

Chapter 1

Fundamentals of the OT approach to grammar

Summary of the Chapter

In this chapter, we introduce the overall architecture of OT. In order to do so, we motivate the core assumption of Optimality Theory (OT), that grammatical rules or principles are violable and that they stand in conflict with each other.

Conflicts among rules or principles are ubiquitous in language and it is only natural that they have been part of the history of grammar from its very beginning, when Pānini wrote the first treatise on grammatical problems we know of. However, apart from explicit discussions of the role specificity plays, linguistics never really tried to formulate a general model of conflict resolution for language (but the rule ordering component of early generative grammar may be an exception). OT makes the claim that the resolution of the different types of conflicts identified in 1.1 follows a general scheme, but in addition, OT also subscribes to further views such as the claim that all principles used by natural language grammars are universal, and that languages differ only in the way they resolve the conflicts between these universal principles. These fundamental assumptions of OT will be sketched in section 1.2: The grammar generates candidates for inputs, and the choice of the optimal candidate, the grammatical one, is made on a “lexicographic” base, using constraint ranking only. In order to make OT accessible even for linguists with little or no background in OT, we develop the argumentation and the methods of this model with the help of an example progressively increasing in complexity: default sentence stress in German.

1.1 Motivating a conflict-tolerant type of grammar

The main characteristics which distinguishes the optimality-theoretic grammatical model from others is the explicit conflict resolution component. Optimality Theory makes the fundamental claim that no linguistic object, no syllable, no word, and no sentence, manages to satisfy all requirements imposed by the principles or rules of grammar. Universal Grammar consists of a set of principles, called constraints, expressing universal linguistic tendencies and included in all

languages. These principles are as simple and general statements as possible, and may be in conflict with each other. This is so because these principles may impose incompatible demands on specific linguistic entities. Individual grammars must resolve these conflicts, and they do so by ranking the constraints. OT's basic insight is that even if grammars are driven by the same principles, these principles are ranked in different ways in different languages. A constraint A may be ranked very high in some language L1, so that linguistic outputs always or nearly always fulfil A, and ranked lower in another language L2, constraint A can be crucially dominated by a constraint B, conflicting with A, to the effect that linguistic outputs fulfil B and violate A. In such a case, A and B conflict with each other and the conflict is resolved differently in L1 and L2. This kind of conflict is usually visualized by means of so-called tableaux in the OT literature. Tableau (1) shows the ranking of A and B in L1. A is ranked higher than B. Suppose now that several candidates compete for the best output. Candidate 1 fulfils A but violates B and candidate 2 violates A and fulfils B. Violation of constraints by candidates is shown by an asterisk in the corresponding cell. There may be other candidates participating to the competition, which violate or fulfil both constraints, or which violate the constraints more than once, but we concentrate here on Candidates 1 and 2. In L2, the ordering of the two constraints is reversed: B dominates A. What does the ordering of A and B mean for L1 and L2? In L1, Candidate 1 is the grammatical output, the optimal candidate, whereas in L2, it is candidate 2 which wins, in each case the candidate fulfilling the highest constraint. Thus, even if both linguistic principles expressed by constraints A and B are present in both languages, OT's prediction is that their ranking has an influence on the choice of the best candidate.

(1)

	A	B
Cand ₁		*
Cand ₂	*	

(2)

	B	A
Cand ₁	*	
Cand ₂		*

Concrete examples for this kind of conflicts, where languages make different choices, will be discussed in detail in the next chapter, where it will become apparent that faithfulness and markedness constraints can influence the inventory

of segments and of other structures. Some languages have marked segments, like nasal vowels, affricates, gutturals, or different Cases, whereas some other languages chose to eliminate these marked patterns. The difference between languages is a consequence of the ranking of the faithfulness constraints for marked structures w.r.t. markedness constraints against them. The conflictual nature of the constraints implies that they are violable. If optimal candidates are to be identified at all, and if constraints are ranked, their violability is a necessary property of the theory.

Since violability may be considered a weakening of the empirical import of principles, the conflictual nature of the grammatical principles should be well-motivated. Thus, before we give a general overview of OT in 1.2, we focus on the necessity of introducing conflicts as a central architectural device into the grammar.

Conflict resolution components have been part of grammar from its very start.

We discuss Pānini's grammar below, but other linguists have also focused on conflicts, like Bech (1955/1957) for instance. Some grammatical models mention conflicts explicitly, like OT and other constraint-based models, whereas others do not highlight them as a crucial part of their linguistic approach and confine themselves to using technical means implying the resolution of conflicts. In reviewing some conflicts found in language, it is useful to distinguish at least two types: (a) the so-called "elsewhere" organization of rules or constraints, for which there seems to exist a principled answer to the question as to how the conflict should be resolved, and (b) those conflicts in which the particular choice among the conflict resolution options seems arbitrary.

The 'Elsewhere' case (also called *proper inclusion* (Anderson 1983, Fanselow 1991), *Paninian conflict resolution* (Prince & Smolensky 1993, McCarthy & Prince 1993a), *intrinsic rule ordering* (Bach 1964, Kenstowicz & Kisseberth 1977), *specific before general, specificity principle*)) refers to situations in which a well-defined subclass of linguistic expressions is affected by a certain process, but elsewhere – in most environments – a different, general process applies. Such cases, some well-known, abound at the interface between morphology and phonology, like the following:

- The indefinite article in English is *a*, except if the word following it begins with a vowel. In this case it is *an* (*a pear*, *an apple*).
- The singular definite article in French is *le* or *la*, except if the following word begins with a vowel. In this case it is *l'* (*la poire* 'the pear', *l'orange* 'the orange').

- The Dutch diminutive is *-tje*, except if the base ends with a syllable containing a short vowel and closed by a sonorant. In this case it is *-etje*. (*banann-tje* ‘little banana’ vs *bol-etje* ‘little cup’)
- The first obstruent in the second member of a compound in Japanese becomes voiced (Rendaku), except if the morpheme already contains a voiced obstruent. In this case it remains voiceless (/ori-kami/ → [ori-gami] ‘folding paper’ /yama-tera/ → [yama-dera] ‘mountain temple’).
- The German dorsal fricative is realized as the palatal fricative [ç], except after a back vowel. In this case, it surfaces as the velar [x]¹ (*Buch* [x] ‘book’, *ich* [ç] ‘I’).

In principle, these facts may be captured in a variety of ways. Taking the German dorsal fricative as an example, the contexts in which the two variants appear might be just listed in two different sub-rules, as in (3) Given that their domains of application are disjoint, they do not stand in conflict with each other.

(3) Distribution of the palatal and velar dorsal fricative in German

- a. The German dorsal fricative is realized as a velar [x] after a back vocoid (vowel and glide).
- b. The German dorsal fricative is realized as a palatal [ç] after a front vowel, a consonant, and at the beginning of a word.

