

Presupposition and Implicature

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To say, “The king of France is wise” is, in some sense of “imply” to *imply* that there is a king of France. But this is a very special and odd sense of “imply”. “Implies” in this sense is certainly not equivalent to “entails” (or “logically implies”).
(Strawson 1950: III)

If someone says “My wife is either in the kitchen or in the bedroom” it would normally be implied that he did not know in *which* of the two rooms she was.
(Grice 1961: 130)

When first (re)introduced into the philosophical literature, and thence into the consciousness of linguists, presupposition and implicature each appeared in turn as the meaning relation that dare not speak its name, as The Other: that inference licensed in a given context which cannot be identified with logical implication or entailment. Further, both presupposition (on Stalnaker’s pragmatic account) and implicature operate through the mechanism of EXPLOITATION. Unlike syntactic and semantic rules, pragmatic principles and conventions do as much work when they are apparently violated -- when speaker S counts on hearer H to recognize the apparent violation and to perform the appropriate contextual adjustment -- as when they are observed. This essay will trace the evolution of thought on these elusive yet crucial meaning relations, considering not just what presupposition and implicature are but what they are not.

I. Presupposition

The linguistic literature has tended to confine the presuppositional universe to one class of presupposing statements, those involving singular referring expressions as discussed by Frege (1892), Strawson (1950), and more recently Burton-Roberts (1989).¹ History does not support this move: presupposition first emerged in the Western tradition among *exponibilia*, syncategorematic terms that can be decomposed into two or more meaning components combining to yield the meaning contribution of the term in question. On Peter of Spain’s thirteenth century investigation of ‘reduplicative’ expressions like *inquantum* ‘insofar as’, such a particle presupposes (*praesupponit*) that a given predicate inheres in the subject and denotes (*denotat*) that the term to which it is attached causes that inherence (Mullally 1945: 112).²

The distinction between an expression *praesupponit* and what it *denotat*, while not formalized by the scholastics, contains the ungerminated seeds of what would later blossom as the Fregean doctrine of presupposition. When the case of the empty (non-denoting) singular term was reopened a century ago, the prevailing wisdom was Aristotle’s: every proposition is of subject-predicate form and is either true or false. A given predicate may be affirmed or denied of its subject, and there are no external (propositional) connectives. For a singular affirmation like (1) to hold,

(1) Socrates is ill.

(2) Socrates is not ill.

the subject referent must exist and the predicate must be predicable of it. A predicate may be truly denied of its subject as in (2) because the subject fails to exist, because the predicate fails to apply naturally to it³, or because the predicate expresses a property the subject happens not to possess (in this case, if Socrates is well).⁴

For Sigwart, this truth-functional, entailment-based analysis yields to an account building on the somewhat inchoate notion of presupposition:

As a rule, the judgement A is not B presupposes the existence of A in all cases when it would be presupposed in the judgement A is B...'Socrates is not ill' presupposes in the first place the existence of Socrates, because only on the presupposition of his existence can there be any question of his being ill.

(Sigwart [1889]1895: 122)

Sigwart offers an ordinary-language argument for rejecting the Aristotelian position on which (2) is merely the semantic contradictory of (1), based on the observation that (2) is 'commonly understood' to signify 'Socrates does live but is ill':

If we answer the question 'Is Socrates ill?' by yes or no, then -- according to our usual way of speaking -- we accept the presupposition upon which alone the question is possible; and if we say of a dead man that he is not ill, we are guilty of using our words ambiguously. (Sigwart [1889]1895: 152)

Technically, however, Aristotle is correct: 'We must admit...that formally, the truth of [(2)] is incontestable' if Socrates is not alive. Sigwart's conclusion that a presuppositionally unsatisfied statement is misleading or inappropriate though true foreshadows the pragmatic turn to come.

The first incorporation of a presuppositional account of singular terms into a formal semantic model is due to Frege (1892). In his classic paper on sense and reference, Frege argues that both (3) and its contradictory (4) presuppose (*voraussetzen*) that the name *Kepler* denotes something.⁵

(3) Kepler died in misery.

(4) Kepler did not die in misery.

Every sentence (affirmative or negative) with a singular subject (name or description) presupposes the existence of a presumably unique referent for that subject. But this presupposition is not part of the content of the expressions in question, and hence (3) does not entail the existence of Kepler -- else the negation of (3) would not be (4), which preserves the presupposition, but rather the disjunction in (5):

(5) Kepler did not die in misery, or the name Kepler has no reference.

While Frege seems to have taken this outcome as a *prima facie* absurdity, it prefigures the later emergence of a presupposition-canceling external negation operator with truth conditions equivalent to those of disjunctions like (5).

Unwilling to accept Frege's conclusion, Russell tries another approach to what he acknowledges to be a significant logical puzzle:

By the law of the excluded middle, either 'A is B' or 'A is not B' must be true. Hence either 'the present king of France is bald' or 'the present king of France is not bald' must be true. Yet if we enumerated the things that are bald and the things that are not bald, we should not find the king of France on either list. Hegelians, who love a synthesis, will probably conclude that he wears a wig.
(Russell 1905: 485)

To solve this puzzle while preserving a classical logic in which every meaningful sentence is true or false, Russell banishes descriptions like *the king of France* from logical form. Once this exorcism is performed, sentences like (6) and (7) no longer have subject-predicate form, their surface syntax notwithstanding.

- (6) The king of France is bald.
(7) The king of France is not bald.

(6) emerges instead as the (false) proposition that there is a unique entity with the property of being king of France and that this entity is bald, i.e. as an existentially quantified conjunction:

$$(6') \exists x(Kx \ \& \ \forall y(Ky \supset y=x) \ \& \ Bx)$$

But Russell acknowledges two distinct ways to unpack its negative counterpart (7). If the description *the king of France* has a wide scope over an internal negation, we get the proposition that there is a unique and hirsute king of France,

$$(7') \exists x(Kx \ \& \ \forall y(Ky \supset y=x) \ \& \ \sim Bx)$$

a proposition 'simply false' in the absence (or oversupply) of male French monarchs. But Russell admits a second reading of (7) with the description falling within the scope of external negation:

$$(7'') \sim \exists x(Kx \ \& \ \forall y(Ky \supset y=x) \ \& \ Bx)$$

This reading, which results in a true proposition when France is a republic, is favored with the appropriate fall-rise intonation contour and rectification (cf. Horn 1985):

(7'') The king of France isn't ^vBALD -- there ISN'T any king of France!

