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THE BORDER WARS: A NEO-GRICEAN PERSPECTIVE

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Abstract

In reports filed from several fronts in the semantics/pragmatics border wars, I seek to bolster the loyalist (neo-)-Gricean forces against various recent revisionist sorties, including (but not limited to) the relevance-theoretic view on which the maxims (or more specifically their sole surviving descendant, the principle of relevance) inform truth-conditional content through the determination of "explicatures", Levinson's defense of implicatures serving as input to logical form, recent arguments by Mira Ariel for a semantic treatment of the upper bound ('not all') for propositions of the form *Most F are G*, and Chierchia's proposal to reanalyze implicatures as part of compositional semantics. I argue for drawing the semantics/pragmatics boundary in a relatively traditional way, maintaining a constrained characterization of what is said, while adopting a variant of Kent Bach's position on "impliciture" and supporting the Gricean conception of implicature as an aspect of speaker meaning, as opposed to its reconstruction in terms of default inference or utterance interpretation. I survey current controversies concerning the meaning and acquisition of disjunction and other scalar operators, the relation of subcontrariety and its implications for lexicalization, the nature of polarity licensing, and the innateness controversy. In each case, I seek to emphasize the significance of the generalizations that a (neo-)classical pragmatic approach enables us to capture.

For some time, David Kaplan (cf. Kaplan 1978:223) has taken to harking nostalgically back to the Golden Age of Pure Semantics, which reached its apotheosis with the theory of extension and intension in Carnap's (1947) *Meaning and Necessity* before the tarnish from the ravages of proper names and demonstratives inevitably set in. Following Kaplan's lead, I will dub the traditional pre-lapsarian pragmatic theory, on which non-truth-conditional aspects of meaning are read off the output of semantically interpreted logical form, the Golden Age of Pure Pragmatics, a.k.a. GAPP (see e.g. Grice [1967] 1989, Horn 1972, 1973, Gazdar 1979, Levinson 1983, Hirschberg 1991).

My survey of the borderlands where semantics meets pragmatics begins with the relevance-theoretic (e.g. Sperber & Wilson, Carston) view on which the maxims (or more specifically their sole surviving descendant, the principle of relevance) inform truth-conditional content through the determination of "explicatures" and Levinson's framework on which implicatures serve as input to logical form.

1 Implicature, explicature, and propositional content

As is well known, GAPP advocates a general account of scalar values as lower-bounded by their literal meaning (what is said) and upper-bounded by quantity-based implicature. Thus the "one-sided" meanings delivered by the linguistic semantics is filled in to yield the "two-sided" communicated understandings in the examples in (1):

(1)   <u>GAPP on scalars</u>   1-SIDED MEANINGS   → 2-SIDED UNDERSTANDINGS
       a. Pat has **3** children.   '. . . at least 3 . . . '   '. . . exactly 3 . . . '
       b. You ate **some** of the cake. '. . . some if not all . . . ' '. . . some but not all . . . '
       c. It's **possible** she'll win. '. . . at least ◇ . . . '   '. . . ◇ but not certain . . . '
       d. He's a knave **or** a fool. '. . . and perhaps both'   '. . . but not both'
       e. It's **warm**.   '. . . at least warm . . . '   '. . . but not hot'

The alternative view, on which each scalar predication in (1) is lexically ambiguous between one-sided and two-sided readings, is ruled out by the general metatheoretical consideration that Grice dubs the Modified Occam's Razor principle: "Senses are not to be multiplied beyond necessity." The same principle has been endorsed elsewhere ("Do not posit an ambiguity unless you are forced to, unless there are really compelling theoretical or intuitive grounds to suppose that an ambiguity really is present" – Kripke 1977:20).

Negating such predications denies the lower bound: to say that something is not possible is to say that it's less than possible. When it is the upper bound that appears to be negated (*It's not possible, it's CERTAIN*), a range of syntactic, semantic and intonational evidence indicates the presence of a METALINGUISTIC or echoic use of negation, in which the negative particle is used to object to any aspect of an alternate (actual or envisaged) utterance, including its conventional and conversational implicata, register, morphosyntactic form or pronunciation (Horn 1989:Chapter 6). If it's hot, it's (a fortiori) warm, but if I know it's hot, the assertion that it's warm can be echoed and rejected as (not false but) insufficiently informative, as in (2):

(2) It's not WARM, it's HOT!

(3) You're right, it's not warm. It's HOT!

As seen in (3), the metalinguistic understanding typically requires a second pass and the effect is typically that of an ironic "unsaying" or retroactive accommodation. (More recently, other approaches have been proposed for these cases, with Carston (1996) in particular recasting these marked uses as echoic negation applying to propositional content; see Horn 2002 for related discussion and references.)

One of the original motivations for GAPP was the straightforward and general account it offers of relations among the logical operators, particularly that between the two subcontraries situated at the **I** and **O** vertices of the traditional post-Aristotelian Square of Opposition in (4):

(4) SQUARE OF OPPOSITION
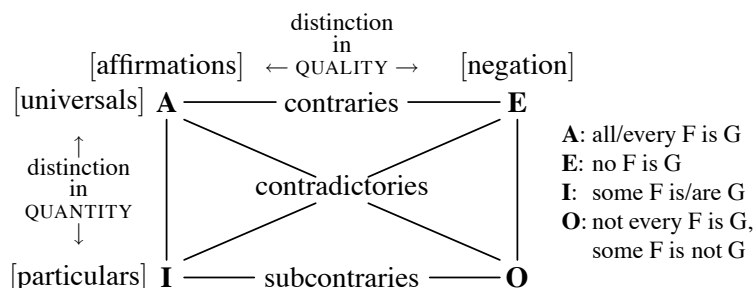
By GAPP, the assertion of either particular subcontrary implicates that (for all the speaker knows) the opposite subcontrary holds, or equivalently that the negation of the corresponding universal

holds: in asserting that *some* … I implicate (ceteris paribus) that for all I know *not all* … Binary connectives (as we shall see below), modal and deontic operators, and other proposition-embedding operators behave in similar fashion (see Horn 1972). More generally, the assertion of a weak scalar value implicates the negation of stronger values in the same domain.

Coming to these issues from the direction of relevance theory (RT), Sperber & Wilson (1986), Carston (2002), and others have rejected GAPP, taking the bilateral understanding of scalar predications to represent an EXPLICATURE, a pragmatically determined component of what is said rather than part of what is (merely) implicated. On such an approach, both one-sided and two-sided understandings of sentences in (1) are directly represented at the level of logical content. While such scalar predications are now all taken to be ambiguous, the ambiguity has been relocated to the propositional level: what is **said** in an utterance is systematically underdetermined by the linguistic content of what is **uttered**. In particular, the RT approach convincingly overturns the original Gricean line on the meaning of cardinal operators (lower-bounded by meaning, upper-bounded by implicature).

However, while a strong case can be made for an enrichment analysis of the meaning contribution of the cardinals, it does not generalize straightforwardly to the "inexact" scalar values. Evidence for this conclusion (summarized in Horn 1992) comes from the contextual reversibility of cardinal scales and the non-implicating ('exactly n') reading of cardinals in mathematical, collective, and elliptical contexts, none of which applies to the scalar operators in e.g. (1b–e). Note also the contrast in the exchanges in (5):

(5) A: Do you have two children?　　　　(5′) A: Did many of the guests leave?
　　B_1: No, three.　　　　　　　　　　　　B_1: #No, all of them.
　　B_2: ?Yes, (in fact) three.　　　　　　　B_2: Yes, (in fact) all of them.

and the fact that (6a) works only as game-playing, while (6b) is entirely natural:

(6)　　a. #Neither of us liked the movie – she adored it and I hated it.

　　　　b. Neither of us has three kids – she has two and I have four.

Similarly, if (1e) were in fact propositionally ambiguous, there is no obvious reason why a 'No' response to the question 'Is it warm?' should not be interpretable as a denial of the enriched, two-sided content and thus as asserting that it's either chilly or hot, or why the comparative in "It's getting warmer" cannot denote 'less hot' instead of 'less cold.'

These observations suggest the need for a mixed approach on which cardinal values demand an enriched-content analysis while other scalar predications continue to submit to a standard neo-Gricean treatment on which they are lower-bounded by their literal content and upper-bounded, in default contexts, by implicature. The same distinction surfaces as significant in early childhood, according to recent work in developmental psycholinguistics (Papafragou & Musolino 2003).

