of data to gather and the methods of doing so, and processing and representing these data for others—involve the application of cross-linguistically relevant constructs. Accordingly, they rely on typology.

In the past decade, documentary linguistics has emerged in its own right as a field of linguistic inquiry. It prioritizes the production of a rich, diverse, and extensive corpus, consisting primarily of naturally occurring discourse, and includes among its

foci concerns about data preservation, accountability, interdisciplinary cooperation among researchers, and direct involvement of speech communities (Himmelmann 2006: 15). The goals of documentation are thus not identical to those of traditional linguistic description, which prioritizes the representation of the patterns underlying the data and focuses on the production of grammars and dictionaries (Himmelmann 1998, Lehmann 2001, Woodbury 2003). Nevertheless, documentation and description are in practice inseparable, in that appropriate data collection and representation necessarily involve descriptive analysis, and vice versa.[1] In this chapter, therefore, 'documentation' is understood as the broader endeavour that includes both data collection and analysis, while the term 'description' is reserved for the more analytical parts of the documentary process.

This chapter explores the close partnership between linguistic typology and language documentation. The discussion focuses first on the contributions of documentation to typology, particularly in shaping efforts to define universals and to make sense of linguistic diversity. Turning to the other side of the coin, it examines the importance of typology to the documentary enterprise and explores typology's role in informing the representation of the language, ensuring its accessibility, and identifying ways in which it may be further refined. The final section considers future directions. Given the mutually constitutive nature of the relationship between these two areas of linguistic investigation, we may expect these to be fruitful.

2. THE IMPORTANCE OF DOCUMENTATION TO TYPOLOGY

2.1 Issues of universality

The field of linguistic typology has traditionally focused on defining universals, the constraints on what is possible in human language. This endeavour is crucially empirical; typology bases its generalizations on broad cross-linguistic comparison. This, of course, is a principal point of contrast between typological and 'formalist'

[1] As Woodbury (2003: 42) puts it, 'there is a dialectical relationship between corpus and apparatus—the corpus informs the analytic apparatus; but analysis—including everything you bring to the table when doing grammatical and lexical elicitation—in turn also informs the corpus. Likewise, almost any presentation of documentary work requires grammatical analysis—transcription requires a phonological analysis, and lexical presentation in the form of a thesaurus or dictionary requires morphological and lexical analysis.' The view taken here contrasts to some degree with that of Himmelmann (1998), who posits a sharper break between documentation and description. Both documentation and description are sometimes referred to as 'field linguistics'.

approaches to language, associated with Chomsky's concept of universal grammar, which postulates universals on the basis of one or only a few languages (e.g. Chomsky 1980).

In typology, cross-linguistic generalizations may be phrased as absolute universals—i.e. exceptionless statements that hold true for all languages—but may also be conceived as tendencies (statistical universals), or as conditioned statements of the form 'if a language has X, it will also have Y' (implicational universals; Greenberg 1963b). An emphasis on tendencies rather than absolutes has continued to gain priority in typological work—again in contrast to formalist approaches, which have focused on exceptionless universals in the attempt to define an innate language endowment (i.e. that which all children are assumed to bring to the learning of language).

Documentary linguistics is largely responsible for this shift of focus from absolute universals to tendencies. Ever since Greenberg (1986: 15) himself noted 'the meagerness and relative triteness of statements that were simply true of all languages', the wealth of newly described languages entering the typological database has falsified claim after claim of universality (Bickel 2007: 242; see Plank and Filimonova 2000, Plank and Mayer 2006, Plank 2003c). As Haspelmath (2007: 122) has observed, 'almost every newly described language presents us with some "crazy" new category that hardly fits existing taxonomies'. True absolute universals of all kinds—even implicational ones—have proven to be exceedingly rare (Evans and Levinson 2009).

There is no shortage of examples that illustrate the role of data from particular languages in stretching the limits of what was thought possible. A well-known case is the 'discovery' of object-initial word order in a number of Amazonian languages (Derbyshire 1977; also see e.g. Munro 2003: 147, Olawsky 2007), which required a substantial revision of our understanding of cross-linguistic word order constraints. Hajek (2007) calls attention to the unusual word-initial consonant clusters in the Austronesian languages Taba and Leti, which contradict several of Greenberg's (1978c) generalizations about possible phonotactic structures. Blevins (2007) observes that the extensive discussion of sibilant harmony in the phonological literature—i.e. the phenomenon by which coronal sibilants within the word (or other domain) all agree with each other in terms of secondary place features (e.g. retroflex vs. non-retroflex)—rests mostly on descriptive data from a handful of North American languages. And Evans (2007b: 24–5) notes the theoretical and typological significance of the remarkable system of multiple case-marking in the Australian language Kayardild, where case-markers can stack on a single noun phrase, and can even contribute information relating to tense and mood in addition to syntactic role.

Criticisms that attention to such rara amounts to no more than 'butterfly collecting' (Chomsky 1998[1977], cf. Johnson 2002) are thus clearly unfounded. It is the documentation of individual languages and the attention to specific

features of these languages that enable typologists—and other linguists—to shape our definition of human language, as well as to predict linguistic patterns that are not yet attested (Blevins 2007: 10). Moreover, many of these data come from endangered languages, a fact which underscores the importance of recording these languages as quickly and as thoroughly as possible (and, where possible, helping to revitalize them). The attention to language endangerment is a critical component of the documentary initiative; it is likewise important to typology, since only living languages will ensure a continued source of data for cross-linguistic comparison.

In addition to contributing data to test cross-linguistic generalizations, language documentation is a prerequisite for a balanced representation of the world's languages, one that takes into account the full range of genealogical (genetic) and geographical diversity. Typologists are well aware that sampling is subject to areal bias, and that limiting this requires that each of the world's major geographical regions be well represented in the sample (Dryer 1989, 1992). Yet our current knowledge of the world's languages is far from equally distributed. Whole areas of the world are represented by languages that are highly exotic from the perspective of most linguists, in comparison to the more thoroughly studied languages of Europe. Amazonia and New Guinea represent two of the most extreme cases: in these regions, linguistic diversity is remarkably high (both in terms of numbers of languages and their relation to each other),[2] but documentation is minimal—and many of the languages are highly endangered.

Nevertheless, the past two decades have seen a remarkable burst of documentary studies in many of these chronically underrepresented regions. The impact on typology has been considerable, leading to substantial revisions of earlier generalizations. Dixon and Aikhenvald (1999: 1) note that Amazonian languages have been a particularly rich source of typological surprises: 'In case after case, just as [Dixon] thought he had achieved some significant typological statement, a counter-example popped up; and this was invariably from a language of Amazonia.' The example of object-initial word order, cited above, is a case in point; if linguists had been as familiar with Amazonian languages as they were with European languages at the time of Greenberg's (1963b) ground-breaking survey, it is likely that object-initial word order would never have been thought to be so unusual, let alone impossible. A similar example concerns Greenberg's generalizations about subject–verb order inversion in questions; these were based entirely on languages of Europe (nearly one-fourth of his sample), but in fact, subject–verb order inversion is extremely rare outside this region. Of the few non-European languages that do exhibit this typologically unusual strategy, at least two Amazonian languages—Hup (Nadahup/Makú family; Epps 2008) and Warekena (Arawak family; Aikhenvald

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[2] For example, Amazonia has some 240 languages (still spoken), comprising 52 distinct linguistic groupings (Rodrigues 2000).

1998)—violate Greenberg's proposed implicational universal that inversion of subject and verb occurs in yes/no questions only if it also occurs in interrogative word questions.

As this discussion has illustrated, linguistic typology recognizes that our generalizations about human language are crucially dependent on data from a wide range of individual languages. Nettle and Romaine (2000: 10–11; see Austin and Simpson 2007: 6) observe that 'to exclude exotic languages from our study is like expecting botanists to study only florist shop roses and greenhouse tomatoes and then tell us what the plant world is like'. Language documentation is the essential means by which these languages may be included.