From a descriptive point of view, (3) is unobjectionable, since the surface facts are captured. But there are other reasons that militate against (3). The format of the description makes it appear an *accidental* property that the set of environments listed in (3) accounts for all possible contexts, and that the application domains do not overlap, so that two sounds are in complementary distribution. Furthermore, while the context of rule application in (3a) is a natural one from a phonological point of view, the composition of application domains in (3b) does not reflect this property. By working with rules such as (3), one would have to concede that phonological processes may be conditioned in a purely arbitrary fashion, in a manner we cannot hope to understand, an unsatisfactorily conclusion.

Obviously, we can do much better! The complementary distribution of the dorsal fricative’s variants becomes apparent when the contexts in which the rules are applied are organized along the following line: a distinction is made between a *particular* case accounting for the more specific environment (4a), and a *contextless*, ‘Elsewhere’ case (4b). If we understand (4) as a system of generative

¹ Or as the uvular [χ], depending on the vowel involved (see Wiese 1996) or Féry (2000).

rules, we derive the correct results if the more specific rule is applied before the general one. If we understand (4) as a system of constraints, correct predictions are made if a more general principle is inapplicable in the domain in which it competes with a more specific statement.

(4) Distribution of the palatal and velar dorsal fricative in German

- a. The German dorsal fricative is realized as velar [x] after a back vocoid.
- b. Otherwise it is realized as [ç].

Complementarity and exhaustiveness follow as well because (4b) implies that (4) affects all instances of the dorsal fricative, and because of the rule/constraint interaction just mentioned. The arbitrariness problem for the non-particular rule has also disappeared: the set of relevant contexts in fact needs not be listed in a phonological rule. The context set on (4b) is no natural class by itself – it arises when a natural process carves out a set of environments from the totality of possibilities.

The two rules in (4) may be said to be *in conflict* with each other for certain elements in the following sense. If we drop the explicit “elsewhere/otherwise” restriction in (4b), rules (4*a) and (4*b) impose different and incompatible requirements on how a dorsal fricative should be realized when it follows a back vowel. The general rule is unrestricted, it could also apply in the domain of the more specific rule.

(4*) Distribution of the palatal and velar dorsal fricative in German

- a. The German dorsal fricative is realized as velar [x] after a back vocoid.
- b. The German dorsal fricative is realized as [ç].

The conflict is then resolved by the ‘Elsewhere Condition’ – a principle of grammar with the sole purpose of resolving conflicts among rules and principles. The two formulations in (5) reflect the derivational and representational interpretations it can be given, respectively.

(5) Elsewhere Condition

If the domain of application of rule/constraint R is properly included in the domain of application of S, then S cannot be applied where R can be (then R must be applied before S has a chance to be applied).

It is important to note that the problem addressed by the ‘Elsewhere Condition’ is not confined to a tiny aspect of German phonology. The list of examples given above already shows that “elsewhere” phenomena are ubiquitous in phonology and at the phonology-morphology interface. They rather seem to characterize the sound system quite generally. A principled solution is called for, and the “elsewhere” principle is a concrete and successful proposal. But note that we have thereby motivated the existence of *violable* constraints in grammar (what the more general rule requires is not always respected), and of *conflicts* between rules and constraints.

It comes as no surprise that ‘Elsewhere’ cases can be found in the other domains of language as well. Consider e.g., plural formation in Polish, an instance of core morphology. For grammatically non-neuter nouns, the primary distinction is whether the noun ends in a soft (palatalized) consonant (then, plural is formed by adding *-e* [e]) or not (then, the ending is *-y* [i]). This need not involve an “elsewhere” situation, but note that there is an exception to the latter rule: masculine personal nouns form their plural by adding *-i* [i]. We certainly prefer (6) to (6*) as a characterization of Polish plural formation.

(6) Plural Rules for non-neuter nouns ending in a hard (nonpalatalized) consonant

- a. Add *-i* if the noun is masculine personal.
- b. Add *-y*.

(6*) Plural Rules for non-neuter nouns ending in a hard consonant

- a. Add *-i* if the noun is masculine personal.
- b. Add *-y*, if the noun is feminine, or if it is masculine and not personal.

Classical examples of ‘Elsewhere’ effects in the syntax involve the influence of the lexicon on syntactic structure. Thus, simple transitive verbs combine with accusative objects in German, but there are lexical exceptions (for verbs like *helfen* “help”). Again, an elsewhere formulation of the case assignment rules as in (7), in which (7d) states the “elsewhere” situation, is superior to a listing as exemplified in (8), where (8d) lists the verbs assigning accusative in the same way as verbs assigning another case. (8) does not express at all that there is an accusative assignment *rule* in German that is quite different in nature from the other case marking options.

(7) Case Rule for Objects in German

- a. the object case is nominative for *bleiben* “remain”, *sein* “be” and *werden* “become”
- b. the object case is genitive for *gedenken* “commemorate” ... *bedürfen* “require” (7 verbs)
- c. the object case is dative for *helfen* “help” ... *gehören* “belong” (perhaps 100 entries)
- d. the object case is accusative

(8) Case Rule for Objects in German

- a. the object case is nominative for *bleiben* “remain”, *sein* “be” and *werden* “become”
- b. the object case is genitive for *gedenken* “commemorate” ... *bedürfen* “require” (7 verbs)
- c. the object case is dative for *helfen* “help” ... *gehören* “belong” (perhaps 100 entries)
- d. the object case is accusative, for *lieben* „love“ ... *eruiieren* “find out” (perhaps 25,000 entries) and all other newly formed verbs

One need not confine one’s attention to irregularities in order to find more cases of the ‘Elsewhere Condition’ in the syntax. Direct objects show no morphologically visible case marking in Hindi or in Spanish – from a theoretical point of view, they seem to bear accusative case. Particles *-ko* and *-a* are added in Hindi and Spanish, respectively, when the direct object is animate and specific. This marking is otherwise used for the dative.

- (9)
- a. Juan busca un libro
John looks for a book
 - b. Juan busca a una secretaria
John looks for a(specific) secretary
 - c. Juan da el libro a una secretaria
John gives the book to a secretary

(10) represents the “elsewhere” version of the case rules for direct objects, while (11) is a rule system that tries to avoid conflicts.

(10) Direct Object Case Rule for Hindi and Spanish

- a. Assign dative case to specific animates.
- b. Assign accusative case.

(11) Direct Object Case Rule for Hindi and Spanish

- a. Assign dative case to specific animates.
- b. Assign accusative case to animates if not specific, and to inanimates.

That the syntax-semantics interface may be particularly prone for exemplifying ‘Elsewhere’ effects has been suggested frequently. For the interaction of reflexive and personal pronouns, this has, e.g., been proposed by Bouchard (1983), and his ideas were taken up in one of the other form in the subsequent literature (Koster 1988, Fanselow 1991, Burzio 1998, Reuland 2001, Wilson 2001, among many others). The key observation is that reflexive pronouns (“anaphors”) and personal pronouns (“pronominals”) are in complementary distribution when it comes to expressing a coreference relation, as (12) illustrates, where co-indexation is to be interpreted as expressing presupposed co-reference of two argument positions.