Both GAPP and its RT critics have tacitly assumed that whatever is communicated but not said must be implicated. Some (e.g. Levinson 2000) have argued from this assumption to the conclusion that implicatures can affect ("intrude on") truth-conditional meaning after all; others have argued instead for the notion of explicature, i.e. pragmatically determined content. But as Kent Bach has stressed, some aspects of speaker meaning are neither part of what is implicated nor of what is said. Thus consider (7a-e) as uttered in contexts in which the material indicated in curly brackets is conveyed.

(7)   a. I haven't had breakfast {today}.

      b. John and Mary are married {to each other}.

      c. They had a baby and they got married {in that order}.

      d. Robin ate the shrimp and {as a result} got food poisoning.

      e. Everybody {in our pragmatics class} solved the riddle.

In each case, the bracketed material contributing to the overall communicated meaning cannot (pace Levinson 2000) arise by Gricean implicature, given that it affects truth conditions, but neither can it be part of what is said, since it is felicitously cancellable:

(8)   a. John and Mary are married, but not to each other.

      b. They had a child and got married, but not necessarily in that order.

Those enrichments that constitute necessary conditions for the expression of truth-evaluable propositions involve what Recanati has called saturation. In such cases, there is a "bottom-up" process triggered by such linguistic elements as genitives (*John's car* – the one he owns? is driving? is following? is painting? is repairing?), unspecified comparison sets (*Chris is tall* – for an adult (fe)male? for an adult American of the relevant sex?) or other expressions with free variable slots: *Lee is ready* (for what?), *Robin is too short* (for what?). Once again it appears that pragmatic inference (but not implicature!) may be responsible for the computation of truth-conditionally relevant propositions that are not directly expressed. But such propositions are not "explicatures" because they are not explicit; and, as Cappelen (2000) stresses, they are crucially cancellable or defeasible and thus cannot constitute what is said. Following Bach (1994, 2001) we can regard these enrichments as IMPLICITURES until a better term comes along.

    This approach permits us to account for so-called pragmatic intrusion while maintaining the classic retro-GAPP-style SYNTACTIC CORRELATION CONSTRAINT (Bach 2001, after Grice 1989:87): what is said must correspond to "the elements of [the sentence], their order, and their syntactic character"; aspects of enriched content that are not directly linked to the utterance cannot be part of what is said.

    Similarly, Taylor (2001) has stressed the role of beliefs about the world to explain why enrichment proceeds differently in (9a) than in (9b),

(9)   a. I haven't had breakfast.

      b. I haven't had sex.

although this would change in a culture in which one normally has sex (but not breakfast) each morning. Saul (2002) has argued persuasively that the (neo-)Gricean and relevance-theoretic conceptions of meaning are not as incompatible as it may appear, given Grice's concerns for an account of speaker meaning (of which implicature constitutes a proper subpart) and relevance theorists' goal of attaining a cognitive psychological model of utterance interpretation, which does not address the question of how and why the speaker, given what she wants to convey, utters what she utters. While there is a natural tendency to characterize Grice's project in terms of the interpretation of utterances (whence Levinson's 2000 characterization of generalized conversational implicatures as default inferences), it must be resisted, as Bach and Saul have argued.

If scalar predicates represent an ongoing skirmish in the border wars, the analysis of asymmetric conjunction is a major battleground. The logical connective is of course a symmetric truth function; "p & q" is true if p and q are both true and false otherwise – and hence so is "q & p". Strawson (1952:80) pointed to the apparent contrast in meaning exhibited by pairs like (10a,b)

(10) a. They got married and (they) had a child.

    b. They had a child and (they) got married.

    c. They got married and then (they) had a child.

as prima facie counterexamples to this thesis, since the former appears to amount to the statement in (10c). (The parenthetical pronoun is inserted to make these sentences look more like the logical conjunctions to which they correspond, although that renders the asymmetric understanding less inevitable.) Similarly, Ryle (1954) famously observed that to get on one's horse and ride away is not the same as to ride away and get on one's horse.[1] For Urmson (1956:9–10), however, the truth-functional picture, while incomplete, is not therefore incorrect:

> In formal logic, the connectives "and" and "or" are always given a minimum meaning, as we have done above, such that any complex formed by the use of them alone is a truth-function of its constituents. In ordinary discourse the connectives often have a richer meaning; thus 'he took off his clothes and went to bed' implies temporal succession and has a different meaning from 'he went to bed and took off his clothes.' Logicians would justify their use of the minimum meaning by pointing out that it is the common element in all our uses of "and."

On the classical pragmatic approach, an assertion of the conjunction in (10a) implicates (10c) by virtue of the "Be orderly" submaxim of Manner (Grice 1981:186). Indeed, Grice's approach was prefigured in the observation that "Events earlier in time are mentioned earlier in the order of words than those which occurred later", one of the eight "natural principles" that influence word order in the inventory of Dionysius of Halicarnassus, *Peri syntheseos onomaton (On the Juxtaposition of Words)* in the 1st cent. B.C., cited in de Jonge (2001).

On this Dionysian/Gricean line, the distinction in meaning between (10a,b) need not be laid at the doorstep of an ambiguous *and* operator. For those who would semanticize temporal asymmetry, such a lexical ambiguity must be invoked for the fact that a non-sequential interpretation is available not only for non-eventive sentences *(They are tall and they are rich)* but even for

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[1]The notoriety of Ryle's observation is indicated by its reappearance, mutatis mutandis, in a letter to the editor of the New York Times (July 20, 1988, A26) 34 years later:

> To the Editor:
>
> Six distinguished writers and philosophers – A. J. Ayer, Graham Greene, H. L. A. Hart, John Le Carre, John Mortimer, P. F. Strawson – writing on the West Bank and Gaza, call "for an end to Israeli occupation and the convening of an international peace conference for all parties concerned" (letter, July 8). But what is to be settled by such a conference? What will Israel have left to negotiate about if it first withdraws and then negotiates? Another distinguished British philosopher, Gilbert Ryle, once observed that it makes sense to say, "She took poison and died," but not, "She died and took poison." A simple point of logic seems to have escaped six eminent thinkers.
>
> – Raziel Abelson (Professor of Philosophy, N.Y.U.)

(10a) in the appropriate context, as in a reply to the question "Did they experience any unusual sources of stress last year?" Arguments against a lexical ambiguity for *and* (= 'and also' vs. 'and then') include the following:[2]

(11)   a. On the ambiguist (two-*and*) theory, conjunction in (almost?) every language would just happen to be ambiguous in the same way.

        b. No natural language contains a conjunction *shmand* ambiguous between 'and also' and 'and earlier' readings, so that *They had a baby shmand they got married* would be interpretable either atemporally or as 'They had a baby and, before that, they got married'.

        c. Not only temporal but causal asymmetry would need to be built in, as a variety of apparent strengthenings of the conjunction arise in different contexts of utterance.

        d. The same "ambiguity" exhibited by *and* arises when two clauses describing related events are juxtaposed without an overt connective *(They had a child. They got married.)*

However, if conjunctions are semantically univocal while Manner-implicating that the events occurred in the order in which they were described, the impossibility of the conjunction *shmand* can be attributed to the absence of any maxim enjoining the speaker to "Be disorderly." As with scalar implicature, the asymmetric implicatum may be cancelled or suspended: *They had a child and got married, but not necessarily in that order*. But if the 'and then' reading comes in only as an implicature, it is hard to explain its apparent contribution to truth-conditional meaning in embedded contexts, and in particular the non-contradictory nature of (12a-c) as pointed out by Cohen (1971) and Wilson (1975):

(12)   a. If they got married and had a child, their parents will be pleased, but if they had a child and got married their parents will not be pleased.

        b. They didn't get married and have a child; they had a child and got married.

        c. It's more traditional to get married and have a child than to have a child and get married.

One possible conclusion is that while pragmatically derived, the strengthened or enriched meaning is an explicature, corresponding to what is said rather than to what is (merely) implicated[3] (see Carston 2002 and works cited therein); another is that we must revisit the architecture of Gricean theory to allow implicature to help determine propositional content (Levinson 2000:Chapter 3).

   The same options arise for the scalar-antecedent conditionals in (13), in which both Levinson and explicature theorists would build the stronger (bilateral) meaning (e.g. *some but not all, warm but not very warm*) into what is said.

(13)   a. If some of my friends come to the party, I'll be happy – but if all of them do, I'll be in trouble.

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[2] See Posner (1978) for a compilation of such arguments.