Notice that (7''), unlike (7'), fails to entail (8).

(8) There is a king of France.

Indeed, the falsity of (8) guarantees the truth of (7'').

Russell's theory of descriptions held sway for a half century (despite the development of non-standard logics motivated on other grounds) until it crashed against the ordinary-language intuitions of Strawson (1950, 1952) and his Oxonian colleagues. For Strawson, as for Russell, (6) is meaningful, but meaningfulness and meaninglessness

are crucially properties of SENTENCES, while reference and truth value are properties of the STATEMENT the sentence is used to make.

Strawson's celebrated attack on Russell's theory of descriptions is premised on the assumption that negation normally or invariably leaves the subject 'unimpaired'. Strawson tacitly lines up with Frege, and against Russell (and Aristotle), in regarding negative singular statements like (7) as essentially unambiguous. For Russell (as for Aristotle), (7) -- on its 'primary' reading, (7') -- comes out false in the absence of a French king; for Frege, the utterance of the analogous (4) makes no assertion if there was no Kepler. For Strawson, someone who utters (7) does commit herself to the existence of a king of France but, contra Russell, she does not thereby ASSERT (nor does her statement ENTAIL) the corresponding existential proposition (8). Rather, (7) -- along with its positive counterpart (6) -- implies ('in some sense of *imply*') or (Strawson 1952) PRESUPPOSES (8). If this presupposition is not satisfied, a statement is indeed made, but the question of the truth value of (6) or (7) fails to arise.

Is this intuition captured by the formal device of assigning a third truth value, distinct from the classical two values of the Aristotelian and Russellian programs? Or is there simply a GAP, a truth-functional black hole, at the point where truth values are normally assigned? Are statements with vacuous subject terms collapsible in some sense with meaningless or ungrammatical sentences and perhaps with future contingents (cf. Horn 1989: §2.1), given that in these cases the question of truth or falsity also arguably fails to arise? The quarter century following the publication of 'On Referring' witnessed a rapid proliferation of three(plus)-valued logics in which truth-value gaps or non-classical values are admitted, i.e. in which meaningful declarative statements are in at least some contexts assigned neither of the two classical values. Ironically, these neo-Strawsonian formal accounts of presupposition consistently assume an ambiguity for negation to deal with non-presupposing negations like that in (7''), a position advocated by the arch-classicists Aristotle and Russell but never explicitly endorsed by the presuppositionalists Frege or Strawson themselves.

One approach distinguishes two propositional negation operators: an internal ('choice') negation that preserves presuppositions and a presupposition-canceling external ('exclusion') negation. Just in case a given affirmative proposition lacks a classical value, its internal negation lacks one as well; the external negation is always true or false. This is shown in (9), where # denotes the third or undesignated value.

(9)	INTERNAL	EXTERNAL
	NEGATION	NEGATION
	p	¬p
	T	F
	F	T
	#	T

Within multi-valued logic it is clear that true and false must be taken as contraries rather than contradictories: if -- but not only if -- a proposition is false, it is not true.

Now a Strawsonian notion of presupposition can be defined in terms of (internal) negation and an inference rule identified as semantic entailment (Smiley 1960) or necessitation (van Fraassen 1968):

- (9') (i) $A \Vdash B$ ('A necessitates B' or 'A semantically entails B') if and only if
whenever A is true, B is also true.
(ii) A presupposes B if and only if $A \Vdash B$ and $\neg A \Vdash \neg B$.

Any coherent multi-valued or truth-gapped logic will capture the standard assumptions: a proposition and its (internal) negation share the same presupposition set, the presupposition of ϕ is a necessary condition for ϕ to be either true or false, and so on. Within such a formal system, necessitation -- unlike classical entailment -- does not allow contraposition. Similarly, while modus ponens is retained (from $A \Vdash B$ and A, we can infer B), modus tollens is not: Let A be any presupposing sentence (e.g. (6)) and B one of its presuppositions (e.g. (8)); then A (and likewise $\neg A$) necessitates/semantically entails -- and indeed presupposes -- B, but all we can infer from $\neg B$ is that A (and likewise $\neg A$) is not true, not that it is false.

Unfortunately, the doctrine of semantic presupposition thus defined is beset with significant conceptual and empirical problems.⁶ Nor is it clear that the quest is worth undertaking: given the existence of sentences like (7") and the undemonstrability of a true semantic ambiguity for natural language negation (see Atlas 1975, Kempson 1975, Gazdar 1979), presuppositionality does not readily accept truth-conditional modeling. Strawson himself, ever skeptical that any system of formal logic could do justice to his intuitions about truth and meaning in ordinary language, would discount the attempts to devise a formal presuppositional logic to represent his observations: 'Neither Aristotelian nor Russellian rules give the exact logic for any expression of ordinary language; for ordinary language has no exact logic' (Strawson 1950: 344).

Kempson (1975: 86) has noted the irony of this concluding sentence from the presuppositionalist manifesto, containing as it does a definite description (*the exact logic...*) which evidently does not induce an existence presupposition. In fact this apparent inconsistency is consistent with the revisionist position of Strawson's later work (1964: 95ff.), where truth-value gaps arise only when non-denoting singular terms occur in referential positions (typically, as surface subject and/or topic). While we may 'feel squeamish' about assigning a truth value to (10a,b), Strawson reports no such qualms in the assessment of (11a,b) as false and true, respectively.

- (10) a. The king of France visited the exhibition.
b. The king of France didn't visit the exhibition.
(11) a. The exhibition was visited by the king of France.
b. The exhibition wasn't visited by the king of France.