- (12) a. John_i saw himself_i/*him_i in the mirror
b. John_i prefers very much for himself_i/*him_i to win the race
c. John_i prefers very much for Mary to caress him_i/*himself_i
d. John_i hopes that he_i/*himself_i will win

It is a commonplace that anaphors must find their antecedent in a local domain. When the antecedent is too far away syntactically, a personal pronoun must be used. (11) might seem fine, coming close to what Chomsky (1981) proposed.

(13) Coreference Rule

- a. Use an anaphor to express coreference between a and b, if a and b are close enough

- b. Use a pronominal to express coreference between a and b, if a and b are not close enough

Consider now German in this respect. First, we observe that German has no genitive anaphor, and it has no anaphoric version of the possessive pronoun.

- (14) a. er gedenkt *sich seiner (selbst)
 he commemorates himself his-gen
- b. er liebt *sich's seine Frau
 he loves refl his wife

The rule in (13) would thus have to be modified along the lines given in (15).

(15) Coreference Rule

- a. Use an anaphor to express coreference between a and b, if a and b are close enough, and if b is neither a genitive nor a possessive.
- b. Use a pronominal to express coreference between a and b, if a and b are not close enough, or if b is a genitive or a possessive.

Furthermore, since first and second person paradigms have no anaphor, a pronoun is used instead (16a), and in certain dialects, the polite form is constructed with a pronominal as well, since there is no polite anaphor. Thus in Bavarian, the anaphor *se* cannot be used for the polite form, and is replaced by the pronoun *eana* in the standard anaphoric contexts. As a consequence, (15) should be elaborated as in (17).

- (16) a. ich liebe mich
 I love me
 'I love myself'
- b. hom's eana/*se hi-gsetzt?
 have-you.polite you/*yourself seated
 'Did you take a seat?'

(17) Coreference Rule

- a. Use an anaphor to express coreference between a and b, if a and b are close enough, and if b is neither a genitive nor a possessive, and if a is not 1st or 2nd person, or a polite 3rd person.

- b. Use a pronominal to express coreference between a and b, if a and b are not close enough, or if b is a genitive or a possessive, or if a is 1st or 2nd person, or a polite 3rd person.

We could continue along these lines: when the antecedent is not a subject, there are special conditions for the use of the anaphor, and typically, these special conditions imply that a pronoun replaces the anaphor when the anaphor is blocked. Instead of adding more and more complications to *both* rules (17), Bouchard proposes an extremely simple and attractive idea that can be formulated as in (18): the pronoun is the “elsewhere” default:

(18) Coreference Rule

- a. Use an anaphor to express coreference between a and b, if a and b are close enough, to the extent that an anaphor with the relevant feature specification can be found in the lexicon.
- b. Use a pronominal to express coreference between a and b.

The domain of coreference illustrates a further aspect of specificity: the “elsewhere-interaction” need not be confined to two rules or constraints. More rules may interact in a nested fashion. Thus, consider the distribution of Dutch pronouns and anaphors, as discussed in Koster (1988) and Reuland (2001), which makes use of three indexical expressions to express coreferentiality: anaphor *zichzelf*, reflexive *zich* and pronoun *hem*.

- (19) a. *Oscar haat zichzelf/*zich/*hem*
Oscar hates himself
- b. *Oscar voelde [zich/*zichzelf/ hem wegglijden]*
Oscar felt SE/him slide away
- c. *hij zegt dat Marie van *zich/*zichzelf/hem houdt*
he said that Mary loves him

Zichzelf is used when the coreferential elements are strictly local (roughly, when they are co-arguments) and only if the anaphor is referential *Zich* is used whenever the anaphor has no referential content, and when slightly more relaxed locality conditions are fulfilled (19a,b). With a number of exceptions that can easily be explained away (as Everaert 1988 has shown), *zich* cannot intrude into the domain of *zichzelf*. The relation between the pronoun and the two anaphors

adds little new to our picture. If the rules/constraints in (20) are applied in the given order, a neat description arises.

(20) Coreference Rule for Dutch

- a. Use *zichzelf* for expressing coreference between a and b if they are clausemates and if b is referential.
- b. Use *zich* for expressing coreference between a and b if a and b are close enough.
- c. Use a pronoun for expressing coreference.

Obviously, the domain of application for *zichzelf* is a proper subset of the application domain of *zich*, and the pronominal's domain is a superset of the latter. Therefore, the 'Elsewhere Condition' makes apparently correct predictions concerning which means of expressing coreference must be used in which context.

In the past years, Blutner (1999) and others have proposed to analyze certain effects of pragmatic implicature in terms of conflictual rules. Consider the following example: when we say that we are happy, we claim that our emotional state (serotonin level?) is above a certain threshold *s*. When we say that we are unhappy, we claim that our emotional state is below a certain threshold *k*. When we say that we are not unhappy, we typically intend to express that our emotional state lingers somewhere between *s* and *k*. How does that come about? If *unhappy* means being below *k*, the negation of *unhappy* should be able to refer to *any* state above *k*, not just those below *s*. But note we have a word (a lexicalized expression) for everything that is above *s*, viz. *happy*.

In its literal interpretation, *not unhappy* is applicable in a larger domain (everything above *k*) than *happy* (everything above *s*), so an 'Elsewhere' effect might explain why we cannot use *not unhappy* in all cases where *happy* is applicable, too.

The insight that principles covering a specific set of data are applying before more general ones has been acknowledged in most linguistic theories, and it has been so from the very beginnings of the scientific inquiry of language. The Indian linguist Pānini, who is sometimes regarded as one of the world's first grammarians, has based part of his theory on conflicts between application of rules and environments where rules were blocked. The following discussion is based on Kiparsky's (2002) insightful interpretation of Pānini's grammar, and more particularly of Astādhyāyī, a system of about 4000 grammatical rules of

Sanskrit. The rules of Astādhyāyī are grouped together, so as to build classes, and the expressions which they have in common are omitted from the particular rules and are instead stated for the whole group of rules at the beginning of a heading. This permits the formulation of very simple rules, but also implies that rules are not understandable in isolation.

Kiparsky illustrates simplicity in Panini's grammar with the formation of patronymics, the derived nouns which designate the descendant of the person expressed by the base. For our goals, it is sufficient to examine the way blocking is accounted for in Astādhyāyī, and to show how conflicts are explicitly identified and resolved in the Paninian rules. The general (elsewhere) patronymic suffix is $-aN$, phonologically $-a$, with a diacritic N which causes strengthening of the stem's initial syllable; general rules accent the suffix, and truncate the stem-final $-a$ before it. A descendant of Upagu is called *Aupagavá*. $-aN$ is just the most general (elsewhere) patronymic suffix. Morphological and phonological effects of suffixing $-aN$ are expressed by a number of rules, themselves parts of a more general suffixation process. We list the rules here for completeness. Rules (21a,b) govern suffixes in general, (21c) states that the first syllable of the suffix is accented. This latter rule is the 'Elsewhere' case, and is active only in case no particular rule is applicable.