[3] While (12b) may be attributed to metalinguistic negation (Horn 1989:373), this analysis is unavailable for (12a) or (12c). For a GAPP-compatible approach to (12a)-style conditionals, see Horn (2004:22).

  b. If it's warm, we'll lie out in the sun. But if it's {VERY warm/hot}, we'll go inside and sit in front of the air-conditioner.

  c. If you're convicted of a felony, you'll spend at least a year in jail. And if you're convicted of murder, you'll be executed.

  d. If you're injured, the paramedics will take you to the nearest trauma center. But if you're fatally injured, you'll be taken to the morgue.

But in each of these contexts, it's only when the stronger scalar is reached that the earlier, weaker one is retroactively adjusted to accommodate an upper bound into its semantics, e.g. with *some* being REinterpreted as expressing (rather than merely communicating) 'some but not all.' This reinterpretation is facilitated by the obligatory focus on the relevant scalar operators.

  The same issues arise for other applications of the pragmatic intrusion argument. Thus, Levinson (2000:210) extends the classic Cohen-Wilson argument from conditionals like (12a) to *because* clauses, based on examples like those in (14):

(14)   a. Because he earns $40,000, he can't afford a house in Palo Alto.

    b. Because he's such a fine friend, I've struck him off my list.

    c. Because the police recovered some of the missing gold, they will later recover it all.

But these examples are heterogeneous. (14a) involves a cardinal, which as noted above is indeed plausibly taken to involve an adjustment of what is said. In (14b), on the other hand, *such a fine friend* involves conventionalization of the sarcastic meaning; compare *?Because he's so considerate, I fired him*. The *all* in the second clause of (14c) forces the reprocessing of the some in the first clause as 'some but not all' (a reprocessing again triggered by the focal stress on *some*). Without the *all* or some other context-forcing continuation, this narrowing appears to be impossible:

(15) Because the police recovered some of the gold, the thieves are expected to return later #(for the rest).

In general, such *because* cases are quite constrained, in particular for the non-cardinal scalar cases in which the implicated upper bound is taken to be the reason for the truth of the second clause (as in (15)) and in which no reprocessing is forced by the affirmation of a stronger value (as in (14c)). Thus consider:

(16)   a. #Because it's warm out [i.e. because it's warm but not hot], you should still wear a long-sleeved shirt.

    b. #Because you ate some of your stewed eel [i.e. and not all], you don't get dessert.

Let us summarize the situation on the borderlands to this point. For a GAPP theorist, implicatures, by definition, cannot serve as input to propositional content/what is said. Generalized conversational implicatures are not default inferences; they are by definition an aspect of speaker's meaning, not hearer's interpretation (cf. Geurts 1998:fn. 12, Schwenter 1999:26, Bach 2001, and especially Saul 2002). The Gricean approach to what is said (although incomplete at the edges, where Bach's approach may be especially fruitful), continues to offer a robust research strategy for the investigation of linguistic communication.[4]

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[4]One interesting result from recent work on acquisition by Papafragou, Musolino, Noveck and others (cf. Noveck 2001, Papafragou & Musolino 2003) is that children may be more adept than adult speakers at distinguishing the contributions to overall speaker meaning contributed by what is said vs. what is implicated.

2 Implicature, polarity licensing, and compositionality

We now turn to recent work by Gennaro Chierchia that re-examines the projection properties and status of scalar implicatures. In earlier work on this problem, Gazdar (1979) argued that scalar implicatures (henceforth SIs) are blocked in embedded contexts, based on the observation that a standard upper-bounding implicature like that from (the assertion of) (17a) to (17a') seems to disappear when the scalar predicate falls within the scope of a logical operator as it does in (17b), which does not implicate (17b').

(17) a. Paul ate some of the eggs.
      a'. [For all the speaker knows] Paul did not eat all of the eggs.
      b. It is not the case that Paul ate some of the eggs.
      b'. [For all the speaker knows] It is not the case that Paul did not eat all of the eggs.
          [= He ate all of them.]

But as detailed by (Hirschberg [1985] 1991), this cannot be a fact about embedded environments in general, since substituting e.g. "It is obviously the case that" for "It is not the case that" in (17b/b') will restore the implicature. On Hirschberg's account, SIs are blocked by overt negation alone. But while Gazdar's approach blocks too many implicatures, Hirschberg's blocks too few. Without fully making the case for the conclusion, I suggested (Horn 1989:233–34) that SIs are blocked in downward entailing (DE) contexts. But, as Levinson (2000:254–55) observes, it is not really a question of blocking the implicatures generated by the positive scale, but predicting the implicatures induced by the inverse scale, given the scale-reversing properties of negation and other downward entailing operators (Fauconnier 1975):

> According to Horn, Gazdar, and Hirschberg, scalar implicatures are simply blocked (i.e., do not arise) under negation. This is an erroneous assumption based on the correct observation that the *same* implicatures are not shared by positive and negative counterparts of the same senence (utterance-type). ... [T]he apparent blockage is due to the fact that negatives reverse scales (because negation effects [sic] the strength of scalar items) and so we get different implicatures, which themselves survive negation ...

Thus, when I assert that Paul didn't eat many of the eggs, I implicate (ceteris paribus) not that he didn't eat all of them (since the positive scale <all, most, many, some> will not be relevant here), but that he didn't eat none of them, i.e. that he ate some (since the scale <no(ne), not many, not all> is now operative).

This is where Chierchia (2004) comes in. Based on the interaction of negation and disjunction in complex sentences, Chierchia argues that SIs must be computed compositionally rather than read off utterances "globally" and they are hence part of the grammar, with semantic rather than "merely" pragmatic effects: "Some aspects of the pragmatic system are more grammar-like than we thought" (see also the subtitle to Chierchia et al. 2001). Further, the correlation of NPI licensing and SI suspension in DE contexts should be directly predicted and accounted for in terms of the parallel strengthening effect yielded by negative polarity items (NPIs) and SIs.

It should be noted first that even if the case can be made for local and compositional computation of SIs along the lines of Chierchia's account, the issues of compositionality and grammatical/semantic status are distinct. Since Karttunen & Peters (1979), it has typically been assumed

that we need to allow for a compositional projection of CONVENTIONAL implicature or presupposition, although on this account and many others such conventional implicatures are not part of what is said, nor do they affect truth-conditional meaning, although on some definitions they do count as semantic. Gazdar (1979) provides an alternative account of a compositional projection of im-plicatures (potential scalar or clausal implicatures) and pre-suppositions (potential pragmatic presuppositions); his compositional theory, like that of Karttunen & Peters, is consistent with a GAPP-style approach to the semantics/pragmatics distinction. While it may be true, as Geurts (1998) has argued, that there are significant differences between the projection properties of presuppositions and conversational implicatures, it is not obvious that these differences require us to take the latter to be more grammaticalized than the former. (See also Sauerland 2004 for a neo-Gricean treatment of some of the same projection facts considered by Chierchia, and see Blutner 2004 for additional challenges to a compositional view of pragmatically contributed meaning.)

As far as the issue of implicature blockage vs. reversal is concerned, Chierchia distinguishes the behavior of positive scales inducing "direct" SIs from that of negative and DE contexts in which, he maintains, only "indirect" SIs are possible; the latter sort of implicatures "appear to be generally somewhat weaker and flimsier than their positive counterparts" (2004). The standard GAPP account makes no such differentiation. Just as the assertion of (18a) will (ceteris paribus) implicate (19a), resulting in the communication of (18b), the assertion of (19a) will (ceteris paribus) implicate (18a), resulting in the communication of (19b). This parallel is generated by the twin determiner scales in (18c) and (19c).

(18)　a. Some F are G.　　　　　　　　(19)　a. Not all F are G.

　　　b. Some Fs are Gs, but not all are.　　　　　b. Not all F are G, but some are.

　　　c. <all, most, many, some>　　　　　　　c. <none, few (not many), no(ne)>

Is there any evidence that the implicature in the positive case is more direct or stronger than in the negative, or that the scalar effects in (18) are more robust than those in (19)? Ironically, the very first invocation of the term SCALAR IMPLICATURE in the literature (according to the *Oxford English Dictionary*) was that given in Horn 1972:96) to account for the fact that "*not all* implicates *not none*, i.e. *some*."

Chierchia comments on the relation between (20a) and (20b)

(20)　a. I don't have many matches left.

　　　b. I have some matches left.

that "Our intuitions concerning the implicature of sentences like [(20a)] are somewhat shaky. In particular, such a sentence may or may not implicate that I have some matches left" (Chierchia 2004). This is again "indirect" implicature.