2.2 Issues of diversity

As documentary data from more and more languages become available, typologists are gradually coming to grips with the remarkable extent to which languages may vary. As Evans and Levinson (2009) argue, the extraordinary extent of this diversity has profound implications: the human capacity for language may well be far more complex than the innate, invariant, and finite faculty proposed by Chomsky. At the same time, an expanded data set enables us to revise and refine our understanding of the patterns and tendencies that do exist. Rather than characterize diversity according to 'sharp boundaries between possible and impossible languages, between sharply parameterized variables, or by selection from a finite set of types', diversity is better represented as 'clusters around alternative architectural solutions, by prototypes (like "subject") with unexpected outliers, and by family-resemblance relations between structures ("words", "noun phrases") and inventories ("adjectives")' (Evans and Levinson 2009: 446). In other words, as Bickel (2007: 245) puts it, 'linguistic diversity is captured by large sets of fine-grained variables, not by grand type notions'.

The emerging awareness that a more sophisticated understanding of language requires a closer attention to variation, detail, and complexity calls for an ever more fine-grained approach to typology (see Bickel 2007: 247). Such an approach is exemplified in a number of recent contributions to the field, many of which ground their discussion in a corpus of primary data from a newly documented language. For example, Seifart (2009) observes that the system of nominal classification in Miraña, a Bora-Witotoan language of Amazonia, defies characterization according to the limited set of prototypes established for classifier systems cross-linguistically. Accordingly, he argues for the need to 'shift the focus away from broad types defined by relatively few characteristics as the basis for typological characterization and comparison towards a model which uses a larger number of more detailed and more varied parameters' (Seifart 2009: 365). Similarly, Schultze-Berndt (2007) discusses how a detailed investigation of the expression of motion events in Jaminjung (a non-Pama-Nyungan language of Australia) informs a revision of

Talmy's (1985, 1991) typology. While Talmy distinguishes between 'satellite-framed' languages (in which path is expressed lexically as a 'satellite' to the motion verb) and 'verb-framed' languages (in which both path and motion are lexicalized in the verb itself), the Jaminjung data suggest that concepts like 'satellite', 'path', and 'manner' require more nuanced definitions (see also O'Connor 2009 for Lowland Chontal of Oaxaca, Mexico).

Discussions like those of Seifart and Schultze-Berndt highlight the mutually constitutive nature of documentation and typology. A more fine-grained typological understanding necessarily rests on a comparably fine-grained catalogue of cross-linguistic variation, which in turn requires more detailed descriptions of individual languages, informed by knowledge of the relevant parameters on the part of the linguists doing the documentation. As Khanina (2009) illustrates with the case of desideratives—expressions of wanting—a refined typology crucially informs the quality of description and documentation, and vice versa.

The goal of refining our typological focus is well served by contemporary documentary methodology, which stresses the collection of a large and diverse corpus. The corpus is expected to capture an extensive range of data types, spanning genres, styles, registers, speakers, etc., and presenting these in multimedia formats. In addition to detailed descriptive records, it includes ethnographic and sociolinguistic notes (see Himmelmann and Evans 2007, Lehmann 2001, Franchetto 2006). The principal focus of documentation is naturally occurring discourse (see Woodbury 2003, Sherzer 1990), but many linguists agree that elicitation is also a valuable source of data (Chelliah 2001), as are 'hybrid' techniques that bridge naturalistic data collection and structured elicitation (Bowerman 2007).

The extensive diversity and depth of the documentary corpus increase the likelihood that it will be a relatively complete representation of the spoken language, and one that can inform fine-grained typological investigation. The study of evidentiality, the grammaticalized expression of information source, provides an excellent example of this point. Speakers often omit evidentials altogether in elicited utterances (Aikhenvald 2004: 18); as Seki (2000: 347, cited in Aikhenvald 2004: 18) describes for Kamaiurá (Tupi-Guarani), this may result in sentences that native speakers find 'artificial, sterile, deprived of colour'. In contrast, Lidz (2007) notes that a full investigation of a complex evidential system may only be possible with some elicitation, as in the case of Yongning Na (Tibeto-Burman), in which evidentiality interacts with verbal semantics and a conjunct/disjunct-like system. Even in natural discourse, the use of evidentials may be highly variable; for example, in Hup (Nadahup), non-visual and inferred evidentials are common in spontaneous conversation, but are quite rare in narrative (which uses primarily the reported specification; Epps 2008: 641–54). Similarly, Michael (2008) shows that speakers of Nanti (Arawak) use more evidentials when concerned about personal responsibility for an event, and fewer evidentials in other situations.

While typological work to date has drawn primarily from descriptive grammars, the extensive corpus generated through documentation—and made available by archiving—promises to be a far richer source of data for typology. The documentary corpus makes it possible for typologists to compensate for gaps in grammars, and allows for double-checking and second opinions (Wälchli 2007, Blevins 2007: 4). Moreover, as we saw for evidentials, a diverse corpus provides information on language-internal variation—not only across genres, styles, speakers, and discourse contexts, but also across linguistic structures. This last point may be of particular interest to typologists, in light of Bresnan's (2007) recent observation that many patterns of variation in language-internal preferences for particular structures show significant correlations with similar patterns of cross-linguistic variation. For example, Bresnan (2007: 300) observes that variation in the choice of the double object construction vs. an indirect object for certain verbs in English (e.g. *Ted denied Kim the opportunity to march* vs. *Ted gave Joey permission to march, but he denied it to Kim*), depending on whether the sequences of objects involve nouns or pronouns, mirrors a very similar cross-linguistic pattern described by Haspelmath (2004c).

Such information on structural variation is often missing from grammars, which tend to present a normalized view that neglects unsystematic or infrequent structures (Wälchli 2007); likewise, marginal structures may also be overlooked if our techniques of data collection are too restricted (Bresnan 2007). Accordingly, Bresnan (2007: 302) stresses 'the need to support claimed generalizations with multiple empirical sources of converging evidence, including observations of ecologically natural language use'. This need holds true equally for typology and for linguistic description. Both approaches to linguistic analysis seek to generalize across a particular domain, as Moravcsik (2007: 34) observes—typology across languages, description across utterances within a single language. Just as typological investigation is moving toward a more fine-grained, detailed approach to cross-linguistic variation, so will the move toward a richer and more thorough documentation result in finer-grained analyses of individual languages—thereby enriching the continued partnership between the two enterprises.

In addition to fostering a more nuanced approach to typological questions, the growing attention to linguistic diversity is shaping a new focus in the discipline: Rather than simply attempting to define what is universal in human language, typologists are now turning to explanations for why diversity is the way it is—'What's where why?' (Bickel 2007: 239). This question demands the consideration of multiple variables: not only universal preferences, but also geographical and (genetic) genealogical distributions, diachronic change, and the interaction between language and social, cognitive, and cultural factors. This last consideration, in particular, entails a clean break with assumptions that have shaped much of linguistic thinking in the past decades, that *knowledge* of language (Saussure's 'langue', Chomsky's 'competence', limited primarily to grammar and lexicon) can and should be studied independently of its *use* (Saussure's 'parole', Chomsky's

'performance'). Rather, it posits that 'observed structures arise, through time, by summing the outcomes of many communicative acts by individuals' (Evans 2003a: 15; also see Keller 1994, Haspelmath 1999b).

Again, the priorities of documentary linguistics closely parallel this emerging concern of typologists. Contemporary documentary methodology emphasizes that data collection and analysis must focus on language *in use*, and takes the perspective that 'linguistic meaning cannot be treated separately from the "encyclopedic" content of the relevant culture and society' (Hudson 2007: 7; see also Lehmann 2001: 90, Hill 2006). Such an organic approach is essential if we are to achieve a more complete typological understanding of diversity. While the role of cultural context in shaping linguistic structures has long been overlooked, it is illustrated in a number of recent discussions of typologically noteworthy phenomena in particular languages. For example, Evans (2003a) observes that kin-sensitive pronouns and dyadic kin terms in some Australian languages (e.g. 'they two' [= husband and child of speaker], 'father and child') illustrate the intrinsic link between these linguistic structures and their cultural context. Similarly, in the Amazonian language Hup (Nadahup), most nouns referring to generic types of human beings ('child', 'shaman', 'youth', 'woman') must be preceded by another noun (typically, either an ethnic denomination or a default third person singular pronominal form). Elsewhere in the language, this 'bound' construction is associated with inalienable possession (e.g. kin terms) or the inherent relationship between a part and a whole (e.g. plant parts); its occurrence with generic human nouns is typologically unusual, but may derive from the cultural emphasis on the person as inherently associated with a social group (Epps 2008: 258–9).