(21) Rules for suffixation

- a. 3.1.1 pratyayah
suffix-Nom
An item introduced in (earlier) rules is (termed) *pratyayah*
'suffix'
- b. 3.1.2 para ca
following-Nom and
'and (an item introduced in earlier rules) follows'
- c. 3.1.3 ādyudāttás ca
initial-accent-Nom and
'and has initial accent'

The next set of rules in (22) governs the specific properties of *taddhita* suffixes ('secondary' denominal derivational suffixes) and their patronymic subclass. Rules (22a–c) contribute to rule (22d) that suffixes $-aN$.

(22) Rules for *taddhita* suffixes

- a. 4.1.1 nyāprātipadikāt
Ni- āP-stem-Abl
‘after (an item ending in the feminine suffixes) Ni, āP , or (after) a nominal stem’
- b. 4.1.76 taddhitāh
taddhitah-NomPl
‘denominal suffixes’
- c. 4.1.82 samarthānām prathamād vā
semantically-related-GenPlfirst-Abl optionally
‘After the first semantically related stem [marked by a pronoun in the genitive case in each rule], optionally [preferably].’
- d. 4.1.83 prāg divyato ‘n
up-to divyati-Abl aN-Nom.
Up to rule 4.4.2. the accented *taddhita* suffix *aN* is added after the first semantically related nominal stem [marked by a pronoun in the genitive case in each rule].’

Exceptions to suffixing *-aN* to express patronymicity are for example a group of stems ending in *-pati* ‘lord’, which form their patronymics with the suffix *-Nya* (*Prajāpati* → *Prāyāpatya*). This class has also an exception: a class of compounds in *-pati*, which require *-aN* again, rather than *-pati* (*Ásvapati* → *Ásvapatá*). Pānini groups the two *-aN* rules together, orders the *-Nya* rule afterwards, and achieves in this way maximal concision.

(23) Rules for the exceptions

- a. 4.1.84 ásvapatyādibhyás ca (83 aN) (82 samarthānām...)
Ásvapati -etc-Abl
‘The *taddhita* suffix *-aN* is also added after the first syntactically related stem which belongs to the class *Ásvapati* etc.’

- b. 4.1.85 dityadit ī adityapatyuttarapādān nyah (82
 samarthānām...) ...
 diti-aditi-aditya-pati-second-word-Abl nya-Nom
 The *taddhita* suffix *-Nya* is added after the first syntactically
 related stem *Diti* ... and after the compounds in *-pati*.

Grammatical architectures allowing for “elsewhere” types of conflict resolution seem widely accepted. The ‘Elsewhere’ principle is, however, not sufficient to account for all conceivable cases of rule interaction in language. We will see below that the ‘Elsewhere Condition’ cannot explain all kinds of rule interaction because the processes in question often do not have nested but rather merely overlapping domains of application. But let us focus first on more disturbing facts pointing to the conclusion that ‘anti-elsewhere’ effects (the reverse of ‘Elsewhere’ effects) are very common: the more general rule applies in the domain of the more restricted one. This is a surprising situation if specific conditions always take precedence over general ones on principled grounds, for reasons intimately linked to the architecture of grammar. One well-known example of ‘anti-elsewhere’ effects from phonology comes from the variation in German between two pronunciations of a word ending with underlying /ng/. In one variant, the word *Zeitung* ‘newspaper’ is pronounced [tsaɪ̯tʊŋ], as the result of assimilation of /n/ to the dorsal articulation of /g/ and deletion of /g/. This happens in standard German and in most other dialects of German. In the other variant, *Zeitung* is pronounced [tsaɪ̯tʊŋk], as a consequence of assimilation of /n/ to the dorsal articulation of /g/ and Final Devoicing.

Part of the processes leading to the two surface forms [tsaɪ̯tʊŋ] and [tsaɪ̯tʊŋk] are conflicting with each other. Dorsal assimilation of the nasal ([n] → [ŋ]) applies in both cases, but the fate of the dorsal stop depends on additional factors. Either it deletes or it is devoiced. In derivational phonology, this variation has been analyzed as a consequence of a conflicting ordering of the rules of Final Devoicing and g-deletion. If g-deletion applies first, we are left with just [ŋ] and nothing else happens. In the alternative ordering, Final Devoicing applies first, leading to [ŋk]. In this case, nothing else happens either since the environment of g-deletion is not present after having changed [g] to [k]. The two orderings are shown in (24) and (25) (see also Wurzel 1980).

(24) Derivation of [tsaɪ̯tʊŋ] (more frequent in the standard variant of German)

- a. Nasal assimilation: [nasal, coronal] → [dorsal]/ _ [-cont, dorsal

tsa_itung → tsa_itung

b. g- deletion: $g \rightarrow \emptyset / \eta _ \left\{ \begin{array}{l} C_0 \\ \text{schwa} \end{array} \right\}$

tsa_itung → tsa_it_u

c. Final Devoicing: [+voiced, -cont, -son] → [-voiced] / _σ

(25) Derivation of [tsa_it_uŋk] (more frequent in the Northern variant of German)

a. Nasal assimilation: [nasal, coronal] → [dorsal] / _σ [-cont, dorsal]

tsa_itung → tsa_itung

b. Final Devoicing: [+voiced, -cont, -son] → [-voiced] / _σ

tsa_itung → tsa_it_uŋk

c. g- deletion: $g \rightarrow \emptyset / \eta _ \left\{ \begin{array}{l} C_0 \\ \text{schwa} \end{array} \right\}$

The contexts in which g-deletion applies affecting only [g], a voiced obstruent, can be understood as being a subset of the situations in which final devoicing applies, affecting syllable-final voiced obstruents in German in general. In other words, an ‘Elsewhere’ effect is to be expected. The rule of g-deletion should always take precedence over final devoicing – which it does not in those dialects in which [tsa_it_uŋk] is acceptable.² In (24) the rules of g-deletion and of Final Devoicing are ordered as expected: particular before general. But in (25), the relevant rules apply in the reverse ordering: general before particular.

OT has no problem with these ‘anti-elsewhere’ effects. Since both the general and the specific conditions are expressed by means of constraints, and since

² The context of g-deletion, as posited in (24) and (25), also includes pre-schwa environments, but in the derivational analyzes of Hall and Wiese (1996), this context is syllable-final at a certain point of the derivation, before schwa-insertion.

constraints can be ordered differently in different languages, both “elsewhere” and “anti-elsewhere” are predicted to be possible outcomes. But a grammar in which the “elsewhere” facts are necessarily ordered after the particular cases have applied cannot account for “anti-elsewhere” results straightforwardly.