Of course, the "may or may not" is endemic to implicature calculation, given the nature of cancelability and indeterminacy. The key point is the intuition that the implicatures in (19) and (20) are weaker, less direct than that in (18).[5] But how solid is this intuition? To evaluate this claim, we can look at one of the earliest applications of Gricean reasoning to natural language

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[5]The same point is made in Chierchia et al. (2001:160), where it observed that while *John saw many students* will normally implicate that he didn't see all of them, no such implicature arises in e.g. *There aren't many students*. From

in the linguistic literature. Chomsky (1972:112) in fact regards the inference from *not many* to *some* in contexts like (20) or (21) as stronger, not weaker, than a garden-variety conversational implicature.

(21)   a. Not many arrows hit the target.

        b. Some arrows hit the target.

For Chomsky, "Sentence [(21a)] (equivalently, *Few arrows hit the target*) presupposes that some arrows hit the target." Similarly, (22a) is taken to presuppose (22b)

(22)   a. {Not much/Little} enthusiasm was shown for that project.

        b. At least some enthusiasm was shown.

He explicitly contrasts these cases with the positive scalar predication in (23),

(23)   Two of my five children are in elementary school.

where "one is entitled to assume that three of my children are not in elementary school, perhaps by virtue of general conditions on discourse of a sort that have been discussed by Paul Grice in his work on 'conversational implicature'." But this assumption in (23) may be withdrawn *("…and so are the other three")*, while the "presuppositions" in (21a) and (22a) cannot be withdrawn.

I have argued (Horn 1972:Chapter 2), contra Chomsky, that the relation in (21) and (22) must be (scalar) implicature, not presupposition.[6] But even so, there does not seem to be any reason to believe that the inference with these pairs is on shakier or flimsier ground than that with (23) or other positive scalars. Without the posited asymmetry between positive and negative scales, we can't really claim that SIs are suspended in DE contexts, but only that (as Levinson points out) the SIs induced there are based on negative scales as in (19c) as opposed to positive scales as in (18c).

Given DE operators' dual role as licensers of NPIs and "blockers" of SIs, Chierchia seeks to unify the two phenomena under the umbrella of compositional semantics. In particular, he argues, just as NPIs serve to strengthen a negative implicature (as in the widening-cum-strengthening account of *any* due to Kadmon & Landman 1993), so too "implicatures must lead to strengthening" (Chierchia 2004).

But DO scalar implicatures result in strengthening? Let us return to the examples in (18) and (19). *Some but not all Fs are Gs* is more informative and more specific than *Some F are G* sans implicature, but it does not result in a stronger positive assertion, nor does *Not all F are G but*

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such observations follows the descriptive generalization

(i) Scalar implicatures do not arise in downward entailing environments.

But in fact *There aren't many students* DOES have an scalar implicature, viz. that there are some. Interestingly, it is noted in the same paper (Chierchia et al. 2001:162) that "DE operators reverse canonical entailments", but it is not recognized that it is for this very reason that they also reverse scales and SIs, rendering the descriptive generalization in (i) untenable.

[6]Even *few* only implicates *not none = some*. A report in the Boston Globe (on-line edition, 14 Oct. 2003) notes of knuckleball pitchers that "few, and perhaps none" had ever done what Tim Wakefield of the Red Sox did in starting and winning a post-season game. (`http://www.boston.com/sports/baseball/redsox/articles/2003/10/14/he_puts_own_spin_on_series/`)

some are result in a stronger (negative) claim than *Not all F are G*. By implicating the upper bound, the speaker in effect weakens the positive or negative force of what is said.

In the dualistic model of implicature I have been urging over the last two decades (Horn 1984, 1989, 1993), I distinguish Q-based implicatures, based on the Q Principle ("Say enough", a generalization of Grice's first maxim of Quantity), from R-based implicatures, based on the R Principle ("Don't say too much", subsuming the second Quantity maxim, Relation, and Brevity). While Q-based implicatures do not strengthen the force of an assertion, R-based implicatures in general do. These include the ascription of the ability to perform some action implicating the successful performance of that action, the "perfection" of a sufficient condition to a necessary and sufficient one, the narrowing of a word's extension from a set to a salient or prototype member or subset, the strengthening of negative statements from contradictory to contrary understandings, and more generally the use of vague expressions as euphemisms for what one would prefer to leave unsaid. In each case, as exemplified in (24)-(29), a speaker who utters the weaker version in (a) counts on the hearer to recognize that the stronger proposition in (b) was intended to be communicated (see Horn 1989:Chapter 5; Horn 2000b).[7]

(24)   a. If you mow the lawn, I'll give you $5.

     b. If and only if you mow the lawn, I'll give you $5. ["conditional perfection"]

(25)   a. I don't believe that ϕ.

     b. I believe that not-ϕ. ["neg-raising"]

(26)   a. I don't like stewed eel. [contradictory negation]

     b. I (actively) dislike stewed eel. [contrary negation, via litotes]

(27)   a. . . . and this is my friend, Chris.

     b. Chris is my "um-friend"/friend-plus. [strengthening via euphemism]

Unlike these cases in which the use of the weaker form implicates the more informative and stronger communicated meaning, in the scalar cases the gain in information yields a weaker (though more specific) assertion. The contrast is especially vivid in minimal pairs like that in (28), based on a strengthening R-based implicature, as opposed to (29), based on a non-strengthening Q-based (scalar) implicature.

(28)   a. She was able to complete the assignment.

     b. She completed the assignment.

(29)   a. It is possible that she completed the assignment.

     b. It is possible but not certain that she completed the assignment.

What of the claim that NPIs result in strengthening, as assumed in Chierchia's model? To be sure, ***any*** in both polarity and generic/non-episodic contexts (i.e. NPI and free choice *any*), as in (30),

---

[7]The (b) proposition in each of the examples in (24)-(27) is not implicated per se but rather communicated by incrementing what is said in (a) with what is R-implicated thereby.

(30)   a. I don't have {potatoes/any potatoes}.

        b. {An owl/Any owl} eats mice.

does involve strengthening of the corresponding simple indefinite in the sense of Kadmon &
Landman (1993), or an end-of-scale 'even'-type meaning as others have argued for in related
work (cf. Lee & Horn 1994, Lahiri 1998, Horn 2000a). Similarly, *ever* – the temporal analogue
of *any* – and the class of MINIMIZERS exemplified in (31)

(31)   a. Robin didn't {drink/touch} a drop of the punch.

        b. Chris didn't sleep a wink last night.

        c. Lee isn't saying a word about it.

serve to reinforce negation, thereby setting Jespersen's Cycle in motion (see Horn 1989 for dis-
cussion and references). However, other NPIs, and in particular those not involving indefinites,
don't seem amenable to a strengthening analysis. In his valuable study of the lexical semantics of
polarity, Israel (1996) distinguishes emphatic NPIs (including *any*, *ever*, *at all*, and the minimiz-
ers) from attenuating NPIs (e.g. *much*, *overmuch*, *long*, *be all that*, *any too*, *great shakes*, *be born
yesterday*, *trouble to V*, *mince words*); the attenuators do not strengthen negative force. Prime
examples of non-strengthening NPIs include negative modals (*need*, Du. *hoeven*), *yet*, *anymore*
(for the relevant dialect), and *until*. We may plausibly regard *He won't ever recover* as a stronger
negative than *He won't recover*, but there is no sense in which *She hasn't recovered yet* strength-
ens the negative force of *She hasn't recovered* or *He doesn't read much* strengthens that of *He
doesn't read*.

    To take another example, consider the effect of the boldface items in (32)

(32)   a. There is*(n't) {**a shred of/an iota of**} evidence for that.

        b. There is(n't) **a bit of** evidence for that.

        c. There is(*n't) {**a little/a tad of**} evidence for that.

In each case, the addition of the highlighted material would weaken a positive assertion and
strengthen a negative; yet the items in (32a) are NPIs, the items in (32c) are PPIs, and the item in
(32b) is no polarity item at all. Once again, we see that the relation between strengthening and
NPI-hood is anything but straightforward.

    In light of the considerations we have reviewed, the proposed correlation between variation
in NPI licensing (across languages or items within a language) and variation in the inducing or
blocking of scalar implicatures remains unproven, if not unprovable. In addition to the prob-
lems outlined here, it is well known that not all polarity-licensing environments are downward
entailing or scale-reversing (e.g. subjunctives, imperatives, generics, modals). Some triggers are
subsumable under DE-hood by adjusting the definition (cf. Heim 1984, Krifka 1995), but not
all. (See Linebarger 1987, Israel 1996, and Giannakidou 1998 for extensive discussion.) Given
that 14th century logicians, without benefit of NPI alternations, developed a sophisticated theory
of upward and downward entailment (cf. Sánchez Valencia 1994, Horn 1996) and that DE-ness
appears to display robust early onset, as Stephen Crain and his colleagues have shown in studies
of children's logical abilities, it is no surprise that downward entailment per se should turn out to
be more strongly correlated with SI reversal than is polarity licensing.