While (10a,b) are about the king of France, whence the induced presupposition and truth-value gap, (11a,b) are about the exhibition, so that the expression which would be 'guilty of reference failure' is absorbed harmlessly into the predicate and no existence presupposition is triggered.⁷

Even the classic gap-inducing (6) may be simply false, Strawson concedes, if it is taken not as a description of the king of France (*Does M. le roi have need of a royal barber? -- No, the king of France is bald*) but as a statement about the class of hairless entities (*What bald notables are there? Well, let's see, the king of ^vFrance is bald*), in which case the subject is not functioning as the sentence topic, as the prosody indicates.⁸

But how can this observation be reconciled with semantic theories of presupposition failure? And whatever we do with these cases, what move can be made for (12), where failure of the existential presupposition again intuitively results in simple falsity?

(12) The king of France is standing next to me.

As discussed by Fodor (1979), Horn (1989, 1990a), and Lasnik (1993), such sentences do not seem to differ from the standard (6)-type examples in topichood or aboutness, rendering Strawson's ploy inapplicable.

The analysis of sentences like (12) turns on the distinction between TRUTH and VERIFICATION. While (6) and (12) are equally false, they differ in that it can be straightforwardly determined that the king of France is not standing next to me (since whoever is in fact standing next to me, if anyone is, does not have the property of being identical to the king of France, whether or not there is one), while (6) can only be falsified indirectly, by determining that France has no king. Whether a given speaker takes the existence of the referent of a given singular term for granted (or at least as noncontroversially accommodable) is a matter of pragmatics, not semantics.⁹

This approach extends naturally to other familiar cases of sentences that must be either true or false but cannot be felicitously uttered (in a given context), including future contingent statements (e.g. Aristotle's *There will be a sea-battle tomorrow*), past "unknowables" (e.g. *There was an odd number of blades of grass in Harvard Yard at the dawn of Commencement Day, 1903*, from Quine 1981: 91) or unverifiable and unfalsifiable claims about the present (e.g. the medievals' *The number of stars is even*). A theory which severs questions of truth conditions from those of verification can account for such cases without sacrificing either classical bivalence or our intuitions of conditions on (un)assertibility.

But if presuppositions are not truth conditions and if their failure does not lead to truth-value gaps, presuppositional phenomena require a pragmatic rather than a semantic account. Such a theory has been urged since the mid-1970's, the seminal proposals being those of Stalnaker (1974, 1979) and Karttunen (1974). In presupposing ϕ , S treats ϕ as a non-controversial element in the context of utterance: 'To presuppose something is to take it for granted in a way that contrasts with asserting it' (Soames 1989: 553). To assert ϕ is to propose adding the propositional content of ϕ to the COMMON GROUND, the working set of propositions that constitute the current context. Equivalently, this assertion is a proposal to discard $\sim\phi$ from the set of live options, to winnow down the context set (those possible worlds consistent with the shared beliefs of S and H) by jettisoning the worlds in which ϕ does not hold. A proposition is presupposed if and only if it is (treated as) non-controversially true in every world within the working context set.¹⁰

To get specific, (13a,b) entail and indeed truth-conditionally equate to (13c); a speaker asserting either (13a) or (13b) is proposing to increment the common ground with (13c).

- (13) a. Even Peewee lifted the rock.
 b. Peewee managed to lift the rock.
 c. Peewee lifted the rock.

What *even* and *manage to* contribute to the context are presuppositions that S treats as noncontroversial: in the former case that others (in the context set) lifted the rock and that Peewee was the least likely member of this set to have done so, and in the latter that it was relatively difficult for him to lift the rock.

The notion of context operative here, as elsewhere, is crucially not a static construct but a dynamic model of the collaborative construction of a conversation. Appreciation of this point forestalls misunderstanding of the nature of pragmatic presupposition (and of implicature: see Green 1990). Thus, the neo-Strawsonian Burton-Roberts points out that a pragmatic theory of presupposition framed ‘in terms of assumption-sharing between speaker and hearer’ is ‘quite simply wrong’:

If I were to say to you, ‘My sister is coming to lunch tomorrow’, I do presuppose that I have a sister but in presupposing it I do not necessarily assume that you have a prior assumption or belief that I have a sister.

(Burton-Roberts 1989: 26)

Thus, he concludes, presupposition cannot be defined directly in terms of mutual knowledge. But nobody ever said it could. For Stalnaker (1974), pragmatic presuppositions are ‘propositions whose truth [S] takes for granted, or seems to take for granted, in making his statement’ (1974: 198); presupposed material can be communicated as new information by a speaker who ‘tells his auditor something...by pretending that his auditor already knows it’:¹¹

I am asked by someone who I have just met, “Are you going to lunch?” I reply, “No, I’ve got to pick up my sister.” Here I seem to presuppose that I have a sister even though I do not assume that the speaker knows this.

(Stalnaker 1974: 202, citing Sadock (p.c.))

Or more dramatically, after A has danced with a handsome stranger with whom her friend B happens to be acquainted, B gently exploits the presuppositional semantics of the possessive to force A to accommodate the existence of the referent in her model.

- (14) A: John is very attractive.
 B: Yes, and his wife is lovely too.

The idea that S can act as if a proposition is part of the common ground, and thereby force H to adjust his map of the common ground to encompass it, is codified in Lewis’s RULE OF ACCOMMODATION for presupposition:

If at time *t* something is said that requires presupposition *P* to be acceptable, and if *P* is not presupposed just before *t*, then -- *ceteris paribus* and within certain limits -- presupposition *P* comes into existence at *t*. (Lewis 1979: 340)

Accommodation, which Lewis generalizes to permission statements, descriptions, vagueness, relative modalities, performatives, and planning, is itself -- as Stalnaker points out -- a special case of Gricean exploitation, a connection forged by Grice himself:

It is quite natural to say to somebody...*My aunt's cousin went to that concert*, when one knows perfectly well that the person one is talking to is very likely not even to know that one had an aunt, let alone know that one's aunt had a cousin. So the supposition must be not that it is common knowledge but rather that it is noncontroversial, in the sense that it is something that you would expect the hearer to take from you (if he does not already know).(Grice ([1970]1981: 190)