This holistic view of language as inseparable from its social and cultural context has implications not only for explanations of *why* the objects of typological investigation exist, but also for determining *what* should be investigated in the first place. As Rumsey (2007) points out, the focus of typology has traditionally been 'langue' (i.e. lexicon and grammar), but considerations of 'parole' may be equally interesting areas of study. For example, parallelism, or structured repetition in discourse, is an important component of verbal artistry in many of the world's languages; moreover, its basis in notions of 'equivalence' can inform our understanding of grammar and semantics, both language-internally and cross-linguistically (Rumsey 2007; also see Fox 1977, Jakobson 1960). Similarly, Evans (2007b) considers the typological and sociolinguistic relevance of the special registers (initiation, respect, etc.) encountered in Australian languages, and notes the semantic insights they bring to the study of the corresponding 'everyday' forms (Evans 2007b: 34). Even for those linguistic phenomena that have traditionally been considered elements of 'langue', a fine-grained typological understanding can hardly ignore considerations of language in use. This is certainly the case for evidentials, for which realization and function depend heavily on usage, as discussed above. It also applies to personal pronoun systems, which relate to categories of possible kinds of speaker and

addressee, and the relationships among them (Rumsey 2007, Evans 2003a); and likewise to lexical phenomena, such as idioms (Thurston 2007). It is documentary linguistics that gives typologists access to these usage-based data; at the same time, typological interest in such diverse phenomena highlights the need for documentation to be thorough, broadly inclusive, and ethnographically rich (Rumsey 2007, Evans 2007b: 34).

3. THE IMPORTANCE OF LINGUISTIC TYPOLOGY TO DOCUMENTATION

3.1 Issues of representation

Making a language accessible to non-speakers is a crucial commitment of documentation—indeed, this is its primary purpose (Lehmann 2001: 86). This activity requires representation, the elaboration of what Himmelmann and Evans (2007) call 'raw data'—recordings of communicative events—to produce 'primary data'— transcriptions, translations, and linguistic and ethnographic commentary. Representation rests on analysis (see Lehmann 2001, Woodbury 2003), the exposition and explanation of patterns in the data—i.e. the descriptive part of the endeavour—which in turn shapes the ongoing development of the corpus itself (Woodbury 2003: 42; see section 1 above). Finally, analysis, by definition, entails an abstraction from the language itself: this involves categorization, which makes it possible to represent the infinite number of linguistic utterances in finite and relatively concise terms, and it involves a metalanguage, which allows us to communicate these generalizations effectively to others.

In other words, efficient representation requires typology. Particularly in communicating patterns, but also in discovering them, we rely on constructs that have some degree of relevance beyond the language itself. For example, accurate transcription requires phonemic representation: to represent a particular phoneme as /t/, we have to define its instantiation as a phonetic category in the language in question, and recognize that this category shares certain (though probably not all) features with those represented as /t/ in a variety of other languages.

Yet there is considerable flexibility in the extent to which representation must rely on cross-linguistically defined concepts, as evidenced by early structuralist experiments in describing languages entirely 'in their own terms' (see Boas 1911, Dryer 1997a, Haspelmath 2007). These efforts led, for example, to Garvin's (1948) classification of Kutenai word stems into the classes 'W', 'X', and 'Y' on

morphological grounds—even though W and X correspond semantically to what are traditionally called 'nouns' and 'verbs' (see Dryer 1997a: 117).

Most linguists agree that Garvin's solution is not ideal. It is unwieldy, in that it requires us to learn a new metalanguage for each language under investigation; it inhibits forming and testing predictions about the internal interactions among subsystems of the languages; and it obscures not only the similarities between this language and others but also the potentially interesting points of variation. Yet typologists are also well aware that on some level, Garvin's solution is reasonable, in that it recognizes that structures such as word classes are not identical across languages (Dryer 1997a: 117). This is a basic problem for typology: we need to be able to compare structures across languages, but these structures vary from language to language (e.g. Croft 1991, 2000b, Dryer 1997a, Haspelmath 2007, 2008b, Stassen, this volume). Likewise, it is a problem for linguistic description: we cannot have confidence in our metalanguage—we cannot reasonably call something a 'verb' or an 'adjective'—without accepting that these categories have some cross-linguistic validity.

Typology offers a solution to this problem. While particular categories—like 'verb', 'adjective', and 'subject'—are not invariant or even necessarily attested across all languages, typologists have recognized that they are useful descriptive labels that capture real tendencies. In other words, they represent cross-linguistically relevant categorial prototypes (Croft 1991, 2000b, 2007b, Dryer 1997a, Haspelmath 2007, Evans and Levinson forthcoming). This has profound implications for linguistic description: Just as the documentation of particular languages has allowed us to generalize more accurately across languages, these generalizations, in turn, give us the tools to represent effectively the structures found in particular languages.

While an understanding of cross-linguistic similarities is important for coherent description, an awareness of how languages differ is likewise essential. It is by now a commonplace in the descriptive and documentary literature that our native and familiar languages can act as blinders, preventing us from understanding a language on its own terms (e.g. Gil 2001, Blevins 2007). Examples of such skewed representations abound; for example, many grammatical descriptions written prior to the 20th century present languages having no morphological case (such as English) according to the six-case Latin model (ablative, genitive, vocative, etc.; see Haspelmath 2008b, Gil 2001). Similarly, French priests describing the Nadahup languages of Amazonia, in which nouns are not usually marked for gender, exaggerated the frequency of masculine and feminine class terms with animate nouns, in explicit parallel to the grammatical gender of Romance languages (Rivet, Kok, and Tastevin 1925). An awareness of just how diverse languages can be— a perspective contributed by typology—helps us to understand familiar patterns as only one option among many. It encourages us to be open to the new patterns we encounter in the documentary process, to meet Hockett's (1993: 4, cited in Blevins 2007: 4) challenge to 'let [the language] show us how it works—instead of trying to

force matters into some conceptual frame of reference we have imported, perhaps without realizing it, from elsewhere' (also see Gil 2001).

Most contemporary descriptive work has clearly progressed far beyond the use of Latin or French as an explicit model for representing an undocumented language. Nevertheless, the lessons of the past also remind us that—just as the documentation of the world's existing languages is far from complete—the typological 'deconstruction of the Eurocentric metalanguage' (Daniel 2007: 74) is an ongoing process. Thus while typology gives us valuable tools for understanding and representing a particular language, these tools should not be applied uncritically. Approaches that rely too heavily on a predetermined typological 'template' risk overlooking or obscuring interesting features of the language, as noted by Baerman and Corbett (2007) for Tübatulabal (Uto-Aztecan) aspect-marking, and by Lüpke (2007: 187) for Jalonke (Mande) voice. Gil (2001: 126–8) observes the trade-off between a 'bottom-up' approach, which starts with the data and allows categories and structures to emerge, and a 'top-down' approach, which relies on a predetermined set of grammatical categories. Any descriptive or documentary effort will necessarily involve both of these approaches to some degree, and it is up to the fieldworker to strike the appropriate balance.

3.2 Documentation, typology, and 'theory'

The tension between the general and the particular—their role both in the representation of individual languages and in our understanding of what constitutes human language more generally—underscores the inseparable relationship between theory and the representation of a particular language. This is particularly clear in the case of descriptive analysis; as Gil (2001: 126) observes, description requires proposing categories and formulating generalizations about them, just as any empirically grounded theory must account for a range of facts (also see Dixon 1997). However, this is also true of the documentation process more broadly; even the collection of raw data must be theoretically informed if it is to result in a relatively complete corpus, representative of the various grammatical structures, genres, styles, and other linguistic resources available to speakers.

Nevertheless, a widespread perception persists among linguists that 'theory' and 'description' are 'fundamentally separate' (Eastman 1978: 3), even diametrically opposed. As Van Valin (2007: 253) observes, the history of this opposition in 20th-century linguistics has been a strained one, marked by the 'conflict between the desire to capture the "structural genius" of languages (Sapir 1921) and the desire to capture what is universal in human language' (also see Gil 2001: 126). However, much of this tension can be attributed to an assumption that 'theory' in linguistics is synonymous with 'formalism', i.e. a type of approach that involves a highly specific metalanguage, with the goal of producing an abstract model of speaker knowledge. Yet 'theory' is better understood as a mechanism for reducing

complexity by means of generalizations (e.g. Gil 2001: 126), or as a set of explanations for why languages (or their particular features) take the form they do (Dryer 2006b), and is thus by no means the exclusive domain of formalists (see also Dixon 2009, Blevins 2007: 4).