    And speaking of Crain . . .

3 Exclusivizing disjunction: Scalar implicature at thirty-something

In their contribution to a recent debate in the pages of *The Linguistic Review*, Crain & Pietroski (2002) construct a novel poverty of stimulus argument based on the behavior of disjunction and its acquisition by children. They begin from the observation that in non-DE contexts, *p or q* is assigned an inclusive "basic meaning" and gets an exclusive "derived" meaning via Gricean implicature. On the other hand, DE environments "licence NPIs and constrain the interpretation of disjunctive statements (to conjunctive readings)", i.e. with no upper bound. Thus (Crain & Pietroski 2002:170), (33a) implicates that he didn't talk to both a linguist and a philosopher last night, but no such "... but not both" implicature arises in the DE environments of (33b-d).

(33)   a. He talked to a linguist or a philosopher last night.

b. He doesn't talk to linguists or philosophers.

c. He {never/rarely} talks to linguists or philosophers.

d. If a linguist or a philosopher goes to the gym, I go swimming.

Further, they argue, this distinction between contexts which do and do not license implicature is not something on which children have direct feedback; it is therefore plausible to hypothesize that this analysis of *p or q* is part of the innate linguistic mechanism.[8]

For Grice (1989:44), the relevant "strong sense" of *A or B* is actually not exclusive disjunction (i.e. the enrichment of the weak, one-sided logical disjunction by the Q-based upper-bounding implicatum) but rather the positing of a non-truth-functional reason for accepting A v B. In his classic example, someone who utters (34a) will normally implicate (34b),

(34)   a. The prize is either in the garden or in the attic.

b. The speaker doesn't know for a fact that the prize is in the garden.

but this implicature may be cancelled either explicitly (e.g. by the continuation "... but I'm not going to tell you which") or contextually (e.g. by situating the assertion of (34a) as part of a treasure hunt).

Besides cancellability, Grice provides two additional arguments for a pragmatic account of the relation between (34a,b). One is the fact that the negation of (34a), *It is not the case that the prize is either in the garden or in the attic*, can only be interpreted as a denial of (34a) (i.e. as asserting that both garden and attic are devoid of prizes), not of (34b). The other is the Modified Occam's Razor we have already touched on in §1; indeed, it is in this context of disjunctive statements that Grice unveils the M.O.R.[9]

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[8]If children "know" downward entailment, as Chierchia et al. (2001) argue, they will also know that *not (p or q)* is more, not less, informative than *not (p and q)*, so that in such environments no exclusivizing implicature will arise.

[9]While some have challenged the validity of the M.O.R. as a heuristic for linguistic semantics and pragmatics, Bontly (to appear) offers a spirited defense of the Occamo-Gricean principle by invoking the roles parsimony and implicature play in language acquisition, as demonstrated in Mazzocco's (1997) studies of homonymy avoidance in language acquisition. See also Doherty (2004) for additional studies bearing on children's resistance to homonymy.

A similar approach had been urged decades earlier by Ryle:

> I judge at Reading … 'That train is going either to Swindon or to Oxford'; and I do so without necessarily implying that the engine-driver, the passengers, or even I myself are in ignorance or doubt which its route actually is. Ordinarily, of course, I would not bother to *make* the statement if I was not in some doubt, since if I could identify its route it would be superfluous to mention such non-individuating facts about it. But facts do not cease to be facts or cease to be known when it becomes superfluous to mention them. (Ryle 1929:92–3).

The neo-Gricean derivation of exclusive disjunction, whereby an assertion of (35a) is upper-bounded by (35b), hence communicating (35c),

(35)   a. Maggie is (either) patriotic or quixotic.

      b. Maggie isn't (both) patriotic and quixotic.

      c. Maggie is patriotic or quixotic but not both.

first appears in Horn (1972:98): "In normal contexts, all things being equal, existentials are upper-bounded by implicature, and disjunctions are exclusive by the corresponding implicature." Similar observations are made by Gazdar & Pullum (1976), Pelletier (1977), and Jennings (1994), but here again the basic idea goes back a bit further. John Stuart Mill, after assuming the proto-Gricean mantle in rejecting Hamilton's (1860) ambiguist analysis of *some* as 'some at least' vs. 'some only',

> No shadow of justification is shown … for adopting into logic a mere sous-entendu of common conversation in its most unprecise form. If I say to any one, "I saw some of your children today," he might be justified in inferring that I did not see them all, not because the words mean it, but because, if I had seen them all, it is most likely that I should have said so: even though this cannot be presumed unless it is presupposed that I must have known whether the children I saw were all or not. (Mill 1867:501)

extends the argument to disjunctions – "When we say A is either B or C we imply that it cannot be both." But this is no logical inference either: "If we assert that a man who has acted in a particular way must be either a knave or a fool, we by no means assert, or intend to assert, that he cannot be both" (Mill 1867:512). Earlier still, Archbishop Whately (1848:106) observes in relation to the two disjuncts in *Virtue tends to procure us **either** the esteem of mankind **or** the favour of God*:

> One being affirmed, we are not authorized to deny the other. We are left to **conjecture** in each case, **from the context**, whether it is to be **implied** that the members are or are not exclusive. [emphasis added]

It was Grice's contribution to allow for incorporating such observations in a general theory of cooperation and, more broadly, of rationality, emphasizing their non-purely linguistic character:

> As one of my avowed aims is to see talking as a special case or variety of **purposive, indeed rational behavior**, it may be worth noting that the specific expectations or presumptions connected with at least some of the … maxims have their analogues in the sphere of transactions that are not talk exchanges. (Grice 1989:28; emphasis added)

The role of rationality in pragmatics has been stressed by Kasher (1982:32), whose PRINCIPLE OF EFFECTIVE MEANS stipulates "Given a desired end, one is to choose that action which most effectively, and at least cost, attains that end, ceteris paribus." Kasher's principle incorporates the minimax give-and-take of effort and cost that also underlies models as diverse as the apparently unitarian relevance theory of Sperber & Wilson (1986), the dualistic Q- and R-based approach of Horn (1984), and the trinitarian Q/I/M heuristic of Levinson (2000).

In particular, the speaker's and hearer's joint (though tacit) recognition of the rational tendency to avoid unnecessary effort, and the inferences S expects H to draw from S's efficient observance of this tendency, are more explicable directly from rationality than from cooperation as such. While Grice (1989:28) describes how the maxims apply to cooperative ventures outside of language (baking a cake, fixing a car), collaboration need not be present, much less communication, at least for the quantity maxims. It seems plausible to assume that the generalized forms of both Q and R Principles – "Do enough; Don't do too much" – govern ANY goal-oriented activity: a person brushing her teeth, a dog digging a hole to bury a bone. In this way, the maxim of quantity, in both its opposed (Q and R) subforms, is a linguistic instantiation of these rationality-based constraints on the expenditure of effort. Of course, as Grice recognized, the shared tacit awareness of such principles to generate conversational implicatures is a central property of speaker meaning within the communicative enterprise. But if this is right, the fundamental nature of Q-based upper-bounding implicature, as in the exclusivizing of inclusive disjunction, while deriving from general and universal principles, is not – contra Crain & Pietroski (2002) – plausibly attributable to a linguistically specific innate mechanism.

4   Semanticization and the upper-bound: the case of *most*

Our next foray takes us to the ongoing skirmishes over the nature of *most*. Consider the relation between the assertion of (36a) and the corresponding upper bound in (36b).

(36)   a. Most Israelis decided for peace.

   b. Not all Israelis decided for peace.

On the standard GAPP analysis, based on the scale in (18c), repeated here as (37),

(37) <all, most, many, some>

this is of course standard upper-bounding implicature; what is said in (36a) is that (at least one) more than half of the relevant Israelis decided for peace, what is implicated is (36b), that not all of them did.