Within the pragmatic approach, presuppositions are restrictions on the common ground, rather than conditions on truth and falsity; their failure or non-satisfaction results not in truth-value gaps or the assignment of non-classical values but in the anomaly or inappropriateness of a given utterance in a given context. But any comprehensive theory of presupposition must resolve the PROJECTION PROBLEM: how are the presuppositions of a larger expression determined compositionally as a function from those of its subexpressions? One proposed solution to the projection problem (see especially Karttunen 1974, Karttunen & Peters 1979) involves the partition of operators into subclasses of plugs, holes, and filters, according to their effect on presupposition inheritance. The fact that ordinary negation is transparent to presuppositions -- that both (13b) and its negation *Peewee didn't manage to lift the rock* presuppose that it was relatively difficult for Peewee to lift the rock -- is accounted for by treating negation as a HOLE to presuppositions. Factive predicates (*realize, regret*) are also holes, letting presuppositions percolate up to a higher level. Verbs of communication, on the other hand, are in principle PLUGS, blocking the transmission of presuppositions (though see Levinson 1983: 195--6 for a contrary view). Thus (15a) but not (15b) presupposes existence of a largest prime.

- (15) a. John regrets that Mary is thinking about the largest prime.
- b. John said that Mary is thinking about the largest prime.

Another plug is the presupposition-canceling “CONTRADICTION” negation of (7”).

Two-place logical connectives are neither plugs nor holes, but FILTERS, letting some but not all presuppositions percolate through, depending on properties of the content and context of the utterance. Thus in (16a,b) the presupposition that would have been induced by the second clause -- that Al has a cat -- is entailed by the first clause and thus filtered out, while in (16'a,b) this same presupposition is not filtered out and survives to become a presupposition of the entire sentence. In both cases, the presupposition of the first clause (that Al exists) percolates up unfiltered.

- (16) a. Al has a cat, and his cat is jealous.
- b. If Al has a cat, his cat is jealous.
- (16') a. Al has a dog, and his cat is jealous.
- b. If Al has a dog, his cat is jealous.

Note the parallel projection of conditionals and conjunctions: in both *if p then q* and *p and q*, the presuppositions of the sentence as a whole will consist of the union of the

presuppositions of p and of q , minus those presuppositions of q that are contextually entailed by the common ground incremented by p . On this account, the presuppositional behavior of conjunctions is just as asymmetric as that of conditionals, whence the irreversibility of (16a).

Gazdar (1979) identifies empirical problems for the Karttunen-Peters theory (focusing especially on a class of incorrect predictions for conditional sentences) and proposes an alternative projection mechanism in which subexpressions induce potential presuppositions that are automatically inherited as a default unless they clash with propositions already entailed or implicated by the utterance or the prior discourse context, in which case they are canceled.

Subsequent work (cf. Soames (1979), Landman (1981), Heim (1983, 1992)) identifies empirical and conceptual problems for both Karttunen-Peters and Gazdar models. Heim, seeking to synthesize the strengths of the preceding models, identifies an operator's projection properties in terms of its CONTEXT-CHANGE POTENTIAL. Presuppositions can be unpacked as invariant pragmatic inferences: if Σ is a sentence, Σ presupposes ϕ just in case every context admitting Σ entails ϕ . The connection between truth conditions and context-change -- between Strawsonian and Stalnakerian conceptions of presupposition -- is elucidated as follows: If a context c (taken to be a set of propositions or the conjunction of the members of that set) is true and c admits a sentence Σ , then Σ is true with respect to c if $c+\Sigma$ (the context incremented by Σ) is true. But if Σ is uttered in a context c which fails to admit it, the addressee will adjust c to c' , a context close to c but consistent with Σ . Heim's projection theory (1983: 117--19) thus incorporates the Stalnaker-Lewis process of accommodation, which appeals in turn to the Gricean model of a cooperative conversational strategy dynamically exploited to generate pragmatic inferences. At the same time, this line responds to the demand (voiced by Gazdar's critique of the Karttunen-Peters system) for an explanatory theory in which projection properties of 'filters' follow directly from the meaning of the logical connectives.

Following Heim (1983, 1992) and Soames (1989: 577--9), the notion of presupposition accommodation can be related to presupposition cancellation, in which the specific utterance context makes it clear to H that the apparent violation of presuppositional requirements must be resolved not by altering the context to entail the presupposing statement but by reinterpreting the statement itself, 'adjusting the requirements to fit the facts' (Soames 1989: 578). Heim distinguishes these processes as GLOBAL vs. LOCAL accommodation, Soames as DE FACTO vs. DE JURE accommodation. This permits an explanation of the surprising result in Gazdar (1979) that potential presuppositions can be canceled by implicatures.

The study of presupposition continues to play a major role in the evolution of current semantic theory. In the light of recent developments in formal pragmatics, we can see (following van der Sandt & Zeevat 1993) how Karttunen's contextual satisfaction-based approach to the projection problem anticipates today's dynamic theories of context change, while Gazdar's cancellation-based account prefigures current work on non-monotonic logics. Van der Sandt (1992), meanwhile, has been pursuing an anaphoric account of presupposition, projection, and accommodation formulated within discourse representation theory. For over a century, since Frege blazed the way, the analysis of presuppositional phenomena has served as a crucible in which semantic

theories of natural language semantics have been tested; those theories incapable of providing a successful model of the generation and projection of presuppositions are destined to suffer the fate of the unfortunate King of France.

2. Implicature

Like pragmatic presupposition, the notion of implicature constitutes a non-truth-conditional aspect of speaker meaning, part of what is MEANT when S utters ϕ within context c without being part of what is SAID by S in that utterance. This contrast between the said and the meant, and thus between the said and the implicated (the meant-but-unsaid) dates back at least to the fourth century rhetoricians Servius and Donatus who characterized litotes, the figure of pragmatic understatement, as a figure in which we say less but mean more ('minus dicimus et plus significamus'; see Horn 1991 for discussion).