The theoretical framework employed in most documentary and descriptive work is essentially the same approach that is taken by most typologists. This framework, which is grounded largely in traditional grammar and is not associated with any particular formalism, has been given the label 'basic linguistic theory' (Dixon 2009, Dryer 2001, 2006a, 2006b). Its development depends on formulating generalizations that are empirically grounded in the properties of particular languages, but that go beyond these to capture broader cross-linguistic facts. This, of course, is the domain of typology, informed by documentation—and typology has had the most influence on the development of basic linguistic theory in recent decades (Dryer 2001, Nichols 2007: 235).

3.3 Refining and enriching documentary linguistics

As this discussion has made clear, linguistic typology and documentary linguistics share much of the same architecture: a common theoretical framework, an awareness of cross-linguistic similarity and variability, and a goal of forming and representing generalizations over diverse realizations (whether cross-linguistically or language-internally; see Moravcsik 2007). This common ground ensures that, just as documentation informs typology, typology profoundly informs documentation, probably more so than any other linguistic sub-field. Typology contributes to the development of a precise metalanguage for the representation of particular languages; it suggests predictions to be tested within a given language, such as interactions among logically independent parameters like word order; and it helps draw our attention to gaps in a language's descriptive representation and documentary corpus. Furthermore, when a particular phenomenon does not fit a cross-linguistically established category, typology helps us to see what is noteworthy and of possible theoretical interest, and what should be explored through further documentation.

The fertile interaction between these disciplines is frequently noted. Dryer, for example, observes that 'looking at lots of languages gives one a sense of what languages are like', so much so that a typologist is likely to have insights into a particular language that even a specialist in the language (who is not typologically trained) will not have (Dryer 2002b: 18; see Song 2007: 16). Nichols (2007: 235) stresses the usefulness of :

the framework-neutral definitions, the growing body of substantive knowledge, and statistical and probabilistic knowledge [of typology], all of which are readily applicable to description, comparison, and pinpointing what is distinctive and valuable about a particular language.

A particularly valuable contribution of typology to documentation is the recognition that language-specific categories are variable and may therefore only roughly match cross-linguistically defined prototypes and inventories (see 3.1 above). This awareness encourages more sophisticated and detailed description; as Haspelmath (2007: 128) observes, 'by shedding the assumption of *a priori* categories, descriptive linguists can avoid getting into category-assignment controversies and can concentrate on refining their descriptions'. In other words, rather than simply calling something an 'adjective' and moving on—or worrying at length about whether it should be called an adjective—the linguist will be led to consider in detail the morphosyntactic, semantic, and other properties that define this category within the language in question, how they resemble those of adjectives in other languages, and how they differ.[3] This awareness also helps documentary linguists avoid being stymied by a lack of confidence, a concern that their analysis may be flawed because it does not fit preconceived notions.

The typological approach also gives us the tools to understand and explain *why* a language-particular category may be non-prototypical. In addition to considering extra-linguistic elements of explanation (i.e. rooted in the culture, history, and environment of the speakers; see 2.2 above), typology takes a 'dynamic' perspective: a view that linguistic systems are always undergoing change, that one prototypical language state may over time develop into another, and that particular instantiations of a grammatical feature in a given language may represent any point in this historical transition (e.g. Croft 2003a, c). This perspective helps us to make sense of phenomena that appear to fall somewhere in between two cross-linguistically defined prototypes. For example, a number of Amazonian languages, such as the sisters Hup and Yuhup (Nadahup; Epps 2008, Ospina Bozzi 2002) and Apurinã (Arawak; Facundes 2000), have systems of 'bound' nouns that serve a classifying function but are neither pervasive enough in the lexicon nor morphologically distinct enough from normal nouns to be easily defined as nominal classifiers. However, these nominal forms can be understood as representing a language state somewhere between a prototypical non-classifier system and a fully-fledged, grammaticalized set of classifiers (see Dixon 1986, Grinevald 2000, 2002, Grinevald and Seifart 2004). In Hup, moreover, the 'incipient' nature of the system is particularly clear, in that the set of 'class terms' occurs primarily with a restricted set of lexical items, neologisms referring to items of non-native manufacture (Epps 2007). It is the dynamic approach of typology that allows us to make sense of this system; the result is a description that is accessible to others, is cross-linguistically relevant yet

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[3] This distinction between the language-specific and the general is aided by the convention of capitalizing terms applied to language-specific categories—e.g. 'perfective aspect'—in order to distinguish these from the corresponding cross-linguistic categorial notions (e.g. Comrie 1976a, Bybee 1985).

richly language-specific, and that allows the prediction of likely avenues of change in the future.

Just as categories defined within a particular language will vary with respect to cross-linguistically defined prototypes, a typological approach also attends to language-internal variation in category membership. This gives documentary linguists the flexibility to recognize and make sense of entities within the language that do not fit the language-internal prototype any better than they fit the cross-linguistic one. For example, individual morphemes undergoing grammaticalization may display characteristics associated with two different lexical or grammatical categories within the language in question (e.g. evidentials developing from verbs; see Aikhenvald 2004: 271–5). In other cases, this sort of liminality is semantically motivated and therefore relatively stable; for example, words referring to periods of time often have features of both nouns and verbs (e.g. Hup *wag* 'day' and *j'əb* 'night' normally appear as arguments of verbs and can take most nominal morphology, but they also can occur as predicates and take verbal inflection; Epps 2008: 163). Once again, attention to such details results in a more refined description of the language being documented (Haspelmath 2007, 2008b).

Finally, in addition to contributing to a theoretically sophisticated model for linguistic description and documentation, typology also informs the relatively framework-neutral terms of its presentation. This is critical to its accessibility. Whereas descriptive work couched in a particular formalism (e.g. generative grammar, tagmemics) tends to be accessible to relatively few people and to become quickly dated, typologically informed work is more likely to remain useful not only to generations of linguists, but to speakers and their descendents as well.

4. A CONTINUING PARTNERSHIP

The past decade has seen linguistic typology come into its own as a mature discipline (see e.g. Bickel 2007 and associated papers in *Linguistic Typology* 11). Likewise, the past decade has seen a renewed interest in the description of little-known and endangered languages, and the emergence of documentation as a focus of investigation in its own right (e.g. Himmelmann 1998, Lehmann 2001, Woodbury 2003, Gippert, Himmelmann, and Mosel 2006, Austin, Bond, and Nathan 2007). The parallel expansion of these two sub-fields is not a coincidence: the emerging awareness of the theoretical importance of linguistic diversity has fuelled interest in typology and has, at the same time, made documentation a priority of the field—especially as the problem of language endangerment has gained widespread attention (Hale, Krauss, Watahomigie, Yamamoto, Craig, Jeanne, and

England 1992; also see Nichols 2007: 235, Woodbury 2003: 37). In the process, typology and documentary linguistics have contributed greatly to each other. Documentation has shaped new paths of typological investigation, ranging from what is to be investigated to how patterns are to be explained. Typology has given documentary linguists a solid and accessible theoretical structure on which to build their discussions of individual languages.

As the partnership between these two sub-fields of linguistics has grown closer and more productive, it has also brought into focus their mutual dependence. For typology, continued progress depends on access to data from as many languages as possible, spanning as many modalities, registers, styles, etc. as possible. For any given documentary effort to be of maximum usefulness to typologists, the corpus must be large, rich, and diverse, built on multiple methods of data collection. It must be ethnographically grounded, such that the record involves 'thick' rather than 'thin' description (Plank 2007: 47, cf. Geertz 1973; see also Evans and Levinson forthcoming, Rumsey 2007, Evans 2007b). In addition to completeness, documentary integrity is also critical: an accurate understanding of the limits of linguistic diversity requires that the descriptions of phenomena in individual languages be neither exaggerated nor understated (e.g. Lehmann 2001: 92, Song 2007: 39–40).

