

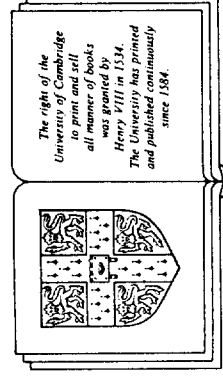
# MENTAL REPRESENTATIONS

The interface between  
language and reality

EDITED BY

RUTH M. KEMPSON

*Department of Phonetics and Linguistics  
School of Oriental and African Studies  
University of London*



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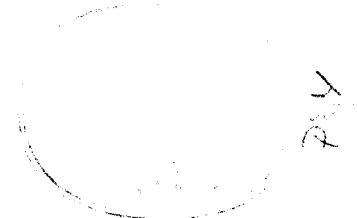
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# Implicature, explicature, and truth-theoretic semantics

ROBYN CARSTON

## 1 Introduction

Pragmatists have given much attention to what an utterance can convey implicitly since Grice brought it to their attention in his work on conversational implicature. Equally important, however, is the proposition explicitly expressed by the utterance of a linguistic expression, what is said, in Grice's terms, although this has been given only passing acknowledgement. Since what is said (the explicit) and what is implicated (the implicit) exhaust the (propositional) significance of the utterance, we are unlikely to have a coherent notion of the latter without consideration of the former.

In this chapter I consider the problem of distinguishing the proposition expressed (henceforth called the explicature<sup>1</sup>) from those implicated (implicatures). It might seem that there is no particular problem; after all, Grice and almost all those following him have assumed the explicature is the result of accessing the conventional sense of the linguistic form used plus assignment of referents to referring expressions and, occasionally, disambiguation of those words or phrases which have more than one sense. As an initial indication that matters might not be so straightforward let us consider B's utterance in (1):

- (1) A: How is Jane feeling after her first year at university?  
B: She didn't get enough units and can't continue

Let us suppose that (part at least of) A's interpretation of B's utterance is: 'Jane didn't pass enough university course units to qualify for admission to second year study, and, as a result, Jane cannot continue with university study. Jane is not feeling at all happy about this.' There are various vaguenesses and ambiguities left in this expression of the interpretation; this is inevitable in any natural language expression of an interpretation (which is itself a set of mental representations). I intend it merely to suggest the sort of interpretation A might reasonably give to this utterance. The question then is which aspects of this interpretation are explicitly expressed (that is, part of the explicature) and which are implicit (implicated)? The disambiguation of 'get' and 'units' and the referent assignment to 'she' are surely part of the explicit content, while the assumption that Jane isn't feeling happy is surely implicit. But what about 'to qualify for admission to second year study', and 'with university study' which enrich and complete the two clauses of the

up a few compelling examples rather than by attempting to define the notion. One of these is given in (2) in the rather informal way that he gave it:

- (2) A: Smith doesn't seem to have a girlfriend these days  
 B: He's been paying a lot of visits to New York lately  
 B implicates that Smith has, or may have, a girlfriend in New York, an assumption he must be taken to believe in order to preserve the assumption that he is observing the maxim of relation 'Be relevant' (Grice 1975: 51). This example seems clear since, whatever problems we might have in clarifying the notion of explicature, we surely don't think that the assumption that Smith has a girlfriend in New York is explicitly conveyed by B's utterance. That message is conveyed implicitly, indirectly, and is clearly dependent on the particular context which includes A's preceding utterance. If the context were different, say A's preceding utterance had been 'I believe Smith's looking for a new job', then this implicit message would not be conveyed by B's utterance. This property of cancellability without creating contradiction is one of the characteristics of implicature to which Grice gives particular emphasis.

A second important property is the calculability of implicatures, that is, something isn't an implicature if it's not possible to give an account of a reasoned derivation of it based on the assumption that the speaker is observing pragmatic principles. Sperber & Wilson (1986) have developed an account of the non-demonstrative inference processes involved in the derivation of implicatures. These processes will not be explained here but one example will indicate what has to be explained:

- (3) A: Have you read Susan's book?  
 B: I don't read autobiographies  
 implicated premise: Susan's book is an autobiography  
 implicated conclusion: B hasn't read Susan's book

A similar distinction can be made for (2):  
 implicated premise: If Smith's been paying a lot of visits to New York lately he's probably got a girlfriend there.  
 implicated conclusion: Smith's probably got a girlfriend in New York.