This minimizing analysis, in which bilaterality is pragmatically acquired, can be opposed to a semantic maximizing treatment on which (36a) (sometimes?) entails (36b). Any such account must allow for an ambiguity in *most* parallel to that detected for *some* by Hamilton (see §3

above). Peterson (1979) in fact finds an ambiguity in *most*, but it is one involving not the upper bound but the strength of *most*, and the primary sense is not the simple majoritarian one on which most Fs are G just in case more than half of them are, but a "few-not" *most* requiring that the Fs that are G "greatly exceed" the Fs that are non-G. Peterson's semantics, however, commits him to the untenable conclusion view that *most* and *many* are duals, so that "the denial (negation-*qua*-contradiction) of 'Most are' is 'Many are not'" (1979:163). This fails to account for the compatibility of *Most Massachusetts voters are Democrats* and *Many Massachusetts voters are not Democrats*. For Peterson, *Most S are P* is true iff *Few S are not-P*, yet the former can be true and the latter false: most senators are Republicans (in fact, 55% currently are) but it is not true that few senators are non-Republicans.

More interesting is the recent reanalysis by Ariel (2003, 2004, 2005), which concurs with the GAPP analysis in taking *Most S is/are P* to implicate 'a significant majority of the S is/are P'. Where Ariel departs from GAPP is in her approach to the upper bound. While rejecting the Petersonian entailment from (36a) to (36b), she maintains that "the fact that we can use *most* when 'all' is true should not force us to assume that the coded meaning of *most* covers 'all'" (Ariel 2005:66). Instead, *most* is upper-bounded as well as lower-bounded by its semantics, as indicated in (38a) (her formulation), or alternatively in (38b):

(38)   a. Most F are G = '51-99% of (the) F are G'

         b. 50%<most<100%

Ariel adduces anecdotal and experimental evidence indicating that speakers are uncomfortable asserting *most* when *all* is (or should be) known to be the case. One nice example would be (39), a quote widely attributed to George W. Bush which unfortunately turns out to be apocryphal.

(39) The vast majority of our imports come from outside the country.

An actual citation that supports Ariel's point appears in (40), which I excerpt from a thread on an e-mail support list for mantle-cell lymphoma devoted to the topic of possible sources for this disease. Note that yyy's use of *most, if not all* can only be understood as an instance of ironic understatement.

(40) *#most if not all* when "all" is known [emphasis added]

```
> From: [xxx]
> To: <Mantlecell@ucsd.edu>
> Sent: Thursday, June 26, 2003 10:53 AM
> Subject: Causes of MCL [Mantle Cell Lymphoma]--Sex?
>
> Something no one on our group has talked about is the
> fact that everyone diagnosed seems to have been sexually
> active.

Date: Thu, 26 Jun 2003 15:04:10 -0400
From: [yyy]
Subject: Re: Causes of MCL--Sex?
```

```
Another seemingly pervasive factor is that most, if not all,
of the members of this list breathed prior to contracting
this disease.....maybe a connection?
```

But what do we make of the inappropriateness of *most* when 'all' is known? For Ariel, as noted, the upper bound of *Most F are G* is semantically specified – *most* "codes a range with both lower and upper bounds" – while the lexical meaning of *most* is compatible with *all* (ceteris paribus). Ariel argues that in many contexts, such as the use of (36a) as a peace activist's bumper sticker, the endorser of the *most* claim cannot plausibly be taken to be implicating 'not all', which would defeat her purpose by weakening the point being made.

But it must be recognized that in other cases we DO implicate what harms, if not defeats, our local purpose. Consider, for example, the following cases, in which someone who utters the (a) sentence would normally implicate its counterpart in (b), although this inevitably damages the effectiveness of the move in question.

(41) a. My, that goat's liver, eel, and raspberry custard was certainly interesting.

     b. The custard was not particularly appetizing.

(42) a. You really should date my cousin, who is intelligent and good-looking.

     b. My cousin is not stunning.

(43) a. I'm very fond of you, you're very special to me – let's go to bed together.

     b. I don't love you.

Similarly, while it may well harm one's immediate short-term argumentative goals to communicate the fact that *not all Fs are G*, the maxim of quality (inter alia) demands that one concede this point, and hence to intentionally (if reluctantly) communicate it. Indeed, under such circumstances, it's safer to IMPLICATE the bad news rather than to ASSERT it as part of what is said. The generalization can be given as a codicil to the quality maxim:

(44) Don't say what you believe to be false – especially if you believe the hearer is in a position to find out.

Another argument Ariel advances against an implicature-based account of the upper bound of *most*-statements is based on a perceived similiarity between *most* and the cardinals. Now, the strongest evidence for the distinction between cardinals and other scalars is that a simple negative answer to a general scalar question, as opposed to one involving a scalar value, always returns a 'less than' meaning, since this context selects descriptive and not metalinguistic negation. But note that in (45), B's negative response to A's *most* query commits him to the proposition that 50% or fewer passed, not to the disjunction that either 50%-or-fewer passed or else all of them did, yet it is that very disjunction that (45B) ought to assert if it negates "50%-99% of the students passed".

(45) a. A: Did most of the students pass the test?

     b. B: No.

In (46), on the other hand, B must first figure out what A wants to know ('at least 6' or 'exactly 6'?) before he knows how to answer her; his negative response below may commit him to either 'fewer than 6 passed' or 'either fewer or more than 6 passed', depending on the context.

(46)   a. A: Did 6 of the students pass the test?

      b. B: No.

Similarly, if on September 1, 1972 I engaged you in the wager reported in (47a), it is clear that once the Dolphins won all their games and finished a perfect 16-0 that season I won the bet. The same outcome applies in (47b), in the unlikely event that you accepted the proposed wager in the first place. But in (47c), where I bet on the cardinal, it is arguable whether I won, you won, or the bet is void in the absence of any prior agreement on whether we had understood 'at least 10' or 'exactly 10'.

(47)   a. I'll bet you that the Dolphins will win most of their games this year.

      b. I'll bet you that the Dolphins will win some of their games this year.

      c. I'll bet you that the Dolphins will win 10 of their games this year.

In (48), *most*, like *many* and *some*, harmonizes with upward-oriented *almost* and excludes negative-oriented *barely* (see Horn 2002 for an account of the orientation of *almost* and *barely*).

(48)   a. Most Michigan drivers exceed 70 mph, {almost/#barely} 75%.

      b. Few Connecticut drivers exceed 70 mph, {barely/#almost} 20%.

Similarly, to take some of the diagnostics for semantic content vs. implicature that trace back to Karttunen & Peters (1979), in (49a) I'm surprised that so many failed, not that some passed. In (49b), I've discovered that more than 50% of Israelis were pro-peace, not that fewer than 100% were.

(49)   a. I'm surprised that most of the students failed the test.

      b. I've just discovered that most Israelis support the peace initiative.

      c. I'm surprised that Fran has 3 children.

On the other hand, in (49c), I may be surprised that Fran has at least 3 children OR that Fran has exactly 3 children, depending on the assumed context.

    Other diagnostics support the status of *most*-sentences as unilateral, lower-bounded, upward monotonic predications: suspension and cancellation frames *(many if not most of the girls, not only most but all of the boys)*, selection of *and* vs. *but* in contexts like *many women and most men* vs. *few girls but most boys*, and so on. It appears that despite Ariel's very interesting data and argumentation, there is a positive orientation of *most* sentences that her bilateral theory fails to predict, but that falls out directly from the classic Q-based scalar account. In addition, as we have seen, *most* patterns (mostly) with other inexact scalar values and not with the cardinals.

    One last point is worth making with regard to some of the empirical results of Ariel's studies and her conclusions based on them (Ariel 2005). As Ariel observes, a pragmatic analysis of *most of the Fs are G* would seem to predict that we should obtain similar intuitions about the truth

conditions of this sentence and *more than half of the Fs are G*. But in fact the respondents in her study tend to prefer *more than half* over *most* when a slight majority of the Fs are G, and to prefer it even more strongly when all the Fs are G, in which case *most Fs are G* is strongly resisted. Ariel sees these results as supporting an account on which "the same semantic status should be attributed to the upper bound as to the lower bound for *most* (but not for *more than half*)", while being inconsistent with the pragmatic theory on which both determiners are semantically unilateral.

Note, however, that the projection of implicatures in GAPP is based not simply on what is said, but from HOW it is said, as well as from what is NOT said. The implicature from *most* to 'not all', based on the scale in (37) operating over similarly lexicalized alternatives, is more robust (more "generalized") than the corresponding upper-bounding implicature from *more than half* to 'not all'. For one thing, in accordance with a general principle I have called the Division of Pragmatic Labor (Horn 1984, 1993; Levinson 2000), a speaker who goes out of her way to say *more than half*, eschewing the less marked and briefer *most*, must have a reason for so doing; marked forms are used in marked situations. One motive for using *more than half* may be precisely its compositional structure, which focuses on whether the proportion in question is less than, equal to, or greater than half of the set under consideration. This is likely to arise in situations involving near majorities or bare majorities. At the same time, if all that is relevant is whether a majority obtains, the presence or absence of totality is not necessarily relevant. These two factors explain why *more than half of the Fs are G* will be acceptable in many contexts in which either just 51% or 100% of the Fs are known to be G. But under these same two conditions, especially the latter, it is harder to imagine an acceptable use of *most Fs are G*, given that here the only relevant choice will be that between *most* and its informationally weaker and stronger alternatives (in particular, *all*). Of course, this does not make *most Fs are G* false in such a context; as predicted by GAPP, a such a sentence will be not only true but uttered appropriately as long as the speaker does not know that the *all* sentence is true when it is uttered (as in (47a) above).