For language documentation, in turn, the goal of more refined, detailed, and theoretically sophisticated records of individual languages will require comparable progress in refining our typological understanding of particular linguistic phenomena, and in accurately characterizing the range of possible structures that may be encountered in any given case. Furthermore, these discussions need to be made available and accessible to documentary linguists. Materials such as Shopen (2007) that offer detailed and typologically informed discussions of a wide range of phenomena are invaluable resources. There is no doubt that documentary work would benefit from more such comprehensive, in-depth typological studies of language.

The association between linguistic typology and language documentation has developed into a rich and productive symbiosis, and its continued fruitfulness will be guaranteed by each sub-field's increasing participation in the other. As documentary linguists gain more training and experience in typology, they will become more aware of the kinds of questions typologists are asking, of the theoretical and typological significance of the phenomena they are describing, and of the level of descriptive detail necessary to answer them. Documentary linguists must confront the considerable challenge handed them by typologists: to produce descriptions in formats that will enable and facilitate comparison across languages (Plank 2007: 46), but also to remain true to the languages themselves, without forcing them into ill-fitting predetermined categories (Gil 2001, Haspelmath 2007, 2008b). For their part, typologists should be aware that the documentary corpus may give considerable insight into the intricacies and complexities which characterize particular linguistic structures but which may be oversimplified in a typological overview that draws from only a small part of that corpus (e.g. a page in a grammar

sketch)—even so far as to compromise the final typological conclusions. Finally, as more and more languages become endangered or moribund, typologists must continue to recognize the importance and urgency of language documentation, and should join in on the documentary endeavour whenever possible.

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CHAPTER 30

LINGUISTIC TYPOLOGY AND FORMAL GRAMMAR

MARIA POLINSKY

1. INTRODUCTION

The goal of this chapter is to provide an overview of the relationship between linguistic typology and formal grammar, a relationship that has existed for several decades now and is unlikely to disappear any time soon. As the reader will see, the two orientations differ in a number of respects, but they share the custody of language, and that motivates the need for communication between the two. More importantly still, the field of linguistics as a whole is beginning to study language as a dynamic system operating simultaneously on multiple levels of representation, rather than as a disparate assemblage of discrete levels of analysis (lexicon, phonology, syntax) or as a collection of particular linguistic phenomena. This common challenge to both theory construction and typology is motivated by the increasing integration of linguistics with more technically sophisticated disciplines that also investigate human cognition and consciousness.

The study of language is no longer solely the prerogative of introspective investigation (since linguistics purports to be a social science and not a branch of philosophy or literature) and/or generalizations made on the basis of individual grammars. Instead, language is something that can be measured using standard scientific methodology, and modelled on the basis of rigorously established data.

The challenge no longer lies in bringing typology and theory construction closer together; the challenge lies instead in the continued survival of both approaches in the face of an ongoing paradigm shift.

In what follows, I will examine several areas where typology and formal grammar diverge, and where they most need to establish a viable dialogue: general goals, the nature of primary data, the structure of theory, and the significance of methodology. Since it would be counter-productive to provide a mere list of differences and similarities between the two orientations, I will conclude with some (hopefully) constructive suggestions about bridging the gap between the two orientations; these suggestions include a possible shift in the research strategies used in typology and a significant shift in existing methodologies, of which all the orientations in linguistics need to be cognizant.

2. GENERAL GOALS AND THE NATURE OF DATA

The initial questions asked by typology and formal grammar are quite different. By virtue of asking very different questions at the outset, the two orientations have a very different approach to primary or preferred data.

A crucial difference between typology and formal grammar construction resides in their differing views on language diversity and linguistic theory. With respect to the former, all linguists agree, without much hesitation, that natural languages share a number of intriguing similarities and also show fascinating differences. This agreement does not extend very far beyond this clause, however. Typologists ask why (and how) languages differ, while grammar construction takes 'the apparent richness and diversity of linguistic phenomena [to be] illusory and epiphenomenal, the result of interaction of fixed principles under slightly varying conditions' (Chomsky 1995a: 8). Such an approach leads one to ask why and in what ways languages are similar, at least at some deep level. Thus, typology's vested (albeit not always consciously recognized) interest is in making languages appear more different, whereas formal grammar wants them all to look alike. Of course, this is an oversimplification, verging on a caricature, but it is striking how much the two different questions in (1) and (2) shape the overall approach to linguistic data.

(1) Linguistic typology: What makes natural languages so different from each other?

(2) Formal grammar: What makes natural languages so similar to each other?

Typology sees its goal as finding and explaining correlations between various aspects of meaning and structure among the languages of the world. There are

few, if any, constraints on the range of such possible correlations, which immediately creates an impression that typology looks at a smorgasbord of phenomena and has no theory at all (or has a very fragmented, almost balkanized approach to language).

And indeed, typology does not aspire to an articulated theory of the language faculty, simply because it does not have the tools (or desire) to impose limits on possible correlations that may be found or make predictions about what else one might expect to find. Such an unconstrained approach has both positive and negative consequences. On the positive side, it allows typologists to venture bravely where no one has trod before and to uncover new data. In the 1970s, when linguists disagreed on whether or not it was necessary to examine a wide range of languages, the quest for unconstrained correlations saved typology and helped it flourish, to the point that formal grammarians also started appealing to wide-ranging cross-linguistic differences (Comrie 1993: 3–4). One could counter (and researchers often do; see e.g. Anderson 1999 or Steele 1997) that this leads to open-ended 'fishing expeditions' that often fail to distinguish between what is theoretically interesting and what is trivial.

Starting out with the similarity assumption (2), formal grammar instead sets as its goal the construction of a theory of language (not languages). A formal grammarian is more or less interested in knowing how the building blocks of language are assembled to form its structure. It is fair to say that rules are of primary importance: a linguist seeks 'an explanation for the general process of projection by which speakers extend their limited linguistic experience to new and immediately acceptable forms' (Chomsky 1955: 519). Because rules rule, the building blocks are assumed, without much empirical evidence, to be the same across all languages. As a consequence, not all data are treated as equally relevant; the truly relevant data are those that allow the analyst to test his or her favourite theory. Under the best of circumstances, this can result in the useful streamlining of the empirical investigation to include only those data points that are absolutely necessary to the analysis. For example, it may not really be necessary to take into consideration all imaginable influences of discourse context in the discussion of the purely structural properties of a particular syntactic construction. Under the worst of circumstances, such an approach runs the risk of potential oversanitization of what may be a more complex data set than the analyst would prefer to admit—and this then becomes the source of criticism from the side of typology that formal analyses do not take into account the full range of relevant data.

Formal assumptions about the cross-linguistic uniformity of linguistic building blocks make typologists uncomfortable, as they are concerned about the notion of engineering from sparse parts, not all of which appear comparable across languages. Another sign of typology's wariness about building blocks is its long-standing interest in categorization and classification: in order to theorize about the engineering aspects of language, it is important to know the inventory of

existing materials. But this preoccupation with classification likewise comes at a cost. An overemphasis on classification can easily turn into a case of overclassification, as when stative predicates are classified differently solely on the basis of whether they are suppletive or not, or underclassification, as when classificatory schemes of verbal complementation options fail to distinguish predicates that involve control from those that do not. Merely classifying types of expressions into categories does not necessarily solve the underlying analytic problem.

Overall, it is striking and somewhat disconcerting how much particular orientations in modern linguistics differ with respect to what constitutes 'proper' data and what does not. Depending on orientation, it may be acceptable or unacceptable to use only naturalistic data, only discourse data, or only minimal pairs and grammaticality judgements.

An interesting consequence of different approaches to data lies in the way the relevant data are elicited. Much has been written about typologists' extreme reliance on descriptive grammars, some of which may be too brief or inexplicit. This reliance points to another difference: that which arises between reliance on naturally occurring data (in typology and functionalism) and potentially unnatural, controlled elicitations (in formal grammar). An analogy could be drawn from physiology: one can observe a number of people in natural running environments, or test a set of subjects on a treadmill in a lab. In those two conditions, the generalizations are different: natural observations would yield generalizations about preferred patterns; treadmill studies would show what a human body can do when pushed to its limits. Physiologists seldom argue whether one method of observation is better than the other: they have long learned how to combine the data from both. Linguists, though, are just now barely entering that stage in the development of the field.