There are two kinds of implicature involved in the derivations: implicated premises and implicated conclusions. Once the implicated premise has been recovered, the conclusion follows by a straightforward deductive inference rule, taking the implicated premise and the explicature of the utterance as input. The real work lies in accounting for the recovery of the implicated premise in terms of a non-deductive process of hypothesis formation and confirmation.<sup>4</sup>

The obvious but important point here is that the explicature is distinct from the implicatures of the utterance; they do not overlap in content. In (3) the truth conditions of 'Susan's book is an autobiography' are independent of the truth conditions of 'B doesn't read autobiographies'. Implicatures have

conjunction, and the 'as a result', linking the two conjuncts. Are these part of what is explicatured or part of what is implicated? Since they are not given linguistically, one might think they must be implicated, but then what is the explicature of the utterance? It must be 'Jane didn't pass enough university course units and Jane cannot continue (something ??)'. It's not clear that this constitutes a propositional form,<sup>2</sup> that is, it isn't possible to specify what conditions in the world must obtain for it to be true. The same difficulty applies to the implicated bits of meaning – they are nonpropositional on their own and need to be embedded in some other representation in order to be truth evaluable. What could this representation be? The best candidate would seem to be the complete form 'Jane didn't pass enough university course units to qualify for second year study', etc. But, if so, either the utterance has no explicature at all or the explicit content is duplicated by or contained within an implicature of the utterance.

I try to establish criteria for distinguishing explicature and implicature so that such apparent enigmas as the above may be resolved. On the one hand, I suggest a criterion of functional independence of explicatures, which ensures that what counts as an explicature isn't arbitrarily confined to linguistic sense plus reference assignment and disambiguation. On the other hand, we need constraints on the process of enrichment of the linguistic sense in building the explicature of the utterance, to ensure that the explicature is not overextended so as to include information properly understood as implicit. However, while it is instructive to consider such criteria, they might well be seen as rather superficial, descriptive principles, if not *ad hoc*. It would be more satisfying to find that they are consequences of some more explanatory psychological principle or principles. This is indeed so; they follow from a single principle directing utterance interpretation, the principle of relevance, which is itself embedded in a general theory of human cognition and communication, the relevance theory of Sperber & Wilson (1986),<sup>3</sup> so they need not be separately stated. In the light of the relevance-theoretic framework I reconsider some examples standardly treated as generalised conversational implicatures and show them instead to be cases of explicature. One nice outcome of this reanalysis is that a previously intractable problem for the semantics/pragmatics distinction dissolves, having been caused by the erroneous implicature analysis. And, finally, this work brings into high relief the mistaken assumption of many truth-theoretic semanticists that the proper domain of truth conditional semantics is natural language sentences, rather than mental language sentences. A distinction must be made between linguistic semantics and truth-theoretic semantics.

## 2 Implicatures

Let's start with conversational implicature, which is what has galvanised work in the new field of pragmatics. Grice established the idea first by setting

distinct propositional forms (see note 2 of this chapter) with their own truth conditions and they function independently of the explicature as the premises and conclusions of arguments. So we have a further property of any assumption conveyed by an utterance that we would want to call an implicature: as well as cancellability (without contradiction) and calculability, there is the independent functioning of these forms in the inferences involved in deriving the full import of an utterance. Any such requirement on implicatures naturally places an identical requirement on the explicatures of the utterance. They too are assumptions which occupy independent roles in the mental life of the hearer (and no doubt of the speaker as well): they must function as autonomous premises in inferential interactions with other assumptions and must be stored in memory as separate assumptions. In fact this is the crucial property, since cancellability and calculability are properties of any and all aspects of utterance meaning which are derived pragmatically rather than via a process of linguistic decoding. Thus the results of disambiguation and reference assignment, which are standardly acknowledged as involved in establishing the explicature of an utterance, are also cancellable and calculable. This functional autonomy property decides in favour of extending the explicature of (1) to include the explanation of what Jane didn't get enough units for and what she cannot continue, since otherwise the explicature is entailed by the implicature and thus is redundant, playing no independent role in inference. This third property proves decisive later when we face problem cases, one of which is exemplified by the casual connection between the conjuncts in (1).<sup>5</sup> However, in the end, this property is no more than a useful heuristic, as we shall see in section 5.