Thus, rather than refuting the pragmatic approach to the upper bound of *most*, the facts presented in Ariel's valuable research lend support to an account on which *most* is taken to be semantically akin to, yet formally distinct from, *more than half*; each imposes a semantic lower bound but no semantic upper bound on the subset described.[10]

5   Lexicalization asymmetries: **nall* et al.

The final front in the border wars we will be reporting on here involves an asymmetry in the lexical expression of logical operators. Recall the traditional square, repeated here in (50), and note in particular the subcontrary relation between the two particulars.

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[10]In addition to the interpretational issues raised here, Ariel's data are arguably affected by the way her studies are designed, and in particular by the amount of information available to her subjects. See Papafragou & Schwarz (to appear) for elaboration, and for a different set of empirical results.

(50) SQUARE OF OPPOSITION
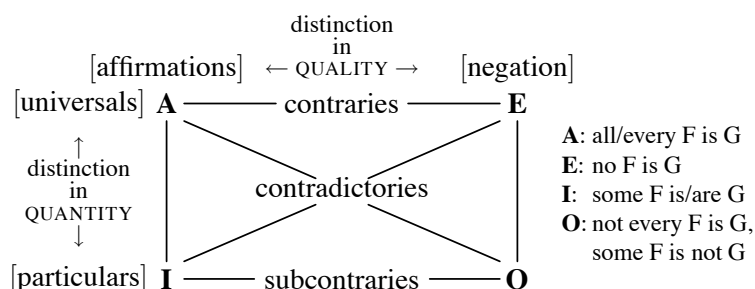
As recounted in some detail in Horn (1972:Chapter 4, see also Horn 1989:§4.5; Horn 1990), while the **A**, **E**, and **I** vertices of the Square can all be directly represented in the lexicon, the **O** vertex resists lexicalization, as schematized in (51):

(51)

	DETERMINERS/ QUANTIFIERS	QUANT. ADVERBS	BINARY QUANTIFIERS	CORRELATIVE CONJUNCTIONS	BINARY CONNECTIVES
A:	all α, everyone	always	both (of them)	both . . . and	and
I:	some α, someone	sometimes	one (of them)	either . . . or	or
E:	no α, no one	never	neither (of them)	neither . . . nor	nor
	(=all$\sim$/$\sim$some)	(=always$\sim$)	(=both$\sim$/$\sim$either)	(=[both . . . and] $\sim$)	(=and$\sim$)
O:	*nall α, *neveryone	*nalways	*noth (of them)	*noth . . . nand	*nand
	(=some$\sim$/$\sim$all)	(=$\sim$always)	(=either$\sim$/$\sim$both)	(=[either . . . or] $\sim$)	(=and$\sim$/$\sim$or)

Thus, alongside the quantificational determiners *all*, *some*, *no*, we never find an **O** determiner *nall*; corresponding to the quantificational adverbs *always*, *sometimes*, *never*, we have no *nal-ways* (= 'not always', 'sometimes not'). We may find equivalents for *both (of them)*, *one (of them)*, and *neither (of them)*, but never for *noth (of them)* (= 'not both', 'at least one . . . not', i.e. the Sheffer stroke); we find connectives corresponding to *and*, *or*, and sometimes *nor* (= 'and not'), but never to *nand* (= 'or not', 'not . . . and').

These observations apply to natural languages only, both spoken and signed; it is significant that in electronic circuitry there are indeed NAND GATES, covering precisely the forbidden **O**-vertex meaning, just as it has often proved useful to define a set-theoretic operator XOR inspired by exclusive disjunction:

(52) "Exceptions" to constraint on lexicalizing **O** (or the conjunction of **I** & **O**):

    a. **NAND**, a Boolean operator in programming languages:
       p **NAND** q is true iff p and q are not both true

    b. $x \in A$ **XOR** B *iff* $x \in A \cup B$ & $x \notin A \cap B$

Crucially, as pointed out in Gazdar & Pullum (1976), no bona fide representatives of the exclusive disjunction operator have surfaced in natural language.

GAPP treatments of the three-cornered square (Horn 1972:Chapter 2; Levinson 2000:69–71) attribute this asymmetry (surprise!) to pragmatic factors. The relation of mutual quantity implicature holding between the positive and negative subcontraries results in the superfluity of one of the two for lexical realization, while the functional markedness of negation (see Horn

1989 for a comprehensive review) assures that the unlexicalized subcontrary will always be **O** rather than **I**.

This asymmetry extends to the modals and deontic operators, as illustrated by the fact that the inflected negative in *A priest can't marry* only allows wide scope (**E** vertex) negation, i.e. the Roman Catholic reading, while the unlexicalized counterpart *A priest can not marry* is ambiguous, allowing both wide-scope (Catholic) and narrow-scope (Episcopalian) readings of the negation.[11]

Since the account in Horn (1972), others have offered their own retellings of the story of **O*. The blocking principle of Huybregts (1979) stipulates that *not Q* can lexicalize just when *Q not* can't, but this correlation fails to fully explain just when the latter state of affairs obtains. Barwise & Cooper (1981:186–87) propose the monotonicity correspondence universal, which predicts inter alia that strong determiners like *every* or *most* can incorporate inner but not outer negation; this correctly allows *neither* and *no* while ruling out **nevery* and **noth*. But without a grounding in the pragmatics of scalar operators, such approaches to the constraints on quantifier lexicalization are ad hoc. Worse still, any treatment based on the semantics of the determiners and quantifiers like that of Barwise & Cooper (1981) fails to generalize to the binary connectives, modals, and other non-quantificational values. A more recent proposal along these lines is that of Hoeksema (1999), who, after reviewing earlier accounts, argues that the non-occurring **O** forms are not blocked by corresponding **I** forms, pace Horn (1972). Rather, he notes, neither of the likely sources that would yield lexicalized **O** quantifiers – the merger of an existential + negation or the reinterpretation of NPIs – is consistent with what is known of the plausible historical development. Once again, however, the considerations he raises, contributing factors though they may be, fail to extend to other scalar values that manifest an asymmetry in lexicalization.

Most recently, Seuren (2003:13) has advanced a new formalization of the Aristotelian Predicate Calculus on which **A**, **I**, and (sometimes) **A*** (= **E**) will have lexicalized representations but **I*** (the **O** of the standard square) does not. He argues that, contra the Gricean moral to the story I have drawn, "The question [of why there is no **nall*] is superfluous . . . an artifact of the defective way [the Aristotelian Predicate Calculus] was formalized by Boethius" and the other geometers of the Square.

But altering the representation does not explain the asymmetry in the lexical incorporation of negation. The GAPP-based approach predicts a generalization of the asymmetry to all operators that can be mapped onto the Square of Opposition, including time adverbs, epistemic and deontic modals, binary connectives, etc., and also extends to intermediate values, predicting e.g. that 'not many' can be lexicalized (as in *few*) but 'many not' cannot. Similarly, we can have *seldom* or *rarely* (= 'not often, usually not') but no comparable lexical equivalent of 'often not, not usually'. The constraint can best be understood via the arithmeticized square in (53),

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[11]On the topic of Catholic priests, it's worth noting that the lexicalization asymmetry was recognized by St. Thomas Aquinas, who noted that whereas in the case of the universal negative (**E**) "the word 'no' [*nullus*] has been devised [sic!]", when it comes to the PARTICULAR negative (**O**) we find that "there is no designated word, but 'not all' [*non omnis*] can be used." (Aquinas *in Arist. de Int.*, Lesson X: Oesterle 1962:82–3)