3. THEORY AND METHODOLOGY

This difference in initial questions leads to significant differences in theory and methods. Although the preceding section dealt mainly with primary data, I have already identified some theoretical differences there. Typology generally eschews uniform, all-questions-answered theorizing in favour of general constructs (markedness, iconicity, grammaticalization) and methodological devices such as semantic maps (see Croft 2001, and many others), often developed in reaction to more formal approaches. Its allegiance to large samples and 'superficial' generalizations is simply one of the consequences of casting the net wide and looking for

differences in a quick and easy way: testing for possible placement of a negative marker should reveal more variation across 200 languages than it would across ten.

The absence of an articulated theory and the general fragmentation of typology may come across as a severe handicap. The lack of a theory makes it more difficult to determine which data are relevant to the investigation at hand and which are of less importance. But this handicap may also be typology's strongest asset: the absence of a unified theory and entrenched formalism has sometimes been liberating to typologists, allowing them to come up with genuine cross-linguistic generalizations that challenge existing theories for an adequate explanation.

Two examples of such generalizations come to mind: the consistency in headedness and the Accessibility Hierarchy. The headedness generalization is quite robust: languages tend to avoid arbitrary combinations of different word orders, and linearize their heads in a consistent fashion. The recognition of this tendency has played a major role in generative analysis, which usually adheres to categorical primitives. For instance, headedness figured prominently in the development of the DP hypothesis (see Abney 1987 and many others), which allowed linguists to see that languages are even more consistent in terms of headedness than the NP structure would have pointed to. If a determiner is viewed to be the head of what was traditionally thought of as a noun phrase (3a), by analogy with clause structure (3b), it turns out that such heads tend to appear on the same side of their complements as inflectional (verbal) heads do.

(3)
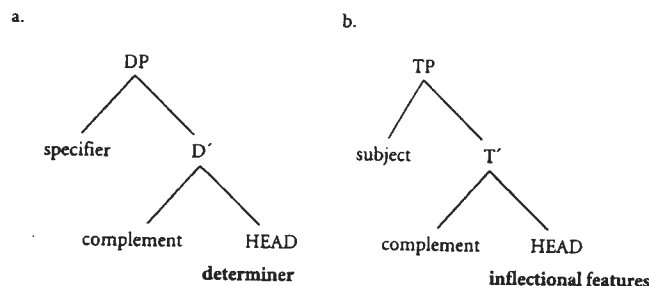
Typological research made it possible to satisfy the drive for symmetry, which has long been strong in the formal approaches to grammar, but it has also helped to keep this drive in check. The actual richness of language data shows that symmetry may be desirable but not always attainable, and that linguists can gain a lot from examining the apparent cases of asymmetry—compare Kayne's radical antisymmetry approach

(Kayne 1994) and, on the more empirical side, a wide and diverse range of phenomena discussed in Di Sciullo (2003).

The well-known Accessibility Hierarchy (Keenan and Comrie 1977) is another example: the ease of relative clause formation depends on the grammatical function of the head noun inside the relative clause. All languages are expected to relativize subjects; beyond subjects, the accessibility of grammatical positions to relativization obeys the following hierarchy:

(4)   Subject > Direct Object > Indirect Object > Object of Preposition > Genitive > Comparative Object

Since the hierarchy has been proposed, many of its apparent violations have been shown to be due to the misanalysis of particular data; once the data were reanalysed, they were typically in line with (4). For example, some cases of apparent relativization of genitives are actually fed by possessor raising, which promotes the possessor into the subject or object position, from which it can then relativize. Imagine a language where the relativization of possessor is possible from (5), which instantiates possessor raising, but not from (6). If the linguistic analysis of a particular language that allows structures like (5) is carried out properly, this language simply shows the relativization of direct object and becomes rather unremarkable from a typological perspective (cf. Payne and Barshi 1999).

(5)   She patted the cat on the back > the cat that she patted (on the) back

(6)   She patted the cat's back > the cat whose back she patted

The Accessibility Hierarchy applies to other types of extraction phenomena (wh-question formation and topicalization, which are subsumed under A-bar phenomena in formal grammar). The hierarchy seems to generalize beyond extractions as well. Thus, it reflects the special status of subjects which surfaces in other grammatical phenomena, such as the interpretation of anaphors, which are also more likely to select a subject antecedent than a grammatical function lower on the scale. This is a manifestation of an even more general principle: subjects have a special status in providing referential identification for 'missing' (unexpressed) constituents, as in the establishment of co-reference across clauses. And in some phenomena, the missing constituent itself must be the subject. This is the case with control and raising, for which the missing element in the embedded clause is the subject (see Davies and Dubinsky 2004 for a detailed overview). While all these phenomena may have different explanations, they still point to the generalization that subjects are privileged across languages. Yet the question remains as to why the preference for subjects exists, and what makes them 'special' (cf. Kluender 2004).

Headedness and the Accessibility Hierarchy are perhaps the best-known examples of genuine typological discoveries that have had a major impact on the entire field: no linguist, regardless of persuasion, can wilfully choose to ignore either one.

However, typologically inclined linguists have produced many other descriptive accounts of equally rich and intriguing data that would, if recognized, present challenges to any linguistic approach, and could perhaps stimulate thought leading to scientific advancement. The sad fact is that since typologists and formalists tend not to talk to each other (or read each other's literature), many of these veritable riches remain buried in descriptive grammars. This is a very general point, of course, and illustrating it would constitute a research project in its own right. At the risk of overgeneralizing, I will illustrate this point with a single example: the mystery of Kayardild redundant marking (Evans 1995, 2003b). In Kayardild, morphological markers of case appear on every subconstituent of a DP, and on top of that, some NPs also get inflected for the categories of the main predicate of their clause, such as negation, modality, or tense. This happens if and when these DPs contain a so-called verbalizing suffix (V.DAT in (7)). The suffix appears on the head noun of the phrase, as well as on its modifiers. For example,

(7)   Kayardild (Evans 2003b: 215)

   a. ngada   waa-jarra   wangarr-ina   ngijin-maru-tharra
      1SG.NOM sing-PST song-MODAL.ABL my-VLZ.DAT-PST
      thabuju-maru-tharra
      brother-VLZ.DAT-PST
      'I sang a song for my brother.'

   b. ngada   waa-nangku   wangarr-u   ngijin-maru-nangku
      1SG.NOM sing-NEG.POT song-MODAL.PROP my-VLZ.DAT-NEG.POT
      thabuju-maru-nangku
      brother-VLZ.DAT-NEG.POT
      'I won't sing a song for my brother.'

What is going on here? Does the beneficiary turn into a secondary predicate, which then gets inflected for tense? That would be a reasonable assumption; judging by Evans's very detailed grammar, most clausal arguments, except subject, can undergo such verbalization. Evans himself takes a different route; he argues for a rather radical reconceptualization of agreement in light of Kayardild data:

In many ways, Kayardild is a language with a great deal of agreement, in the familiar sense of grammatically stipulated featural compatibility between different words. But it just happens to manifest agreement by unfamiliar semantic categories, on unfamiliar targets, over unfamiliar domains, in unfamiliar directions, with unfamiliar patterns of nested multiple agreement, [...] and with unfamiliar functions. (Evans 2003b: 232)

Here the data definitely address the theory, theory of agreement in particular, and such work, done by a careful researcher, points to further probing questions, whose answers may change our conception of agreement or bring into being a different view of Kayardild grammar. The latter solution is hinted at by Corbett (2006), who notes

that a radical reconceptualization of agreement would lead to a rather skewed typology, in which most known languages would make up one class and Kayardild alone would form another. Whatever the solution, consistent verbalization of clausal arguments is an unusual phenomenon definitely calling for further investigation.

While typology (at least in its functional instantiation) has done its best consciously to ignore generative grammar, much typological research has nonetheless unconsciously been driven by the generative engine—but in the opposite direction. Because of an unfortunate confluence of historical circumstances, typological research has, by way of reaction to the purportedly misguided generative emphasis on structure, become equally obsessed with structure in a negative sense, namely, with demonstrating that the structures proposed by generative analyses cannot possibly be right (see Polinsky and Kluender 2006 for more discussion). Both parties, formal theoreticians and typologists alike, stand to gain a lot from breaking the cycle of arguing and trying to prove the other side wrong. A better theory of language may emerge in the process.

4. EXPLANATORY TOOLS

Nowhere have typology and formal grammar been more distant than in their approach to the explanation for language phenomena. This difference stems from the difference in initial premises discussed above, but it becomes much more prominent once we move from facts to interpretations.