Having introduced the pragmatic maxims and the notion of conversational implicature by using these highly context-dependent cases (particularised conversational implicatures), Grice went on to consider the group he calls generalised conversational implicatures. While particularised implicatures are 'carried by saying that *p* on a particular occasion in virtue of special features of the context,' generalised implicatures are those 'normally carried by saying that *p*' no matter what the context is (Grice 1975: 56). A set of familiar instances of these, some of which will be reconsidered in this paper, is given in (4)–(9). In each case (a) is the sentence uttered by the speaker and (b), or (b) and (c) in (9), is the generalised conversational implicature which would be standardly conveyed by an utterance of the sentence.

- (4) a. She gave him her key *and* he opened the door  
 b. She gave him her key and then he opened the door
- (5) a. Mr Jones has been insulted *and* he's going to resign  
 b. Mr Jones has been insulted and as a result he's going to resign
- (6) a. Mrs Smith has *three* children  
 b. Mrs Smith has no more than three children

- (7) a. *Some* of the students passed the exam  
 b. Not all of the students passed the exam
- (8) a. She's a *competent* pianist  
 b. She's not a brilliant pianist
- (9) a. Bill is ill *or* he's working at home  
 b. Bill isn't both ill and working at home  
 c. The speaker doesn't know whether or not Bill is ill

Grice was interested in a pragmatic explanation for these aspects of meaning as a counter to the prevailing tendency at the time to postulate a large number of distinct but related senses for a word, multiple ambiguities. Given the notion of generalised conversational implicature he could maintain that the semantics of natural language *and* is identical with logical conjunction.

### 3 *And*

Let us first remove the lexical ambiguity view from the debate on the appropriate treatment of these *and* cases by quickly running through some evidence against it. Firstly, if one is going to go for ambiguity, then *and* is going to be many more than three ways ambiguous and some of these ways are actually going to contradict one another:

- (10) a. Mary was in the kitchen and she was listening to the radio  
 b. He fell into a deep sleep and dreamed that he was flying  
 c. We investigated the problem and it was far more complex than expected

If we consider the examples in (10) together with the two we already have in (4) and (5) we find three different temporal notions: successivity in (4), simultaneity in (10a) and some sort of temporal containment in (10b). Then in (10c) there is some sort of resultant sense as there is in (5), but they are different: in (5) the one event is a cause of the other or at least gives a reason for the other. But in (10c) the fact that the problem proved far more complex than expected isn't caused by our investigating it, and our investigating it isn't a reason for its being more complex than expected. The more such examples one looks at, the less plausible it seems that what we have here are a range of subtly different meanings of the word *and*. Rather, these meanings are the result of the way our minds organise information into connected scenarios or scripts, making a variety of connections amongst events and states of affairs in the world (that variety doubtless determined by innate constraints on our powers of conceptualisation). So we relate events temporally, causally and for that matter spatially (in (10a), for example, we naturally assume that the listening of the radio was going on in the kitchen) whenever it seems reasonable to do so. It seems that this must be the outcome of general properties of the mind rather than the meaning of *and*, since if we take out all the *ands* in the examples and put in instead a full-stop

or a pause, we find ourselves making exactly the same temporal and causal connections.

This strongly indicates that the account of the temporal, etc., connotations be a pragmatic one. Grice has given such an account explicitly for the temporal case invoking the submaxim, 'Be orderly', of the general maxim of Manner, 'Be perspicuous'. He says '... if what one is engaged upon is a narrative (if one is talking about events), then the most orderly manner for a narration of events is an order that corresponds to the order in which they took place. So the meaning of the expression "He took off his trousers and he got into bed" and the corresponding expression with a logician's constant "&" would be exactly the same' (Grice 1981: 186). That is, both acquire, by the act of utterance, the implication that the event related in the first conjunct took place before that related in the second one. Grice does not discuss the further causal sense of examples such as (5) and (1) and it's less easy to see how the explanation would go using his maxims. A co-operative speaker should not present a hearer with a sequence of events which any normal human being would assume to be causally connected if she does not intend this assumption to be made. A more substantial explanation than this is desirable and is possible with a properly developed principle of relevance (see section 5).