Grice's contribution was to offer an explicit and general account of what he termed

...a distinction...within the total signification of a remark...between what the speaker has *said* (in a certain favored and maybe in some degree artificial, sense of "said"), and what he has *implicated* (e.g., implied, indicated, suggested, etc.), taking into account the fact that what he has implicated may be either *conventionally* implicated (implicated by virtue of the meaning of some word or phrase which he has used) or *non-conventionally* implicated (in which case the specification of implicature falls outside the specification of the conventional meaning of the words used). (Grice [1967] 1989: 118)

In his earliest published work on the then unnamed doctrine of implicature, Grice (1961: §3) distinguishes several separate species within the genus of non-entailment relations, as exhibited in the pairs in (17):

- (17) a. Smith has left off beating his wife.
 a'. Smith has been beating his wife.
 b. She is poor but honest.
 b'. There is some contrast between her poverty and her honesty.
 c. Jones has beautiful handwriting and his English is grammatical.
 (in letter of evaluation of Jones for a faculty position in philosophy)
 c'. Jones is no good at philosophy.
 d. My wife is either in the kitchen or in the bathroom.
 d'. I don't know for a fact that my wife is in the kitchen.

Grice, taking (17a') as a (semantic) presupposition of (17a) (with the truth of the former thus a necessary condition for the truth or falsity of the latter), observes that this inference is neither cancelable (**Smith has left off beating his wife, but then he never beat her in the first place*) nor detachable, in the sense that any other means of asserting what (17a) asserts induces the same presupposition: *He has stopped/ceased beating her, He no longer beats her...* The inference in (17b,b'), on the other hand, while still non-cancelable, is detachable, since the same truth-conditional content we can expressible in a way that removes (detaches) the inference: *She is poor and honest*. This implication also differs from that of (17a) in its irrelevance to truth-conditional considerations: (17b) is

true if the referent is both poor and honest and false otherwise. In later work (Grice 1975, Karttunen & Peters 1979), such detachable but non-cancelable inferences which are neither part of what is said (part of truth-conditional meaning) nor calculable in any general way from what is said are termed CONVENTIONAL implicata, corresponding essentially to the Stalnaker-Karttunen notion of pragmatic presupposition. Indeed, along with *but*, the now classic instances of conventional implicature involve precisely those particles traditionally analyzed as instances of pragmatic presupposition: adverbial particles like *even* and *too*, truth-conditionally transparent verbs like *manage to* and *bother to*, and syntactic constructions like clefts.¹²

But whereas these inferences are non-truth-conditional components of an expression's conventional lexical meaning, the inferences associated with (17c,d) are non-conventional in that they can be calculated from the utterance of such sentences in a particular context given the view of conversation as a shared goal-oriented enterprise of speaker and hearer. In each case, the inference of the corresponding primed proposition is cancelable (either explicitly by appending material inconsistent with it -- '*but I don't mean to suggest that...*' -- or by altering the context of utterance) but non-detachable (given that any other way of expressing the literal content of (17c,d) in the same context would license the same inference). Where (17c) differs from (17d) is in the fact that the utterance of the former 'does not standardly involve the implication...attributed to it; it requires a special context to attach the implication to its utterance' (Grice 1961: 130), while the inference in the latter case, that S did not know in which of the two rooms his wife was located, is induced in the absence of a special or marked context (e.g. that of a game of hide and seek). (17c) exemplifies PARTICULARIZED CONVERSATIONAL IMPLICATURE, while (17d) represents the more linguistically significant concept of GENERALIZED CONVERSATIONAL IMPLICATURE (Grice 1975). But in both cases, it is crucially not the proposition or sentence, but the speaker or utterance, that induces the relevant implicatum in the appropriate context.

Grice seeks to show how participants in a conversational exchange can compute what was meant (by S's utterance at a given point in the interaction) from what was said. The governing dictum is the Cooperative Principle (Grice 1975: 45): 'Make your conversational contribution such as is required, at the stage at which it occurs.' This rule in turn is analyzed into the four general and presumably universal maxims of conversation on which all rational interchange is grounded:

(18) The Maxims of Conversation (Grice 1975: 45--6):

QUALITY: Try to make your contribution one that is true.

1. Do not say what you believe to be false.
2. Do not say that for which you lack evidence.

QUANTITY:

1. Make your contribution as informative as is required
(for the current purposes of the exchange).
2. Do not make your contribution more informative than is required.

RELATION: Be relevant.

- MANNER: Be perspicuous.
1. Avoid obscurity of expression.
 2. Avoid ambiguity.
 3. Be brief. (Avoid unnecessary prolixity.)
 4. Be orderly.

There is, a priori, no privileged status to this classification, and neo- and post-Gricean pragmaticists have entertained a variety of reductionist efforts. In the first place, all maxims are not necessarily created equal. Grice and others have assigned a privileged status to Quality (though see Sperber & Wilson 1986 for a dissenting view):

The maxims do not seem to be coordinate. The maxim of Quality, enjoining the provision of contributions which are genuine rather than spurious (truthful rather than mendacious), does not seem to be just one among a number of recipes for producing contributions; it seems rather to spell out the difference between something's being, and (strictly speaking) failing to be, any kind of contribution at all. False information is not an inferior kind of information; it just is not information...Indeed, it might be felt that the importance of at least the first maxim of Quality is such that it should not be included in a scheme of the kind I am constructing; other maxims come into operation only on the assumption that this maxim of Quality is satisfied.

(Grice 1989: 371; Grice 1975: 46)

Of those 'other maxims', the most linguistic mileage has been obtained from the first quantity maxim, which is systematically exploited to yield upper-bounding generalized conversational implicatures associated with scalar operators (Horn 1972, 1989; Gazdar 1979; Hirschberg 1985). This submaxim (under a variety of formulations) and its explanatory potential have long been recognized. Thus Sir William Hamilton (1860: 254) distinguishes two senses of *some*, the INDEFINITE (*at least some*) and the SEMI-DEFINITE (*some but not all*), taking the latter as basic: 'Some, if not otherwise qualified, means some only -- this by presumption.' While acknowledging the existence of this presumption in 'common language', De Morgan (1847) and Mill (1867) marshal proto-Gricean reasoning to reject Hamilton's thesis in favor of the standard practice of relegating the *some* *not all* inference to an extra-logical domain:

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, emphasis added)

Notice especially Mill's epistemic rider on quantity-based inferences: the use of a weaker operator implicates that for all S knows the stronger operator on the same scale could not have been substituted *salva veritate*.