A further kind of conflict resolution arises when two rules that potentially apply to the same element are not in an “elsewhere” relationship, but in another type of relation: optionality. From the perspective of Universal Grammar, this third category of conflictual cases involves *true optionality (free variation)*, and these cases have also figured prominently in discussions concerning conflicts in language. The conflict resolution happens in an arbitrary manner.

Truly optional cases are, perhaps, hard to come by within a single language, since it is generally possible to find some contextual effect influencing the choice of one or the other option. In his influential study, Labov (1966) showed that free variation should be understood as an artefact of sociological features like social status, age, sex, etc, and that the realization of allophones in free variation are largely predictable on the basis of statistical calculation. In this book, we are interested in accounting for free variation, but not in the factors influencing the alternation, or the diachronical evolution, even though we acknowledge the interest of such studies. In chapter 10, some remarks are introduced about which kind of influence on the allophonic variation should be part of the grammar proper. At this point, it is enough to mention that free variation is common in language or dialect variation (and may be difficult to deal with in Optimality Theory).

An example of intralinguistic optionality comes from the Ukrainian paradigm in (26) illustrating the point for case assignment (Sobin 1985, Shevelov 1963). The ‘Elsewhere Condition’ leads us to expect that the more general case assignment rule must not apply in the domain of more specific rules. This prediction is not borne out in Ukrainian. Simplifying a bit, Ukrainian is like any other Slavic language in allowing that subjects bear nominative case. In a passive, the subject may bear accusative case. As in Russian or Polish, there are special case rules for negative clauses, according to which direct objects and subjects in passive clauses may bear genitive. All rules predict different outcomes, they make conflicting statements on what the surface form of a case in a positive and a negated passive should be. The three rules stand in an “elsewhere” relation, with the genitive contexts being a subset of the accusative contexts, and the latter being a subject of the constellations that accept nominatives. One would thus expect that subjects of negated passive can show up with genitive case only. This expectation is not borne out, as (25) illustrates. The conflict between the rules is resolved by attributing them equal importance – the choice between the various case possibilities is optional (Paslawska, p.c.)

- (26) a. Cervku bulo zbudovano v 1640 roc'i.
church -fem.acc be-past.neuter build-part-neut in 1640
- b. Cervka bula zbudovana v 1640 roc'i.
church -fem.nom be-past.fem build-part-fem.sg in 1640
- c. Cervkvy ne bulo zbudovano v 1640 roc'i.
church -fem.gen be-past.neuter build-part-neut in 1640
- d. Cervka ne bula zbudovana v 1640 roc'i.
church -fem.nom be-past.fem build-part-fem.sg in 1640

A second example brings us back to the syntax-semantics interface. Above, our conclusion concerning the distribution of anaphors and pronouns was that they are in complementary distribution, reflecting an 'Elsewhere' effect. This is true for standard anaphors only, however. In certain languages like Icelandic, Chinese, or Japanese, reflexive pronouns may have a (subject) antecedent in a higher clause – but this enlargement of the domain of anaphoric binding does not necessarily lead to a corresponding reduction in the options for pronominals!

- (27) Xiaoming_i yiwei Xiaohua bu xihua ziji_i/ta_i
Xiaoming think Xiaohua not like self/him
'Xiaoming thinks that Xiaohua does not like self'

These examples suggest again that the general rule *does* sometimes apply in the domain of the particular rule. The "elsewhere" approach therefore cannot be the *only* solution for conflicts in languages. Whether a conflict is solved in terms of the 'Elsewhere Condition' is not determined on a principled basis – rather it is subject to interlinguistic variation.

Further examples of optionality within single languages are listed here:

- In a set of environments, the auxiliary may but need not be contracted in English (*he will kiss Mary* – *he'll kiss Mary*)
- The question phrase may but need not be preposed in French matrix questions (*tu as vu qui?* – *qui as-tu vu?* 'Who have you seen')
- The location of the negation on the auxiliary alternates with its location on the complement in sentences like *Mary did not see anything* vs. *Mary saw nothing*

- In a variety of languages, high vowels in the first position in a hiatus can be alternatively realized as a full vowel or as a glide: The realization of *Radio* in German alternates between [Ra.di.o] and [Ra.djo], nuage ‘cloud’ in French between [ny.aʒ] and [nyɑʒ].

True optionality in the context of typological variation is a frequent phenomenon and has occupied an important place in the OT literature up to now. We will sketch only two cases of this kind here, as further examples will appear at numerous places in this book.

The first example is the well-known variability in the tolerance languages have for codas in syllabification. English has numerous examples of syllables with codas (cap, hat, lamp, etc.) whereas Hawaiian has not a single one. This language does not tolerate codas at all, and furthermore has a very limited segment inventory. It accordingly changes the segmental and syllabic structure of loanwords in a considerable way. The following examples come from Gussenhoven & Jacobs (1998:43).

(28) Adaptation of English loanwords in Hawaiian

- | | | |
|-----------|---|----------|
| a. Albert | → | ʔalapaki |
| b. ticket | → | kikiki |
| c. wharf | → | uapo |

Prince & Smolensky (1993) assume that the constraint responsible for the dispreference for codas (called NOCODA) conflicts with the tendency for segments to be realized without change, as well as without deletion or insertion of additional segments. In Hawaiian, clearly, it is NOCODA which wins the competition, since vowels are inserted after segments which are in the coda position in the original language. In English, codas are allowed and it is the tendency for underlying segments to be realized without change which wins.

It is important to notice that these two tendencies are not in an “elsewhere” relationship. It is not the case that being truthful to an underlying segment is more general or more specific than the prohibition against codas. In fact the two needs are expressed as unrelated, and it is only in some situations that they conflict and can lead to opposite results.

The second case of typological variation is the well-known difference between languages which systematically locate wh-phrases at the front of the sentence and languages with wh-phrases in situ. A language of the first kind is English and a language of the second kind is Japanese.

(29) Wh-Phrases

- a. English: What did you tell me?
- b. Japanese: John-wa nani-o kaimasita ka
 John-TOP what-Acc bought Q
 ‘What did John buy?’

The example has been discussed a number of times in the OT literature, first by Grimshaw (1997). The conflict observed in this case is whether the need to place the wh-word or phrase in the position in the sentence in which its scope is most clearly visible is higher ranking than the desire to avoid movement and traces. In English, the former solution is chosen, whereas in Japanese the opposite ranking is the right one.

We will return to these examples in more detail in chapter 2. If one concedes that principles may stand in conflict with each other, and may be violated, because ‘Elsewhere’ effects, ‘anti-elsewhere’ effects and true optionality imply just that, it is a natural idea to extend this analysis to other types of rule interaction. The next chapter will concentrate on the third kind of conflicts between grammatical principles and propose a typology of conflicts along the lines of OT conflict resolution.