Grice has undoubtedly established a strong case for the pragmatic treatment of these aspects of conveyed meaning; it tends to be assumed that they are therefore implicated. Linguists, such as Gazdar (1979), Horn (1972, 1984) and Levinson (1983), who took up Grice's principles, have written as if any meaning not derived by linguistic decoding must be implicated. However, everyone acknowledges that deriving the explicature depends on reference assignment and disambiguation; as several people have pointed out (Katz 1972, Walker 1975 and Wilson & Sperber 1981), these are processes which are just as dependent on context and pragmatic principles as is the derivation of implicatures. So there simply is not a neat correlation between a semantics/pragmatics distinction and an explicating/implicating distinction. The (tacit) assumption of most pragmatists then is that there is a small gap between sentence sense and explicature, but that it is entirely filled by disambiguation and reference assignment. Why should this be so? It seems a rather arbitrary and unprincipled assumption and will be shown to be in fact false. Given that the maxims make some contribution to determining the explicature, it is an open question how great their contribution is. In particular, given that we are rejecting the semantic ambiguity account of conjoined utterances, it is an open question whether those aspects of their interpretation that are pragmatically determined are explicatured or implicated. It seems that an account at either level is possible.

A pragmatic account at the explicature level might go as follows. In determining what the speaker of (4a) has explicatured, the hearer must assign a reference to each of the referring expressions, including the past tense *gave*

and *opened*. Just as pragmatic principles are employed in ascertaining the referents of *she* and *he*, so they are used in assigning temporal reference. The hearer goes beyond the strict semantic content of the sentence uttered, and on the basis of contextual assumptions and pragmatic principles (say the maxims of relation and manner) recovers from (4a), at the level of explicature, a representation such as (11):

- (11) She<sub>1</sub> gave him<sub>2</sub> [her<sub>1</sub> key]<sub>3</sub> at *t* and he<sub>2</sub> opened the door at *t+n* using [the key]<sub>3</sub>

Now this is a conceptual representation whose properties can be shown only roughly by this index-boosted linguistic representation. The indexed pronouns should be understood as indicating uniquely referring concepts rather than as simply showing coreference; one could replace the pronouns by proper names, say *Mary* and *Bill*, but, although these are more specific referring expressions than pronouns, some further means of indicating the particular *Mary* and the particular *Bill* would be necessary. *t* is some more or less specific time prior to the time of utterance and *t+n* is some more or less specific time, later than *t*. The temporal ordering of the events described in conjuncts is thus treated as a by-product of the reference assignment process involved in determining the explicature.

The representation in (11) might reasonably be taken to imply that (4a) contains some linguistic devices referring to instants of time analogous with pronouns that make particular references. Pierre Jacob (personal communication) says that it is not at all clear that the way tensed verbs refer to times is comparable to the way pronouns refer to persons, and that (4a) does not express conjoined singular propositions with respect to times but rather existentially (hence general) conjoined propositions as in (12):

- (12) (∃ *t*, *t'*) (She<sub>1</sub> gave him<sub>2</sub> [her<sub>1</sub> key]<sub>3</sub> at *t* and he<sub>2</sub> opened the door at *t'* with [the key]<sub>3</sub> and *t* precedes *t'*)

It seems to me that this will depend on the particular context of utterance; (12) is the least specific possibility, derived in a context where all that matters is the order of some events. More often, though, hearers will narrow down the time spans to some probable period along the line from the beginning of time to the moment of utterance.

Partee (1973) finds a range of parallels in the use of pronouns and tenses. Discussing the example *I didn't turn off the stove* she says 'When uttered, for instance, halfway down the turnpike, such a sentence does not mean that there exists some time in the past at which I did not turn off the stove or that there exists no time in the past at which I turned off the stove. The sentence clearly refers to a particular time – not a particular instant, most likely, but a definite interval whose identity is generally clear from the extralinguistic context' (Partee 1973: 602–3). As she acknowledges in a footnote, the narrowing down to the relevant time is explainable pragmatically, so it is not the sentence that picks out the time interval but the explicature of the utterance. The most reasonable construal of Jacob's suggestion, then, is that it concerns

for this is that the former can be seen as a by-product of the reference assignment process which is necessarily involved in deriving the explicature of the utterance. Ambiguities and referring expressions can be seen as instructions given by the grammar to carry out some process of choosing or specifying in order to derive a propositional form. There is no grammatical device in (5) that sets up a further slot to be filled, or that directs any fuller articulation of the relation between the events of the two conjuncts, which might lead to the specification of a causal relation. The assumption that the relation exists is a result of general world knowledge about human feelings and behaviour, mentally represented as scripts about the nature and effects of insults and of resigning from jobs. So it might well be felt that the causal relation is implicated and not part of the explicature. We could dub the assumption guiding this decision the 'linguistic (or grammatical) direction' principle. It should be distinguished from the linguistic encoding of conceptual content. Linguistic direction includes this but also covers cases such as pronouns, tenses, and empty grammatical categories which are indicators delivered by the grammar that some pragmatic work is needed to derive some conceptual content from the context. On this principle, the causal connection is implicated because the grammar does not deliver a relational variable instructing the hearer to find a relevant connection. This is clearly at odds with the prediction made by the criterion of functional independence, which, again, would favour an explicature analysis. Before pronouncing further on this case, which raises more problems than the temporal one, let us retreat a few steps and consider a little more closely what is meant by an explicature and whether explicatures in general respect the linguistic direction principle.