The tacit principle Mill alludes to, requiring S to use the stronger *all* in place of the weaker *some* when possible and licensing H to draw the corresponding inference when the stronger term is not used, is independently formulated by Strawson (1952: 178--9), who credits Mr H. P. Grice for this ‘general rule of linguistic conduct’: ‘One should not make the (logically) lesser, when one could truthfully (and with greater or equal clarity) make the greater claim.’ Grice (1961: 132) later takes his own ‘first shot’ at the relevant rule -- ‘One should not make a weaker statement rather than a stronger one unless there is a good reason for so doing’ -- which has appeared on the market in different packaging.¹³

For Grice, the methods of radical pragmatics are enlisted in the defense of a conservative bivalent semantics, with the gap between what that logic gives us and what we seem to need bridged by the assumption that S and H are in business together under the banner of the Cooperative Principle and the attendant maxims. Quantity-based scalar implicature -- my inviting you to infer from my use of *some...* that for all I know *not all...* -- is driven in particular by your knowing (and my knowing your knowing) that I expressed a weaker proposition in lieu of an equally unmarked utterance that would have expressed a stronger proposition, one unilaterally entailing the one I did express. Thus, what is said in the use of a weak scalar value like those in boldface in the sentences of (19) is the lower bound (...*at least n...*), with the upper bound (...*at most n...*) implicated as a cancelable inference generated by (some version of) the first maxim of quantity.

(19) 1-SIDED READING \emptyset 2-SIDED READING

- | | | |
|--|------------------------------|-------------------------------------|
| a. Max has 3 children. | '...at least 3...' | '...exactly 3...' |
| b. You ate some of the cookies. | '...some if not all...' | '...some but not all...' |
| c. It's possible she'll win. | '...at least \diamond ...' | '... \diamond but not certain...' |
| d. Maggie is patriotic or quixotic. | '...and perhaps both' | '...but not both' |
| e. It's warm out. | '...at least warm...' | '...but not hot...' |

Negating such predications denies the lower bound: to say that something is not possible is to say that it's impossible, i.e. less than possible. When the upper bound is apparently negated (*It's not possible, it's necessary*), a range of syntactic and phonological evidence suggests that this is an instance of the metalinguistic use of negation, in which the negative particle is used to object to any aspect of a mentioned utterance, including its conventional and conversational implicata, register, morphosyntactic form or pronunciation (Horn 1989: Chapter 6).¹⁴

Setting Quality aside, we can collapse the remaining maxims and submaxims into two fundamental principles regulating the economy of linguistic information (Horn 1984, 1989, 1993). The **Q** Principle is a lower-bounding hearer-based guarantee of the sufficiency of informative content (“Say as much as you can, modulo Quality and **R**”); it collects the first Quantity maxim and the first two submaxims of Manner, and is systematically exploited (as in the scalar cases just discussed) to generate upper-bounding implicata. The **R** Principle is an upper-bounding correlate of the Law of Least Effort dictating minimization of form (“Say no more than you must, modulo **Q**”); it collects the Relation maxim, the second Quantity maxim, and the last two submaxims of Manner, and is exploited to induce strengthening or lower-bounding implicata. **Q**-based implicature is typically negative in that its calculation refers crucially to what could have been said but wasn't: H infers from S's failure to use a more informative and/or briefer

form that S was not in a position to do so. **R**-based implicature typically involves social rather than purely linguistic motivation and is exemplified by indirect speech acts (in particular, euphemism) and negative strengthening (including so-called neg-raising, the tendency for *I don't think that ϕ* to implicate (*I think that*) *not- ϕ*).¹⁵

The functional tension between these principles motivates and governs not just implicature but a wide range of linguistic phenomena from politeness strategies to the interpretation of pronouns and gaps, from lexical and semantic change to the analysis of conversational interaction (cf. Horn 1984, 1993; Brown & Levinson 1987; Levinson 1987a,b, 1991). Crucially, the two antinomic forces are not in simple opposition, but interact dialectically, each appealing to and constraining the other. Thus Grice incorporates **R** in defining the primary **Q** maxim ('Make your contribution as informative as is required'), while Quantity₂ is constrained by Quantity₁ and essentially incorporates Relation: what would make a contribution more informative than is required, except the inclusion of contextually irrelevant material?¹⁶

The opposition of the two forces may result in maxim clash. Thus an utterance of *I broke a finger yesterday* **R**-implicates that it was one of my fingers I broke, unless the common ground entails or accommodates the proposition that I am enforcer for the mob, in which case the opposite, **Q**-based implicature is derived. Notice too that the use of *finger* here conveys *~[thumb]*. Truth-conditionally, a thumb is a finger: I have ten fingers, not eight. But if I tell my doctor I broke a finger, she will infer that the maimed digit wasn't a thumb, or I would have said so. (Saying so would be more informative and no less brief.) Thus *finger* **Q**-implicates *non-thumb*, just as *rectangle* is typically used so as to exclude squares.

Related to these cases of **Q**-based narrowing¹⁷ is the DIVISION OF PRAGMATIC LABOR: given two co-extensive expressions, the more specialized form -- briefer and/or more lexicalized -- will tend to become **R**-associated with a particular unmarked, stereotypical meaning, use, or situation, while the use of the periphrastic or less lexicalized expression, typically (but not always) linguistically more complex or prolix, will tend to be **Q**-restricted to those situations outside the stereotype, for which the unmarked expression could not have been used appropriately. Thus consider the following pairs, abstracting away from issues of conventionalization:

- (20) a. Black Bart caused the sheriff to die.
Black Bart killed the sheriff.
- b. I'd like to see something in pale red.
I'd like to see something in pink.
- c. He wants him to win.
He wants PRO to win.
- d. I am going to marry you.
I will marry you.
- e. It's not impossible that you will solve the problem
It's possible that you will solve the problem.
- f. I need a new driller./cooker.
I need a new drill. /cook.