1.2 Overview of OT

Having motivated the presence of conflicts in grammar, we now give a sketch of the architecture of Optimality Theory as it was developed in Prince & Smolensky (1993). Some of OT’s architectural decisions derive in straightforward way from the need to resolve grammatical conflicts. Others involve matters of execution that might have also been arranged differently. Thus, OT is a constraint-based/representational model of grammar. As Prince & Smolensky point out in their 1993 manuscript introducing the theory, major aspects of OT might be formulated in rule based/derivational systems, too. Further aspects of the organization of human languages have not been addressed in a principled way at all. Thus, OT can be applied as a grammatical model for phonology, morphology, syntax, semantics, and pragmatics, as well as for facts concerning language acquisition, language loss, diachronic change, etc. The nature of the interaction of, say, the morphological and syntactic constraints is not the subject of *uniform* modeling in Optimality Theory, so that approaches in which morphological and syntactic constraints are part of a single set of constraints (see Bresnan 1999 for

instance) coexist with approaches in which syntactic structures are built on the basis of syntactic principles only, and are later interpreted morphologically by a separate constraint system (see Trommer 2002 for instance).

Let us now introduce some basic technical aspects of OT. Imagine L, a native speaker of Mandarin Chinese, who has learnt German from books and grammars but who has never heard it spoken. She only knows that German is a stress-based language and that main accent in a declarative sentence is realized with a falling tone. She would like to find out how regular sentence stress is assigned, something that her textbooks and grammars have not taught her. She comes across a German speaker, S, who utters single sentences, sometimes a bit out of context. S first says (30) (the word bearing the falling tone for main accent is written in small caps).

(30) Guten TAG ‘Hello’

From this utterance, L deduces that noun phrase accent is final and formulates an according OT principle (31).

(31) ALIGN-R -NP (NP, main stress, Right)
In a noun phrase, accent is final.

This constraint expresses that the right edge of a noun phrase falls together with the right edge of a main stress. Formally, (31) might be interpreted as a generative statement that picks any noun phrase and guarantees that the accent goes to the rightmost position. In the OT model developed by Prince and Smolensky, the approach is truly constraint based. The grammatical entity is picked by the *evaluation component* of the grammar, called EVAL. EVAL consists of a set of constraints, by which possible outputs are evaluated. These possible outputs are called *candidates*. In the context of (30), the candidates would seem to be *Guten Tag*, GUTEN TAG, *Guten TAG* and *GUTEN Tag*. OT candidates are generated by the generative part of the grammar, the *GEN* component. Thus the grammar, as conceived by Prince & Smolensky consists of two steps. First, candidates are generated by the function GEN, which delivers for each input a certain number, possibly an infinite number, of candidates. The input, for the moment best conceived as a kind of underlying representation, can have little structure, possibly underspecified, but which can also be completely specified. The principle Richness of the Base (Prince & Smolensky 1993), guarantees that the input can take any form it wants, as long as it is a linguistic entity. It is the task of the second component of the grammar, EVAL, to eliminate bad inputs, and to

determine, according to the constraint ranking of the language under consideration, which are the grammatical forms.

Principle (31), together with a constraint to the effect that just a single word has main stress in an NP, correctly picks (30) as the winning candidate. The other candidates violate the constraint and are eliminated.

The next sentence uttered by S (32) confirms (31) since accent in the NP *zwölf Stunden Verspätung* is final.

(32) Mein Flugzeug hatte zwölf Stunden VERSPÄTUNG
 my plane had 12 hours delay
 ‘my plane was 12 hours late’

Sentence (32) allows L to hypothesize a further constraint to the effect that sentence accent is also final. L formulates constraint ALIGN-R.

(33) ALIGN-R (sentence, main stress, Right)
 In a sentence, main stress is final.

S goes on with his monologue and the next sentence forces L to revise her grammar.

(34) Ich bin nämlich gestern von Berlin nach BEIJING geflogen
 I am Particle yesterday from Berlin to Beijing flown
 ‘I flew from Berlin to Beijing yesterday’

The main stress in this sentence is not compatible with ALIGN-R, since the penultimate word bears main accent, but according to ALIGN-R, the last word *geflogen* should be stressed. What could be the difference between (32) and (34) leading to the different position of main stress? The sentence (34) is in the present tense and has an inflected verb in the V2-position, whereas (32) is in the perfect tense, with a final unstressed past participle, and the participle is unstressed. One idea might be to split (33) into two different principles. (33) itself would be restricted to sentences with a simple tense, whereas a further principle restricted to sentences with complex tenses would place the main stress into the position immediately preceding the verb complex at the end of the sentence. L, however, decides to keep the predictions of ALIGN-R but adds a new constraint to her grammar. She observes that there is a similarity between both sentences. It lies in the fact that the accented word is an internal argument of the verb. L formulates

STRESS-ARGUMENT in (35), which requires that an argument of a verb bear main accent.

- (35) STRESS-ARGUMENT
Accent is on a verbal argument.

At this point, L has already constructed a series of hypotheses of how sentence stress is assigned in German. Her system derives the correct predictions concerning (34) if ALIGN-R must be respected to the extent only that it does not get in conflict with STRESS-ARGUMENT. When the two constraints predict divergent results, STRESS-ARGUMENT decides. The constraints of grammar thus have a different weight. EVAL is not just a set of principles and constraints, it consists of *a hierarchy (an exhaustive total ordering) of the constraints in question*. The notation ‘a >> b’ means ‘a has a higher rank than b’. (36) is thus what L needs in her account of German stress placement.

- (36) STRESS-ARGUMENT >> ALIGN-R

The candidate structures are evaluated relative to the hierarchy EVAL, and the candidate with the best violation profile is the grammatical one. A first formal definition of grammaticality can be found in (37).

- (37) A candidate *c* generated by GEN from Input *I* is *grammatical* iff all candidates *c'* it competes with are such that *c'* violates the highest constraint *c* from EVAL on which *c* and *c'* differ, whereas *c* does not.

Concentrating on S’s last sentence “*Ich bin nämlich gestern von Berlin nach Beijing geflogen*”, a *tableau*, like the ones we saw in (1) and (2), can be drawn which visualizes the evaluation procedure and identification of the grammatical candidates in a transparent form. In an OT tableau like (38), constraint ordering is represented by linear organization. The leftmost constraint is the highest one; to its right comes the next one in the hierarchy, and so on. Since L has only two constraints to rank, this presents no particular problem. The next step is to mark violations of the constraints by the candidates with the help of asterisks. Candidate *a* violates ALIGN-R, but not STRESS-ARGUMENT. Candidate *b* violates STRESS-ARGUMENT. Such a tableau allows us, as well as L, to evaluate candidates and decide which one is optimal. STRESS-ARGUMENT is the highest-ranking constraint, and for this reason, candidate *b*, violating it, is eliminated from the competition. This is indicated in tableau (38) with an exclamation mark following the asterisk. Candidate *a* is identified as grammatical. It violates a constraint, yet

respects the highest constraint on which the two candidates introduced so far differ.

(38) Tableau

	STRESS-ARGUMENT	ALIGN-R
a. Ich bin [...] von Berlin nach BEJING geflogen		*
b. Ich bin [...] von Berlin nach Beijing GEFLOGEN	*!	