#### 4 Explicatures

As already noted, most pragmatists working in the Gricean framework have adopted as a working principle the view that any pragmatically determined aspect of utterance interpretation, apart from disambiguation and reference assignment, is necessarily an implicature. The explanation for cutting things this way lies with the further assumption that the explicature must be truth-evaluable; so Grice and the Griceans are prepared to let in just whatever is necessary in addition to linguistically determined content to bring the representation up to a complete propositional form, that is, something capable of bearing a truth value. On this basis even the temporal ordering information is not strictly part of the explicature, since a truth-evaluable proposition is derived without it: (4a) can be said to be true provided the two events took place at some time in the past, never mind the order of the events. However, as a consequence of reference assignment it might be countenanced as part of the explicature.

In general the linguistic direction principle and the minimally truth-

the linguistic sense of the sentence, which should be taken to include these time variables bound by an existential quantifier, that is (12) above without the indices and without the clause specifying temporal ordering, and that it is left to pragmatic considerations whether and to what extent the time span is specified. In this respect the semantics of tense is parallel with that of indefinite pronouns rather than personal pronouns: *Someone has eaten the cake* might be understood as some specific person, say Bill, in some contexts, and as simply indefinite in others. The linguistic device of tense does not pre-empt the accessing of particular times but nor does it preclude the possibility. It may well be that neither (11) nor (12) captures this satisfactorily. However, this is a notational problem which arises whether one opts for an explicature or an implicature analysis of temporal connotations and as such does not affect the possibility of an explicature analysis.

Finally, notice that we also understand (4a) as saying that the key *he* used to open the door is the one *she* gave him, although this too goes beyond the linguistically given sense. This is simply the most plausible interpretation to give the second conjunct since the speaker has chosen to conjoin it to the first one. If she hadn't meant us to understand this, she should have supplied the information that another key was used. This completion of sense is similar to that proposed for (1), and is discussed further below.

So once the semantic ambiguity analysis is ruled out there are two pragmatic accounts possible. We need to see if there is any reason for preferring one to the other. Let's return to the traditional implicature account for (4a) and consider what the explicature of the utterance is on such an account. It must be either (11) or (12) minus the specification of  $t+n$ , or  $t'$ , as later than  $t$ . Then, assuming that the implicature is a conceptual representation with a propositional form, the explicature is entailed by the implicature. If the implicated assumption is stored in memory the implicated assumption need not be, since all the information given by the latter is also given by the former. Further, whatever role the implicated assumption might play in chains of reasoning the implicated assumption could also play, as well as giving rise to the extra possibilities hinging on its encoding of the temporal ordering. In other words whatever the explicature can do, so can the implicature plus more. The explicature has no function in mental life that can't be played by the implicature. By the criterion of functional independence proposed earlier, the explicature analysis of temporal sequence is favoured. It will shortly be shown that this conclusion is supported by relevance theory predictions too and that it sweeps away a problem that the implicature analysis creates.

The question now arises whether this analysis extends to the causal connotations that often accompany uses of *and*, as in (1) and (5). While some theorists seem to be willing to grant the treatment of the temporal ordering as above they balk at the further enrichment of explicit content so as to include the causal relation between the events related in the conjuncts. The reason

evaluable criterion coincide, the one reflecting a more linguistic turn of mind, the other a more philosophical; both assume that the domain of grammar, sentences, and the domain of truth-conditional semantics, propositions, are essentially the same. I want to argue that neither of these is an appropriate principle for a PSYCHOLOGICALLY plausible theory of utterance interpretation, that they give only a sufficient condition for some pragmatically derived meaning to be an aspect of the explicature, not a necessary one, and that the domains of grammar and of truth-conditional semantics are not the same.