The use of a periphrastic causative suggests that the agent acted indirectly (cf. McCawley 1978: 250), *pale red* implicates a tint not pre-empted by pink (Householder 1971: 75), the selection of a full pronoun over a null PRO (or pro) signals the absence of the coreferential reading associated with the reduced syntax (Chomsky 1981, Levinson 1987a, 1991), the periphrastic blocks the indirect speech act function of promising conveyed by the modal (Searle 1975), a double contradictory negation signals a rhetorical effect absent from the direct positive (Horn 1991), and agentive *-er* nominals are excluded from meanings pre-empted by the more lexicalized zero-derived deverbals: a driller can only be an agent, given that drills are instruments, but a cooker can only be an instrument, given that cooks are agents (Kiparsky 1983 on AVOID SYNONYMY, Aronoff 1976 on BLOCKING, Clark & Clark 1979 on PRE-EMPTION BY SYNONYMY). Whenever a speaker opts for a more complex or less fully lexicalized expression over a simpler alternative, there is always a sufficient reason, but the particular motivation depends on the particular context.

While the model described above retains two antinomic principles along with an unreduced maxim of quality or convention of truthfulness, a more radical simplification has been urged in the Relevance Theory of Deirdre Wilson, Dan Sperber, and their associates. For Sperber & Wilson (1986), a suitably refashioned Principle of Relevance is the only begetter of the bridgework connecting linguistic meaning to utterance interpretation.

Even for Grice, propositional content is not fully fleshed out until reference, tense, and other deictic elements are fixed. But Relevance theorists, expanding on earlier observations of Atlas (1979), recognized that the same pragmatic reasoning used to compute implicated meaning must also be invoked to fill out underspecified propositions where the semantic meaning contributed by the linguistic expression itself is insufficient to yield a proper accounting of truth-conditional content. Thus Carston (1985: 6) argues that what is said in the natural use of sentences like those in (21),

- (21)a. The park is some distance from where I live.
 b. It'll take us some time to get there.

must be computed via the Principle of Relevance. The distance or time communicated by S is not simply an implicatum read off the underspecified content contributed by linguistic meaning alone, i.e. a trivially true existential proposition. Instead, the pragmatically recoverable strengthened communication comprises the EXPLICATURE or truth-conditional content. Pragmatically derived aspects of meaning are not necessarily implicatures: 'There is massive pragmatic penetration of explicit content' (ibid.). Nor does the acceptance of widespread pragmatic intrusion into propositional content result in an erosion of the boundary between semantics and pragmatics: 'Linguistic semantics is autonomous with respect to pragmatics; it provides the input to pragmatic processes and the two together make propositional forms which are the input to a truth-conditional semantics' (Carston 1988: 176).

Thus, both one-sided and two-sided understandings of the scalar predications of (19) are directly represented at the level of logical content: 'The conclusion that there is a lot more truth-conditional ambiguity than is contributed by the language in question is unavoidable' (Kempson 1986: 88). But while the scalar predications of (19) are now all

taken to be ambiguous, the ambiguity is no longer situated at the lexical level but has been relocated to the propositional level: what is SAID in an utterance is systematically underdetermined by what is UTTERED.

Other work has challenged some of these results. Thus, while a strong case can be made for an enrichment analysis of the meaning contribution of the cardinals, it does not generalize straightforwardly to “inexact” scalar values (Horn 1992). Evidence for this conclusion 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. (19b-e). Thus contrast the exchanges below:

- | | |
|---|---|
| (22) A: Do you have two children?
linguists? | (22') A: Are many of your friends
linguists? |
| B ₁ : No, three. | B ₁ : ?No, all of them. |
| B ₂ : ?Yes, (in fact) three. | B ₂ : Yes, (in fact) all of them. |

Further, notice that a bare ‘No’ answer is compatible with a non-monotone (‘exactly n’) reading in (22) in an appropriate context, but never in (22’), where an unadorned negative response can only be understood as conveying ‘less than many’. Similarly, if (19e) were truly 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’. Nor could we explain the contrast in (23):

- (23)a. #Neither of us liked the movie -- she hated it and I absolutely loved it.
b. Neither of us has three kids -- she has two and I have four.

Such paradigms support a mixed theory in which sentences with cardinals may well demand a pragmatic enrichment analysis of what is said, while other scalar predications continue to submit happily to a minimalist treatment on which they are lower-bounded by their literal content and upper-bounded, in default contexts, by quantity implicature.

Relevance Theory has proved a powerful construct for rethinking the role of pragmatic inference in utterance interpretation and its relation to other aspects of cognitive structure. It is also worth noting that the contrast between the dualistic **Q/R** model and the monistic approach of Relevance Theory is somewhat misleading in that Relevance for Sperber and Wilson is itself a two-sided coin. Both frameworks are predicated on a minimax or cost/benefit relation which takes the goal of communication as maximizing contextual effects while minimizing processing effort, and the Principle of Relevance is itself couched in terms of this trade-off of effort and effect.¹⁸

The explanatory scope of implicature may have been reduced from the heyday of the Gricean program, as that of presupposition was in previous work, but in each case the pragmatic principles underlying these constructs -- accommodation, exploitation, common ground, and the distinction of implicit vs. explicit components of utterance

meaning -- continue to play a vital role in the elaboration of dynamic models of context and communication.

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¹Keenan (1971), Levinson (1983: 181--4), and the articles in Oh & Dinneen (1979) provide useful surveys of presuppositional phenomena. For an historically important treatment of non-existential presuppositions within early generative grammar, see Kiparsky & Kiparsky (1971).

²The relation can be detected as well in the presupposition-dependent *sophisma* of choice for the medievals, *Do you still beat your ass?*, which is in turn a lineal descendant of the 3rd century B.C. Megarians' *Have you stopped beating your father? Answer yes or no* (cf. Wheeler 1983: 290--1). The development from the father-beating of the ancients through the ass-beating of the medievals to the wife-beating of the moderns provides an eloquent commentary on 23 centuries of social progress.

³This is the CATEGORY MISTAKE, e.g. *The number 7 is red* (cf. Horn 1989: §2.2 for elaboration). Thus vacuous singular expressions and category mistakes are automatically false, and their denials automatically true.