The difference in explanatory tools has many guises: the opposition between formal and functional explanations (Hyman 1984, Hall 1992: ch. 1), between internal and external explanations (Newmeyer 1998: ch. 3), or between synchronic and diachronic motivations (Bybee 2001 and Lightfoot 1999 are good examples of the opposing views here). I will follow Newmeyer in casting this opposition in terms of internal vs. external explanation.

Internal explanation is one that exists within the context of a given theory of language, and is based on the principles of that theory. Under this type of explanation, linguistic phenomena are accounted for by principles (i) built into the theory (hence the term 'theory-internal') or (ii) inherent in the level of linguistic representation to which the phenomena belong. Because formal grammars are very focused on theory and theory construction, it should come as no surprise that they give more weight to internal explanation. But a successful internal explanation has to be based on a descriptively accurate account. This requirement is shared by any serious theory committed to the scientific method, and this is where the two orientations may successfully be united (see Moore and Polinsky 2003 for an extensive discussion).

The essence of external explanation is in relating linguistic and extralinguistic phenomena as manifestations of the same principles. Thus, external explanation is often defined negatively, as one where a given linguistic phenomenon is linked to a phenomenon or principle that either (i) is not particular to language or (ii) is outside the level of linguistic representation where the phenomenon belongs. The broad and narrow conceptions of external explanation run in parallel to the two conceptions of internal explanation.

Linguists have explored several domains that may provide us with external principles motivating linguistic phenomena. General cognitive ability is the first of these domains. Under this approach, language is viewed as part of human cognitive ability. If language is similar to other cognitive systems (vision, attention), then linguists need to identify principles that are shared by language and such systems. Significant advances towards identifying such cognitive principles have been made by Cognitive Grammar (Langacker 1991). Within Cognitive Grammar, many general principles motivating language structure are taken to be by-products of the structure of human cognition and attention. For example, an important property of language is construal, defined as the observer's interpretation with regard to a particular scene. Construal includes the distinction between figure and ground, which goes back to Gestalt psychology, and the notions of perspective and focus, also recognized in cognitive psychology. However, in order for this approach to achieve a truly external mode of explanation, there needs to be independent corroboration of the relevant principles as belonging to language-external components. That is, experimental cognitive psychology and psycholinguistics must build upon the descriptive apparatus of Cognitive Grammar and test its hypotheses in such a way as to show their external explanatory power. Otherwise, being part of theory and lacking independent corroboration through experimental methodologies, these notions run the risk of qualifying as internal, not external, factors.

Despite their shared conceptual premises, Cognitive Grammar and functional typology have had little interaction, and Cognitive Grammar has remained largely Anglocentric. This lack of dialogue between the two frameworks which share some general principles may seem puzzling at first sight, but on closer scrutiny, it appears to be simply an extension of the relationship between formal grammar and typology. Like formal grammar, Cognitive Grammar is an articulated theory of language, intent on deriving all language forms from a set of well-defined principles. This premise is at odds with the more free-wheeling, open-ended approach of functional typology, which, as noted earlier, is uncomfortable with the notion of rule-based structure building, using components that do not even appear to be comparable across languages.

The second source of external explanation is in the function of language as a communication device. Such external explanations have long been associated with functional approaches to language; they establish a causal relationship between the

form of language and the need to express a proposition/concept efficiently and coherently (hence the well-known conversational implicatures), to facilitate the identification of referents (hence pragmatic and information structural principles), and to rule out ambiguity as much as possible (cf. Gricean principles or iconicity, which has long played an important role in typology; e.g. Haiman 1983).

The cross-linguistic distribution of overt reflexive pronouns across grammatical persons, discussed by Comrie (1993), offers a good example of such causal principles at work. There are languages that have no overt reflexive pronouns distinct from non-reflexives; Old English was one such language (Keenan 2003). There are languages, such as modern English, that have distinct reflexives across all grammatical persons, and there are languages, such as Romance, where the reflexive/non-reflexive distinction is overtly expressed only for third person. There seem to be no languages where this distinction is overtly expressed for first or second person only. Is this gap in the distribution accidental? Comrie (1993) provides a functional external explanation by noting that the reflexive/non-reflexive contrast does not distinguish between different possible referents in the first and second persons ((8a) and (8b) mean the same), whereas it does make a difference in the third person (cf. (9a) and (9b)). Only in the third person does the overt non-reflexive/reflexive distinction allow for a more efficient tracking of referents.

(8)   a. I hurt me
      b. I hurt myself

(9)   a. She$_i$ hurt her$_{j/*i}$
      b. She hurt herself

Many complaints about functional explanations arise from cases where an external explanation is taken to replace an internal one, or where a description of the function is taken to constitute both the description of a phenomenon and the motivation for that phenomenon. However, it is important to notice that Comrie's account of the cross-linguistic distribution of reflexive distinctions has no direct bearing on the binding principles, and should be taken not as their replacement but rather as a corroboration of internal principles of language modelling by general functional strategies. A productive approach that aims to resolve the tension between structure and interpretation is optimality-theoretic syntax (cf. Bresnan 2001, 2002, Aissen 1999), within which quite a bit of research has focused on distinctions observed in third person arguments (e.g. Aissen 1999, 2003). Optimality-theoretic syntax is inspired by the idea of bringing together the universal—hence presumably structural—and the more variable—presumably interpretive—properties of language. OT syntax accomplishes this by appealing to harmonic alignment in syntax (especially in Aissen's work cited above) and by deriving syntactic markedness constraints in communicative principles of language use (see Bresnan 2001, 2002, Aissen 1999). It has certainly offered the field a new and

exciting avenue of research, bringing together orientations that have traditionally been kept apart. One hopes that its development will provide new explanations for numerous intriguing phenomena at the interface between syntax and information structure, syntax and morphology, or syntax and the lexicon.

Still another domain of external explanation is found in diachrony. *Sensu stricto*, a diachronic or 'evolutionary' explanation may not be external because it pertains to the immediate domain of language and to language structure in particular. However, even assuming that languages are the way they look because of historical developments, we still face the question of whether a child learning a given language can access the relevant diachronic information: does this child know that the current state of the language input arose under competing pressures from an earlier state? This prior state may not be accessible to the learner, and as a result, the appeal to grammaticalization of a prior state into the new grammar has the distinct flavour of an external explanation. I am certainly cognizant of the many important discoveries that have been made in trying to relate the current shape of language grammars to a prior grammar. It is still unclear, however, what the limits of such a historical explanation are and how to determine them (where should a historical explanation apply?). One of the lessons evident from historical explanations is that they cannot constrain the data in such a way as to predict an unambiguous outcome. Two lines of research seem possible and promising at this stage of our knowledge: first, an understanding of how smaller-scale, local changes can affect language subsystems (Moore and Polinsky 2003: 15–17), and second, a better understanding of such fundamental mechanisms as frequency or extension. As our understanding of such mechanisms progresses, historical explanation has a chance of moving away from a post hoc, causal approach to a more predictive, teleological theory.

The range of explanations sought in formal grammar and typology is quite broad, and it is almost ironic that certain phenomena remain unexplained in spite of this embarrassment of riches. Two outstanding examples were brought up earlier in this chapter: the headedness parameter and the Accessibility Hierarchy. Despite its clear empirical validity, a full explanation of headedness is still beyond the reach of either orientation. Likewise, the Accessibility Hierarchy, while empirically robust, evades a true explanation in the most ironic way. The original explanation, proposed by Keenan and Comrie, was that the referent of the subject is most salient and hence easier to access, and thus ultimately an effect of processing. While this explanation is rather vague, it has been confirmed by several studies of relative clause processing in languages as diverse as English (King and Just 1991, and many others), Japanese (Miyamoto and Nakamura 2003), and Korean (Kwon, Polinsky, and Kluender 2006). However, psycholinguists have now been placed in the strange position of providing processing evidence for a phenomenon that was originally attributed, if only vaguely, to processing—an obvious case of circularity. Despite

the richness of explanatory tools, we are still left with a puzzle as to why subjects are privileged in a number of respects.