As soon as one looks at real utterances, it becomes apparent that pragmatic principles may have much more to do in establishing what has been explicated than just assigning reference and disambiguation. Supplying clipped material is an obvious case of under-specification by linguistic meaning, so phrasal or lexical utterances such as *On the table*, *Telephone*, are standardly instantly understood as conveying complete propositions – a large portion of which has clearly been pragmatically derived. It can be argued that this is in line with the truth-evaluability requirement and the linguistic direction requirement, since linguistic decoding might well deliver up a representation such as (13):

(13)  $s_{[NP[e] VP[v[e] PP[on\ the\ table]]]}$

thereby directing the supply of further material by pragmatic processing. The completion of (1) could be directed in the same way, if the verb *continue* is subcategorised for a following NP.

For my purposes the more interesting cases are those which have the following three properties: linguistic meaning, reference assignment and disambiguation DO supply a complete (hence truth-evaluable) proposition, the grammar does NOT generate variables instructing further filling in, and yet the proposition is still too underspecified to be taken as the explicature of the utterance:

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

Consider (14a); the logical form of this is existentially quantified over distances and requires just reference fixing (of *I* and *the park*) to be fully propositional, that is, capable of bearing a truth value. It's doubtless generally true that there is a distance (of some length or other) between the speaker's home and the park referred to, but it's very unlikely that that's what a speaker wants to convey on a given occasion of utterance or that that's what a hearer would take her to be explicating. This is what linguistic decoding and reference assignment alone retrieve but it is seldom going to be a claim worth making; it wouldn't tell a hearer anything he didn't already know. If this was all the speaker was saying, she wouldn't be observing pragmatic principles which enjoin relevance and informativeness. The particular proposition expressed by (14a) will depend on the particular context, which must be such that it is worth remarking on the distance. One possibility is that the speaker thinks the hearer is underestimating it, in which case

the explicature would be something like 'The park is further away from where I live than you think' or 'The park isn't a walkable distance from my house'.

Philosophers and pragmatists who subscribe to the principles above want to stop at the weakest propositional form with determinate truth conditions, so in the case of (14a) this would simply be the truth that there is a distance between the park and my house, and any other conveyed meaning is an implicature. But what function then does the explicature have in the mental life of the hearer? It is entailed by the implicature: if the park is further away from my house than the hearer had been assuming, it follows that it is some distance or other from my house. When this entailment relation holds between putative implicature and explicature the probability of functional independence of the two propositional forms is very low. What the hearer is going to remember from this utterance is some estimate of the distance involved, not the fact that there is a distance, and any inferences he draws on the basis of the utterance will involve the proposition concerning this amount of distance, rather than the basic proposition concerning the existence of a distance, a truism which has long been an assumption he has subscribed to. So, again in conformity with the functional independence criterion, this more fully specified proposition must be understood as explicated. The same argument applies to (14b). It's difficult to see any justification for a principle along the lines of 'use the maxims just in order to get a minimally truth-bearing vehicle'. This is to ignore the nature of communication and of cognition in general in the interests of a formal principle which has absolutely no bearing on human psychology.

As Diane Blakemore has impressed upon me, the building in of extra information of one sort or another is quite pervasive; consider the following examples:

- (15) a. He ran to the edge of the cliff and jumped  
 b. I went to the exhibition and ran into John  
 c. She took the gun, walked into the garden and killed her mother  
 d. I had a holiday in Austria and did some cross-country skiing

The interpretation of (15a) in most contexts of utterance will include the understanding that he jumped over the cliff although there's no linguistic expression there telling us this or requiring us to fill in a prepositional phrase. The verb *jump* is not subcategorised for an obligatory following PP. Similarly, in (15b) we would most likely assume that the place where I ran into John was the exhibition, in (15c) that the killing of the mother was with the gun and took place in the garden, and in (15d) that the skiing referred to took place in Austria, although, again, the linguistic content of the utterances does not supply this information or direct its retrieval. The same point can be made regarding the PP *with a key* which is supplied in the interpretation of (4). In each case this is simply the most natural interpretation to give and a



speaker who didn't intend this would simply not be observing the maxim of relation. Since the form with the additional prepositional phrase entails the form without in each case, the criterion of functional independence would again choose the enriched form as the explicature of the utterance rather than as an implicature.