Obviously, however, the set of candidates to be considered is not exhausted by what we find in tableau (38). There are many other options for locating stress in the sentence in question, as indicated in tableau (39). Candidates d through g are correctly eliminated by STRESS-ARGUMENT, but with candidate c, we seem to run into a problem, since its constraint violation profile does not differ from a, the only grammatical option.

(39) Tableau

	STRESS-ARG	ALIGN-R
a. Ich bin nämlich gestern von Berlin nach BEJING geflogen		*
b. Ich bin nämlich gestern von Berlin nach Beijing GEFLOGEN	*!	
c. Ich bin nämlich gestern von BERLIN nach Beijing geflogen		*
d. Ich bin nämlich GESTERN von Berlin nach Beijing geflogen	*!	*
e. Ich bin NÄMLICH gestern von Berlin nach Beijing geflogen	*!	*
f. Ich BIN nämlich gestern von Berlin nach Beijing geflogen	*!	*
g. ICH bin nämlich gestern von Berlin nach Beijing geflogen	*!	*

This problem is solved in OT by assuming that some constraints are *gradient* in the sense that we can determine how often they are violated. Main stress is one position away from the right edge in a, but is separated by two elements from clause final position in c. Assume that this difference matters – we might e.g., interpret ALIGN-R as meaning: an element E must not follow the main stress of a sentence. We enter a violation (mark) for each phrase that violates ALIGN-R under that interpretation. The result is represented in tableau (40). The candidate c

through g successively accumulate violation marks for principle ALIGN-R, because the distance of the main stress to the clause final position increases. For candidate c, the additional violation of ALIGN-R is critical (as indicated by the exclamation mark), while the fate of the other candidates has already been settled by the higher constraint stress-argument. It is a useful custom to shade those cells in a tableau which are irrelevant for the outcome of the evaluation procedure. The winning candidate is identified by the sign ☞.

(40) Tableau

	STRESS-ARG	ALIGN-R
☞ a. Ich bin nämlich gestern von Berlin nach BEJING geflogen		*
b. Ich bin nämlich gestern von Berlin nach Beijing GEFLOGEN	*!	
c. Ich bin nämlich gestern von BERLIN nach Beijing geflogen		**!
d. Ich bin nämlich GESTERN von Berlin nach Beijing geflogen	*!	***
e. Ich bin NÄMLICH gestern von Berlin nach Beijing geflogen	*!	****
f. Ich BIN nämlich gestern von Berlin nach Beijing geflogen	*!	*****
g. ICH bin nämlich gestern von Berlin nach Beijing geflogen	*!	*****

Of course, we need to slightly change the definition of grammaticality in order to formally arrive at the result that we have motivated informally with tableau (40).

- (41) A candidate c generated by GEN from input I is *grammatical* iff all candidate c' it competes with are such that c' violates the highest constraint c from EVAL on which c and c' differ *less often* than c does.

With tableau (40), we introduced several properties of OT constraints. Constraints are *ranked*. OT assumes that the ranking is *always* determined on a language-particular basis. We saw that German has the ranking shown in (36), but in a language with regular final stress, like French, the two constraints STRESS-ARGUMENT and ALIGN-R would be ranked the other way round, thus ALIGN-R >> STRESS-ARGUMENT, in order to guarantee that candidates with nonfinal accent are eliminated before STRESS-ARGUMENT has a chance to choose among the remaining candidates. In a sentence like (42), the participle is final and stressed. The argument *l'argent* 'the money' does not bear the nuclear stress because it is not final. This is illustrated in tableau (43).

(42) French final stress

Marie a rencontré le peintre auquel l'argent a été REMBOURSE.
Mary has met the painter to whom the money has been reimbursed

(43) A French tableau

	ALIGN-R	STRESS-ARGUMENT
☞ a. auquel l'argent a été REMBOURSE.		*
b. auquel L'ARGENT a été remboursé.	*!	
c. AUQUEL l'argent a été remboursé.	*!*	

The constraint reranking faculty is a crucial property of OT which will be the theme of chapter 3. In fact, all possible rankings derivable from some set S of constraints are claimed to possibly figure as natural languages.

(44) Let S be a set of constraints used in language L. Then any ordering of S yields a possible natural language L'.

In other words, constraints are freely rerankable.

The third property of constraints, which has been introduced in the context of tableaux/s (40) and (43), is their violability. In principle, all constraints are violable, even if they are the highest in a hierarchy. It was also demonstrated with ALIGN-R that constraints can also be gradiently violated, though most constraints induce binary decisions on violations. A candidate that violates a gradient constraint more often than another candidate loses to this second candidate.

We can now return to an observation that has already been made several times: the decision as to which candidate is optimal is made on a *lexicographic* basis, called like that because it is reminiscent of the way a lexicographer orders the words in a dictionary. There is an ordering of the letters of the alphabet (a, b, ... x, y, z), and if two words differ by their first letter, it is this letter that decides which word comes first in the lexicon. If they have the first letter in common, the second letter determines their order – unless the two first letters of the words are once more identical. In such a situation, the third letter will determine order if it can do so, etc.. In OT, the decision between two candidates follows exactly the same strategy. If c and c' differ on the highest constraint C, it is their performance relative to C which determines which of the two is better. If they do not differ with respect to C, the next principle C' in the hierarchy is chosen. If the two

candidates do not have the same number of violations with respect to C', then C' will determine between them, otherwise, one proceeds to the next lowest constraint C'' etc.

Envisaging the entire competition, pairwise evaluations is able to identify one optimal candidate. Let us limit the discussion to the first three candidates of tableau (40). In tableau (43) a wins over b, c wins over b, and a wins over c. The winner of the entire competition is a.

(45)

	STRESS-ARG	ALIGN-R
a. Ich bin [...] von Berlin nach BEJING geflogen ~		a
b. Ich bin [...] von Berlin nach Bejing GEFLOGEN	b	

(46)

	STRESS-ARG	ALIGN-R
a. Ich bin [...] von Berlin nach BEJING geflogen ~		a
c. Ich bin [...] von BERLIN nach Bejing geflogen		cc

(47)

	STRESS- ARGUMENT	ALIGN-R
b. Ich bin [...] von Berlin nach Bejing GEFLOGEN ~	b	
c. Ich bin [...] von BERLIN nach Bejing geflogen		cc

Let us now return to our imaginary interaction of S and L. S goes on with her monologue and says the following sentence.

(48) Man hat mich KONTROLLIERT.

This sentence has a verbal argument, but it is not stressed. The argument is a reflexive pronoun and as such, a function word with less prosodic weight than a content word. L decides on the basis of sentence (48) that such words repel stress. She needs a new constraint ranked higher than *STRESS-ARGUMENT*, since otherwise an argument would be stressed regardless of its status as function or content word.

- (49) UNSTRESSEDFUNCTIONWORD
Function words are unstressed.