(53)

every/all	1				−1	no/none
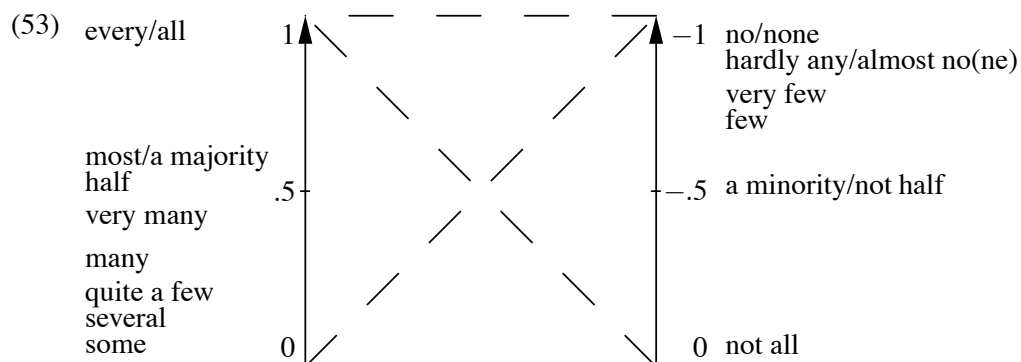
in which the quantificational scale is overlaid on the traditional Square of Opposition (see Horn 1989:236ff.) and each (upward- or downward-entailing) scalar operator is situated at its semantic lower bound. (Similar squares can be defined for the quantificational adverbs, the alethic, epistemic, and deontic modals, and so on.) The relevant generalization is that a lexical equivalent of Q + neg is possible only when Q is above the halfway point on the positive scale.[12]

While the asymmetry in lexicalizing complexes associated with the **A**, **I**, and sometimes **E** vertices as against **O** is equally exhibited in all of these lexical domains, some domains are more equal than others (cf. van der Auwera 2001 for related discussion). The degree of asymmetry varies according to how closed the category is: strongest for connectives *(*nand)* and determiners/quantifiers *(*nall, *nevery, *noth, *nalways)*, somewhat weaker for modal auxiliaries (where *needn't* would violate the strong form of the constraint, albeit in a context in which, given the NPI status of *need* as a modal, no **E** reading would be possible), and weaker still (though still present) for ordinary adjectives (cf. *impossible* vs. *unnecessary*, where the latter but not the former is restricted to deontic, non-logical contexts).

In the case of verbs, alongside the sizable array of causative verbs that lexicalize the **E**-value complex 'cause . . . not possible' in (54a), we find only a couple of candidates for the corresponding **O**-style logical form 'cause . . . not necessary' (or 'cause . . . possible not') in (54b):

(54) a. 'cause to become not {possible/legal/moral}'

ban	enjoin	interdict	proscribe
bar	exclude	preclude	refuse
deter	forbid	prevent	veto
disallow	inhibit	prohibit	withhold

   b. 'cause to become not {necessary/obligatory}', '{possible/legal/moral} not . . . '
      excuse   exempt

Confirming the universal lexicalization preference for **E** over **O** values, a wide range of modal and quantificational complexes which appear (by morphosyntactic criteria) to represent **O** forms are in fact assigned **E** semantics. Russian *nel'zja* 'impossible, forbidden' should on etymological grounds denote not an **E** but an **O** value, since it derives from the negation of a (now archaic) root *l'zja* 'good, useful'. Similarly, the frozen English adverbial *not at all*, like its French cousin *pas du tout*, appears to have strengthened **E**-wards from its original source as the negation of

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[12]See Löbner (1987) for a formal definition of this above-the-halfway-point property and Horn (1972:§4.3; 1989:§4.5) and Levinson (2000:§1.7) for related data and discussion on the lexicalization constraint.

a universal (positive *at all* survives in Irish dialect with the meaning 'wholly, altogether'). The evidence is even clearer in Old English, where the lexical item *nalles*, *nealles* – while appearing to challenge the constraint blocking **nall*-type determiners – is in fact attested only with the value 'no, not, not at all', never 'not all'. (Other OE quantificational expressions include *næfre* 'never', *næðor* 'neither, nor', *náht* 'nothing', *nán* 'no one, none', and *náhwær* 'nowhere', all occupying the **E** rather than **O** slot.)

The conspiracy toward simpler expressibility of **E** over **O** values is also supported by a well-attested **O** > **E** semantic drift. The outer negation associated with a necessity predicate often seems to develop an inner negation reading, the contradictory of the **A** value strengthening into its contrary. This locus classicus of this development is the French construction *Il ne faut pas que tu meures*, lit., 'It is not necessary that you die' but actually 'You mustn't die'. As Tobler (1882) demonstrates, the *'unlogisch'* **E** reading co-existed alongside the compositional **O** sense for neg + *falloir* as early as the 14th century before evicting it altogether.

Other instantiations of the constraint on the direct expression of **O** values are the inner-negation ('prevent') reading of negated strong causatives à la *Il caffè non mi fa dormire* ('Coffee doesn't let [lit., doesn't make] me sleep') in such languages as Italian, Japanese, Turkish, Amharic, Czech, Jacaltec, and Biblical Hebrew, the unambiguous **E** readings required by negative-affixed adjectives like *improbable*, *unlikely*, *inadvisable* (compare the ambiguous unlexicalized counterparts *not probably*, *not likely*, *not advisable*), and the aforementioned tendency toward the strengthened "neg-raised" understandings of *I don't believe that p, I don't want to VP*, and so on.

The Gricean account of the three-cornered square is more general and more explanatory than the rival theories which either dismiss the asymmetry as uninteresting or restrict it to the determiners and quantificational operators while neglecting other operator types and intermediate values that can be mapped onto the Square of Opposition.

6   Final dispatch from the front

I have argued for a set of related conclusions for a variety of phenomena involving the treatment of meaning in natural language. In §1, I re-examine the evidence for recent accounts of (non-cardinal) scalar predications that posit truth-conditionally relevant implicatures or an enrichment of what is said. In §2, I challenge Chierchia's recasting of scalar implicature as part of the grammar on the basis of the apparent (but, I argue, nonexistent) parallel between implicature and negative polarity licensing. I also dispute the asymmetry between direct and indirect scalar implicature Chierchia associates with positive and negative sentences respectively. I defend classical Gricean approaches to the meaning of *or* and of *most* in §3 and §4 respectively; in each case, I maintain that a lower-bounded semantics and (where context permits) an upper-bounding scalar implicature, following from a general theory of cooperation and rationality, provides the most explanatory basis to account for the full range of data compatible with the formal diagnostics and the facts of acquisition. Finally, in §5, I revisit the asymmetry exhibited by the range of cross-linguistic lexicalizations of logical values that can be plotted on the traditional Square of Opposition; once again, I argue that a classical pragmatic account invoking the effects of scalar implicature offers the most successful general explanation of the phenomena in question.

If I have been successful, I will have shown that – to paraphrase Mark Twain's cable – the reports of the death of the neo-Gricean paradigm have been greatly exaggerated. To be sure, it has become clear in the post-GAPP era that much of the excitement in the study of meaning these

days transpires in the unstable borderlands between what linguistic content provides and what post-semantic inference accounts for. Classical Gricean implicature must be exploited enough – but not too much.

I take it that "Where Semantics Meets Pragmatics", the theme of the workshop that gave rise to this volume, was inspired by the original Border Wars between the forces arrayed under the flags of England and Scotland, beginning with the heroic exploits of Mel Gibson eight centuries ago at Bannockburn and culminating with the heroic but doomed last stand of the Scots under Bonnie Prince Charlie at Cullodden in 1746. It may well have been this latter battle that inspired Scotland's national poet Robert Burns to pen the immortal "Comin' Thro' the Rye", which appears in (55) in its familiar modern form. We see Burns's original verses on the right in (56).

(55) Comin' Through the Rye –
      the revised standard version

      If a body meets a body
        Coming through the rye,
      If a body kiss a body,
        Need a body cry?

(56) Comin' Thro' the Rye –
      the Robert Burns version

      O gin [=if] *a body meet a body,*
        Comin' thro' the rye;
      Gin a body f—k a body,
        Need a body cry.

      Gin a body meet a body,
        Comin' thro' the glen;
      Gin a body f—k a body,
        Need the warld ken.
      (Burns [1800] 1964:144)

One's eye is drawn inevitably to the final line of each of Burns's quatrains, given in the form of rhetorical questions (or queclaratives, as Jerry Sadock (1971) would have it). We are now prepared to answer the optimally relevant rhetorical question –

(57) Where semantics meets pragmatics
          Cuttin' up the pie;
        If semantics . . . kiss pragmatics,
          Need pragmatics cry(?)

– with an unalloyed and fervent "NO!" and with the reminder that even in London, far below the Tweed, one is firmly instructed to. . .

(58) # Mind the GAPP!

Acknowledgments

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