5. BUILDING BRIDGES

So far, our discussion of two different orientations has pointed to a fragmented field, where one orientation refrains from pushing for deeper generalizations, while the other desperately tries to derive every observable phenomenon from structural principles. One of the proposed solutions to the fragmentation problem involves changing the methodology of typology in particular in such a way that both orientations can interact in a more productive fashion (Polinsky and Kluender 2006, Baker and McCloskey 2007). The proposed change would involve comparative investigation of closely related languages. A good illustration of such an approach comes from comparative Romance linguistics, which helped create a key testing ground for research on language variation in the early 1970s, with work by Richard Kayne and his students, comparing and contrasting French, Italian, and Spanish. Comparative Romance has demonstrated the enormous benefits of in-depth research on closely related languages and dialects. Such research allows us to uncover subtle distinctions and fine details of grammar that often remain unnoticed in a coarse-grained approach to language typology (see Comrie 1993 for similar observations). Comparative Germanic syntax followed suit, creating a large, vibrant field with numerous research projects under way.

Maybe because I am personally invested in this subfield, I think a similar moment has arrived for the birth of comparative Austronesian syntax. Because of the sheer number of Austronesian languages, such a field could provide an excellent testing ground for linguistic theory, one larger and typologically more diverse than Romance or Germanic. To give just one example, many Austronesian languages exhibit the uncommon word orders verb–subject–object (VSO) or verb–object–subject (VOS). These word orders pose an apparent challenge to theories of word order, in which, universally, all sentences have the underlying word order SVO (Kayne 1994). The abundance of heretofore unknown languages with VSO and VOS orders allows us to test further the Greenbergian correlations against new empirical data. Another example that comes to mind is in keeping with this chapter's preoccupation with subject: many Austronesian languages favour just one syntactic argument in extractions and clause linkage (Keenan 1976a, Pearson 2005, Aldridge 2005, and many others). The following examples from Malagasy illustrate this restriction; in order to be accessible to relativization, the head noun must be the highest syntactic argument in the relative clause. The semantic role of

the privileged argument (underlined below) is indicated by voice morphology on the verb:

(10)   Malagasy

    a. n-i-vidy   ny   kadoa ho an-dreni-ny   ny   zaza
       PST-AF-buy DET   gift   for OBL-mother-3SG DET   child
       'The child bought a gift for his mother.'

    b. ny   zaza   (izay) nividy   ny   kadoa ho an-dreniny
       DET   child that   bought DET gift   for OBL-his.mother
       'the child that bought the gift for his mother'

    c. *ny   kadoa (izay) nividy   ho an-dreniny   ny   zaza
       DET   gift   that   bought for OBL-his.mother DET child
       ('the gift that child bought for his mother')

    d. *ny   reny   (izay) nividy   ny   kadoa ny   zaza
       DET   mother that   bought DET gift   DET   child
       ('the mother for whom the child bought the gift')

(11)   Malagasy

    a. no-vid-in'ny   zaza   ho an-dreniny   ny   kadoa
       PST-buy-TF.DET child for OBL-his.mother DET gift
       'The gift, the child bought for his mother.'

    b. ny   kadoa (izay) n-ovid-in'ny   zaza ho an-dreniny
       DET   gift   that   PST-buy-TF.DET child for OBL-his.mother
       'the gift that the child bought for his mother'
       (lit. 'the gift that was bought by the child for his mother')

(12)   Malagasy

    a. n-ividi-an'ny   zaza (ny) kadoa ny   reni-ny
       PST-buy-CF.DET child DET gift   DET mother-3SG
       'The mother, the child bought her a gift.'

    b. ny   reny   (izay) n-ividi-an'ny   zaza (ny) kadoa
       DET   mother that   PST-buy-CF.DET child DET gift
       'the mother whom the child bought a/the gift'
       (lit. 'the mother who was bought the gift for by the child')

The privileged argument, indexed by the voice morphology on the verb, is often referred to as the 'external argument'. While the single external argument restriction is well documented and by now is almost expected for a 'well-behaved' Austronesian language, it is much less clear what the grammatical status of the external argument is. The external argument could be the subject, as was originally proposed by some researchers, most notably Keenan (1976a), but it could also be the topic and thus associated with a non-argument position (A-bar position in

derivational frameworks). Furthermore, it is also conceivable that some Austronesian languages could treat the external argument as subject, and others, as topic.

Identifying the range of variation in Austronesian languages would not only provide further insights into the syntax of these languages but could also inform general linguistic theory, which has long struggled with the notion of subject. On the one hand, subjects are assumed to be universal: pretty much every theory, from functional grammar to Relational Grammar to Minimalism, assumes that all clauses have subjects, even the impersonals, where that subject is silent (but see Babby 1989, McCloskey 2001 for a different view). On the other hand, the universal principle that clauses must have subjects often comes as a stipulation (the Extended Projection Principle is just one notable example; see Chomsky 1981), and neither the actual status of this crucial constituent nor the motivation for its presence is well understood.

Although 'micro-typology' is highly desirable (and within reach), it is also useful to keep the achievements of large-scale sampling typology in sight. The latter approach is often useful in uncovering first-pass, coarse-grained generalizations, which can then be tested in more subtle microstudies or subjected to computational or experimental testing. It is hard to see why a particular approach has to be advocated at the expense of all the others; as long as a reasonable dialogue between the orientations is possible, there is no loss in combining several fields of inquiry with respect to a particular phenomenon, be it clitic climbing, word order, or pharyngeal spreading.

I also think that a more fundamental change in mindset is needed. The starting point of this proposal is quite simple: we need to stop pretending that linguistics is mathematics or physics, which has long been the underlying desire of many formal grammarians, and at least entertain the idea that language may operate like other natural systems. If so, linguistics has a lot to learn from biology. Biology has long since moved beyond classificatory schemes that have little to say about the underlying mechanisms of natural systems, and this carries an important lesson for typology. In order to understand how natural language works, it is worth considering whether it might better be assessed as an entire system, much in the way that biology has learned to study the entirety of interactions at various levels of the organism. This is where sub-fields like neurolinguistics and computational linguistics can be of service: neural imaging techniques allow us to look at the neural composite of interactions at all levels of linguistic analysis, and computational models provide us with the means to determine how those interactions can create composite patterns at the systems level (e.g. Kirby 1999, van Everbroeck 2003). Even within linguistics proper, we should be taking all available data sources into account in constructing our theories of language—not just principles of structure building, but their processing correlates and functional properties as well.

The bad news is that continuing to base our linguistic inquiry on partial data sets (derived from introspection, observation of limited though naturally occurring

data, incomplete elicitation of minimal pairs, etc.) is more likely than not an exercise in inevitable obsolescence, planned or unplanned. Otherwise, we seem doomed to continue along the path of scholastic disputes over insufficient, albeit preferred, data. Nonetheless, the good news is that many of the components of such an enterprise are already in place: formalists are good at deducing principles of structure building, while typologists are good at recognizing their functional properties.

One approach within typology that moves in this direction is that pursued by Hawkins in various publications (Hawkins 2004 and references therein). Hawkins proposes quantifiable and falsifiable hypotheses about why languages exhibit the structural properties that they do and how those structures might relate to facts of language processing. He does explicitly theorize, relying on phrase structural configurations, but that theorizing is not invoked merely in the service of structure *qua* structure. Instead, Hawkins attempts to relate what we can find out about structure from large sampling to what we know about language processing from numerous experimental studies, and he suggests further possibilities for experimental validation of the theory in the process. This approach truly offers a synthesis of the best of both worlds. In other words, typology and theory construction can indeed coexist to good effect.

6. CONCLUSION

Despite numerous differences, some of which were outlined above, the typological and formal orientation are united in their commitment to language and in their ability to enlighten other disciplines studying consciousness in the intricacies of language structure and linguistic diversity. Typology and formal grammar are actually much closer to each other than might initially be assumed: over time, theory construction has learned to be sensitive to cross-linguistic details, and good typology has, of course, always depended on structural generalizations. In one sense, the challenge faced by typology and formal grammar is essentially the same: both can choose to step boldly into the 21st century by changing their approach to data and by forging connections with specialists in sister disciplines like psychology, cognitive neuroscience, and computer science, or they can choose to run the risk of being relegated to history and (re)subsumed by the humanities. This is a common challenge faced by linguists of all stripes. If the mindset of the field as a whole does not change, debates such as those between typologists and formalists will continue to have religious rather than scholarly overtones.

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Author Index

LANGUAGE INDEX