It does not seem, then, that the pragmatically derived enrichments of the linguistically given meaning are confined to following instructions delivered by the grammar, such as finding pronominal or temporal referents. Given this, the absence of a linguistic device directing retrieval of a causal relation in (3a) need not deter an enrichment along these lines in determining the explicature of the utterance. Although it is truth-evaluable without our supposing any particular connection between the events, the most natural interpretation, in the vast majority of contexts, is one in which these events are part of a scenario in which they are both temporally and causally connected. We might represent this causal connection as in (11) or (12) above; also of course have to be temporally specified as in (11) or (12) above):

- (16) [[Mr Jones]<sub>i</sub> has been insulted]<sub>p</sub> and because of p [he's]<sub>i</sub> going to resign

As with (4) there are two possible pragmatic analyses. The cancellability and calculability criteria apply to all pragmatically derived material, whether at the level of explicature or implicature, so cannot help us. The tacitly assumed criteria for determining explicatures (or what is said) do not help either: both the minimal truth-evaluability criterion and the linguistic direction criterion have been shown insufficient to account for a range of cases; fulfilling them places only a lower bound on the process of enrichment. Again the functional independence criterion makes a decision: it dictates that the causally enriched (16) be understood as the explicature, since if it is taken as an implicature of the utterance the explicature is rendered redundant as it is entailed by the implicature. The same line of reasoning applies to the relation between the conjuncts in (1) when it is understood that Susan cannot continue university studies *because* she didn't pass enough course units.<sup>6</sup>

As Kempson (introduction, this volume) points out, the indexicality of natural language has proved far more extensive than truth-theoretic semanticists originally allowed. The term indexical is usually understood as referring to linguistic expressions whose value is dependent on the context in which they are uttered. As the last few examples show, the recovery of the proposition expressed by the utterance of a linguistic form has an even stronger degree of context-dependence than indexicality; some content supplied by the context receives no direction at all from linguistic expressions.

Sperber & Wilson (1986: 182) say that 'an assumption communicated by an utterance U is *explicit* (that is, is an explicature) if and only if it is a development of a logical form encoded by U'. The logical form of the linguistic expression uttered is the semantic representation (or sense) assigned to it by the grammar and recovered in utterance interpretation by an automatic

process of decoding. As we have seen, in a range of examples this logical form is frequently not fully propositional, and a hearer then has the task of completing it to recover the fully propositional form that the speaker intended to convey. While any communicated assumption is either an explicature or an implicature, it is clear that an explicature may be more or less explicit since it is a combination of linguistically encoded and contextually inferred features. There is always a linguistic contribution, but this contribution varies from near total determination of the explicature to a very small role, as shown by the following examples:

- (17) a. The sun will rise at 5.25 am on May 15 1990  
 b. Susan's performance isn't good enough  
 c. She took it  
 d. At home  
 e. Later

Understanding these requires various amounts of disambiguation, reference assignment, enrichment (e.g. not good enough for what, in (b)) and completion, in accordance with the pragmatic principles. The explicature in (17a) is highly explicit while that in (c) is much less so and (e) even less.<sup>7</sup>

We might worry a little about what constitutes a development of a logical form. A list of allowed developments could be made: reference assignment, disambiguation, specification of vague terms, supplying empty grammatical categories with conceptual content, building in certain relations between events and states. Obviously, though, it would be better if we could find something more explanatory to say than this. The temporal and causal connections standardly derived in interpreting conjunctions such as (4) and (5), which were formerly treated as generalised conversational implicatures, now fall under the definition of explicature. What is to stop all elements of communicated meaning being interpreted as parts of the explicature? Whole further assumptions might be tacked on: for instance, it might be claimed that the explicature of (3) is 'I don't read autobiographies and Susan's book is an autobiography' (referring expressions more fully specified of course). This surely is a development of the logical form of the utterance. In other words, while truth-evaluability sets a lower bound on the process of development there doesn't seem to be an upper bound. We might try setting up constraints, such as prohibition on any development which involves a logical form independent of the original one and so has a range of entailments of its own distinct from those of the original logic form of the utterance. Alternatively, we might exclude any development which is entirely detachable by a logical rule such as *and*-elimination. It is unlikely that these will be foolproof: although 'I don't read autobiographies' and 'Susan's book is an autobiography' do have largely distinct entailments they may have some in common, 'Autobiographies exist' for instance, and in general such a constraint is likely to be too strong. While a development involving adding the proposition 'Susan's book is an autobiography' is detachable by *and*-

elimination, it may be argued that the proposed explicature need not be understood as a conjunction: 'I don't read autobiographies of which Susan's book is an instance'. However, playing around any further with these possibilities is unnecessary, since the principle of relevance which drives the interpretation process can be shown to impose the supposed missing upper bound. I turn to that now.

## 5 The principle of relevance

One of Grice's maxims is the instruction to speakers to 'Be relevant'. He recognised that much work needed to be done to develop this principle; Sperber & Wilson (1986) have done this work. Only the merest indication of their theory can be given here (see note 3 of this chapter).