⁴In addition to predicate denial, which determines contradictory opposition via the law of excluded middle, Aristotle admits narrow scope, non-middle-excluding predicate term negation. Where predicate denial (*Socrates is not well*) denies a positive term of the subject, predicate term negation (*Socrates is not-well*) affirms a negative term of the subject; if Socrates does not exist, the former is true and the latter false.

⁵At least three different relations are collapsed under Frege's *Voraussetzung*: sentences may have presuppositions, uses of sentences (i.e. assertions) may involve presuppositions, and speakers may make presuppositions (cf. Atlas 1975, Soames 1993). This ambiguity resurfaces within the generative semantics tradition, where (as in Kiparsky & Kiparsky 1971) x in the formula x presupposes y may range over sentences, sets of sentences, propositions, speech acts, speakers, utterances, or verbs, and y over sentences, propositions, or truth values.

⁶For some discussion, see Rescher 1969: 160ff., Horn 1989: §2.4.

⁷Within presuppositional semantics, the alternative to Strawson's concession that not all singular terms are equally presuppositional is the acceptance, with Burton-Roberts (1989: Chapter 9), of a 'loosening of the tie between presupposition and lack of truth value': a sentence with a failed presupposition may nevertheless, in the right circumstances, be true or false. For other approaches, see McCawley (1979) and Lappin & Reinhart (1988).

⁸The Strawsonian notions of topic and aboutness, discussed insightfully by Reinhart (1981), are related to pragmatic presupposition and to given/old information in Horn (1986, 1989).

⁹Compare the moral drawn by Mates (1973: 417--18) from the contrast between (10a) and (11a):

To make the truth-value of what is said fluctuate with these differences of situation and purpose is only to lose the difficulties in a haze of confusion. Far better, it seems to me, is to draw the semantics-pragmatics line in such a way that questions like 'what topic is he talking about?' and 'Was that an odd thing to say?' are classified as pragmatic, while 'Is what he said true?' is semantic.

¹⁰This formulation follows the exposition of Stalnaker 1978: 321ff.

¹¹A parallel process of exploitation is involved in (i) and (ii), where the presupposition lexically associated with factive *regret* must be noncontroversially accommodated:

-
- (i) We regret that children under the age of 12 cannot attend the exercises.
[from an MIT commencement brochure, cited by Karttunen]
 - (ii) I regret to inform you that your insurance policy is hereby cancelled.

¹²Following Gazdar (1979), we can say that (17a) entails (17b), as well as (pragmatically) presupposing or conventionally implicating it; it is the entailment that is truth-conditionally relevant. Since the existential premise associated with clefts is also entailed in the positive -- as is existence with singular expressions -- it will function as part of what is said in that context but only as part of what is (conventionally) implicated in negatives or questions. Hence the parallel below:

- (i) It's Kim who ate the pizza. The King of France is bald.
- (ii) It isn't Kim who ate the pizza. The King of France isn't bald.
- (iii) Someone ate the pizza. There is a King of France.

In each set, the statement in (i) but not that in (ii) entails the corresponding (iii) proposition, but in addition (the utterer of) both (i, ii) pragmatically presupposes or conventionally implicates (iii). With *even* or *manage to*, on the other hand, the non-truth-conditional component involving unlikelihood or effort is entailed by neither positive nor negative statement.

¹³See inter alia the corresponding principles of Fogelin, O'Hair, and Harnish discussed in Horn 1990b.

¹⁴Thus if it's hot, it is a fortiori warm, but if I know it's hot I can echo and reject the assertion that it's warm as (not false but) insufficiently informative:

- (i) It's not warm, it's hot!
- (ii) You're right, it's not warm. It's hot!

As seen in (ii), the effect is often that of an ironic unsaying or RETROACTIVE ACCOMMODATION: The metalinguistic understanding typically requires a second pass, after the descriptive reading self-destructs. It should be noted that the set of metalinguistic negations inducing double processing is not truth-conditionally homogeneous. When the the focus of negation involves a truth condition for the corresponding affirmative (e.g. *The king of France is not bald: there is no king of France*), the metalinguistic negation suffices to render the sentence true as a descriptive negation. Thus, even though such a denial is most naturally uttered as an echoic objection to an earlier positive assertion, no truth-conditional contradiction arises in the processing of the negative utterance. When the objection focuses on an aspect of meaning that is not a truth condition of the affirmative, the use of metalinguistic negation fails to guarantee the truth of the corresponding descriptive negation. Hence the contrast in (iii):

- (iii) a. The king of France isn't bald, (because) there is no king of France.
- b. It's not warm, (#because) it's hot.
- c. I didn't trap two monGEESE, (#because) I trapped two monGOOSes.
- d. Grandpa isn't 'feeling lousy', (#because) he's just indisposed.

Cf. Horn 1990a for related discussion.

¹⁵**R**-based implicata, while calculable, are often not calculated on-line when conventions of use are involved; a specific form of expression may be associated with a given pragmatic effect while an apparently synonymous form is not. Thus *Can you close the window?* is standardly used for indirect requests while *Are you able to* is not; *I don't guess that ϕ* allows a strengthening 'neg-raised' understanding in only a subset of the dialects for which *I don't think that ϕ* does. These are instances of

STANDARDIZED NONLITERALITY (Bach & Harnish 1979: 192--219) or SHORT-CIRCUITED CONVERSATIONAL IMPLICATURE (Morgan 1978, Horn 1989: §5.3).

¹⁶For detailed discussion of the issues involved the definition and interaction of the maxims, see Martinich 1980, Wilson & Sperber 1986, Levinson 1987b, Neale 1992.

¹⁷Compare **R**-based narrowing, in which the restriction of e.g. *poison, liquor, drink, undertaker* to a particularly salient subset or exemplar of the original denotation is not prompted by the existence of a specific word pre-empting that portion of semantic space. Cf. Horn 1984 for discussion.

¹⁸Compare Searle's acknowledgment (1965: 235) of 'a principle of maximum illocutionary ends with minimum phonetic effort' or the minimax principle of Carroll & Tanenhaus (1975: 51), "The speaker always tries to optimally minimize the surface complexity of his utterances while maximizing the amount of information he effectively communicates to the listener', or various precursors of these formulations by Paul, Zipf, and Martinet (Horn 1993).