Tableau (50) illustrates how this new constraint forces stress to be final again. Since *mich* cannot be stressed because of high ranking *UNSTRESSEDFUNCTIONWORD*, and there is no other internal argument which could be stressed, the decision is taken by *ALIGN-R*.

(50)

	UNSTRFUNCWORD	STRESS-ARG	ALIGN-R
☞ a. Man hat mich KONTROLLIERT		*	
b. Man hat MICH kontrolliert	*!		*
c. Man HAT mich kontrolliert		*	*!

An important characteristic of OT competitions is visible here. A candidate can be chosen on the basis of a relatively low-ranking constraint, here *ALIGN-R*, which was shown in to play no role in the decision between candidates containing content words as arguments. The situation illustrated has been called Emergence of the Unmarked (TETU) by McCarthy & Prince (1994). It will be illustrated in more detail in chapter 3, but now it suffices to say that even low-ranking constraints can take decisions given that all higher-ranking ones are not in a position to decide, be it because more than just one candidate fulfil them, or the reverse situation is the case, the candidates that could still win are doing equally bad on them.

Coming back to (32), we observe that the optimal candidate for this competition does not violate any constraint, as testified by tableau (51). This is of course because only three constraints are active. As soon as more constraints are involved, winning candidates always violate some constraints.

(51)

	UNSFUNCWRD	STRESS-ARG	ALIGN-R
a. Mein Flugzeug hatte 12 Stunden VERSPÄTUNG			
b. Das Flugzeug HATTE Verspätung		*!	*
c. Das FLUGZEUG hatte Verspätung			*!*

So far, we have left it open which candidates *c*, *c'*, ... compete with each other relative to EVAL, in other words, whether we opt for a containment of a correspondence version of OT. In the correspondence theory, every output can in principle be evaluated for every input (see chapter 2 for a detailed exposition of the two versions). But of course, the well-formedness of “*Ich muss mich BEEILEN*” does not interfere at all with “*Ich bin nämlich gestern von Berlin nach BEIJING geflogen*”, although the former sentence violates less principles than the latter. This is because these two sentences are optimal candidates of different inputs, and for this reason, even if they participate in the same competition, as would be predicted in the correspondence theory, they do not really compete with each other. High-ranking constraints eliminate all candidates which differ in an obvious way from the input. In the containment version of OT, the two sentences do not even compete with each other. Only those candidates which contain the input are part of the evaluation set.

Is the result obtained in this section at odds with our reflection concerning the ‘Elsewhere’ effect? Consider first a situation in which the more specific principle *S* outranks the general principle *G*, as was shown with the distribution of the German dorsal palatal and the distribution of the reflexives and the pronouns in several languages in section 1.1. Whenever *S* is applicable, it governs the wellformedness of candidates, whenever it is not, *G* decides. This is the typical “elsewhere” constellation. But if *G* outranks *S*, *S* has *never* a chance to exert any visible effect in the language in question. We called this effect ‘anti-elsewhere’. Thus, *G* is always applicable when *S* is, but since it has a higher rank, it is always *G* that decides. It would be represented, e.g., by a language in which reflexive pronouns never surface, because the principle that licenses them is outranked by the general principle that coreference be expressed by the use of pronominals. The language in question cannot be distinguished empirically from a language in which *S* is non-existent. Thus, assuming that *S* nevertheless exists (but does no harm) is sufficient to maintain the claim of free rerankability, although it may not always be forced upon us on empirical grounds. To conclude this chapter, we

illustrate ‘Elsewhere’ and ‘anti-elsewhere’ effects and show that the same grammar that was illustrated in detail for true optionality also account for these effects.

First, consider ‘Elsewhere’ effects as those illustrated in section 1.1 for pronouns and anaphora, which both can be used to express coreference. Imagine a (possibly fictive) situation in which anaphora (reflexives) are used in a smaller set of domains than pronouns. A constraint is necessary to express that anaphors cannot refer to an antecedent across specified domain boundaries (a finite clause for instance). In other words, anaphora can corefer inside of certain grammatical domains but not beyond. This is expressed by (52a), where [] stand for variable domains according to the language considered. Leaning on insights formulated by Burzio (1988), Fanselow (1991), and translated by Burzio (1998) into OT, we may postulate that reflexives are less costly than pronouns, because they have less grammatical features. Constraints a, b and c ranked in that ordering express the “elsewhere” relationship: Since anaphora are less costly, they are preferred as long as they are licenced in the domain in which they stand. Otherwise (elsewhere), pronouns are chosen.

(52) Constraints expressing pronouns and anaphora coreferentiality

- a. BARRIER: A reflexive must be bound within the domain of []
- b. *PRONOUN: No pronoun (Pronouns are costly.)
- c. *ANAPHOR: No anaphors (Anaphors are costly.)

Tableaux (51) and (53) illustrate some language in which anaphors have a limited range. Tableau (53) shows how the constraints allow an anaphor to express coreferentiality as long as the anaphor and its antecedent are in the limit of the domain defined by BARRIER. When the antecedent and the coreferent are separate by the crucial barrier, the candidate using an anaphor is no longer allowed because it violates BARRIER, and candidate b, using a pronoun, is optimal.

(53) Tableau: Coreferentiality by means of reflexives or pronouns

	BARRIER	*PRONOUN	*ANAPHOR
☞ a. [a... anaphor]			*
b. [a...pronoun]		*!	

(54) Tableau: Coreferentiality by means of reflexives or pronouns

	BARRIER	*PRONOUN	*ANAPHOR
a. [a... [anaphor ...]]	*!		*
☞ b. [a...[pronoun ...]]		*	

In a language without anaphora, the same constraints are used, but with a different ranking. Now the particular constraint BARRIER has no effect anymore, regardless of its ranking, because the crucial ranking between *ANAPHOR and *PRONOUN disallow the emergence of anaphora altogether. Since it should be evident that across the boundaries specified by [], anaphora are also disallowed, we do not draw the tableau for this case. The particular case – anaphor under special circumstances – is obliterated entirely as a consequence of the prohibition of anaphora in all domains.

(55) Tableau: Coreferentiality by means of pronouns only

	BARRIER	*ANAPHOR	*PRONOUN
a. [a... anaphor]		*!	
☞ b. [a...pronoun]			*

‘Elsewhere’ and ‘anti-elsewhere’ effects are thus accounted for by the same means: ranking of the relevant constraints, though the rankings are different. Furthermore the cases just illustrated for the distribution of pronouns and anaphora are similar to what has been illustrated for stress assignment in German and French, a true optionality effect. Here too, it was shown that reranking is all we need to obtain the desired effect.

Conflicts and their resolution have been shown to be pervasive in all domains of linguistics, and no grammatical theory has managed to avoid reference to them, (see chapter 5 on the precursors of OT). OT puts the emphasis of the analysis on exactly this aspect and accounts for different kinds of conflicts by the same means: reranking of the constraints. The next chapter examines the constraints and provide a classification as well as a review of their interactions.