Utterances are one of a great range of stimuli that impinge on humans; they have the special property of being ostensive, that is, they call attention to themselves in a particular way. Ostensive stimuli make evident to a receiver the intention of the communicator to make it evident that she intends to inform the receiver of something. So an addressee is justified in expecting some significance from ostensive stimuli that he cannot expect from non-ostensive stimuli which he may attend to. He cannot expect an ostensive stimulus to achieve a certain level of *relevance*.

A phenomenon is said to be relevant to an individual if it has certain cognitive effects for that individual. There are three kinds of such cognitive effects: (1) interaction with assumptions in the individual's mental context to yield new implications (Sperber & Wilson call this *contextual implications*), (2) contradiction of an existing assumption which leads to its being abandoned, and (3) providing additional evidence for an existing assumption and so strengthening the individual's confidence in it. Clearly, then, relevance is a matter of degree: the more cognitive effects a phenomenon has the more relevant it is. This is offset, however, by a factor of processing costs: one doesn't go on endlessly processing a new piece of information, checking through all one's existing assumptions to see if it interacts with them, but abandons the endeavour when the returns threaten not to offset the effort. So there are two parts to defining relevance: the more cognitive effects a phenomenon has the more relevant it is, and the less the effort required to process a phenomenon the more relevant it is.

Utterances, and ostensive stimuli in general, come with a guarantee of *optimal relevance*: a guarantee that the cognitive effects the speaker intends the stimulus to have are sufficiently great to make it worth the hearer's while to process it, and that the stimulus is the least costly in terms of processing effort that the speaker could have chosen to have these effects. Finally, then, the *principle of relevance* states: every act of ostensive communication communicates a guarantee of its own optimal relevance. In comprehending an utterance a hearer must find an interpretation which is *consistent with the*

*principle of relevance*, where this is defined as an interpretation which 'a rational communicator might have expected to be optimally relevant to the addressee' (Sperber & Wilson 1986: 166). The first interpretation which the hearer finds to be consistent with the principle of relevance is taken to be the correct one, the one intended by the speaker. Obviously the first interpretation arrived at is the least costly one in terms of processing effort so, provided it has an adequate range of cognitive (or contextual) effects and it could have been intended by the speaker,<sup>8</sup> it is the only interpretation consistent with the principle of relevance. There is always at most one interpretation consistent with the principle of relevance. Sperber & Wilson (1986) show that this single principle, resting on a general theory of relevance, is sufficient to account for all pragmatic aspects of utterance interpretation and that it subsumes Grice's maxims.<sup>9</sup>

Let us consider how this principle might constrain the process of developing logical forms into explicatures so that they are not over enriched, encroaching on the territory of implicature. Firstly, we need some idea of what's involved in incurring processing costs. Linguistic decoding takes variable amounts of processing effort dependent on length and structural complexity of the expressions used. Interpreting an utterance requires the setting up of a context of assumptions within which to assess the cognitive impact of the utterance (some subset of the set of all our pre-existing assumptions and perhaps others constructed on the spot). The processing effort required for this varies from individual to individual and from utterance to utterance, the less accessible the assumptions needed, the more the effort involved in assembling them. The interaction of the context and the explicature involves a variable number of applications of a variable number of inference rules, the more of each the greater the processing costs.

We made the reasonable assumption above that the speaker in uttering (3) was implicating the assumption that Susan's book is an autobiography and the conclusion that she hasn't read it; surely if anything qualifies as implicature these do. But the definition of explicature that we have seems to allow the attachment of these to the logical form of the utterance as part of the development process. It might seem that we need to define the notion *development of a logical form* more closely. However, this is unnecessary. The rule that derives the implicated conclusion is a synthetic one, that is, a rule which takes two separate assumptions as its input, a universal of the form 'All *X* are *Y*' (in this case, a property is predicated of all autobiographies) and a singular of the form '*n* is *X*', where *n* picks out an individual (in this case, a particular autobiography). If the explicature had been developed into a conjunction of the enriched logical form and the retrieved assumption that Susan's book is an autobiography, the conjuncts would simply have to be detached by a rule of *and-elimination* for the inference to go through. Nothing would have been gained by this development of the logical form of the utterance and a certain amount of effort would have been expended to no

end, that is, the attachment of the assumption immediately followed by its detachment. Since the utterance comes with a guarantee of optimal relevance, no hearer will waste effort in this fashion when the same effects are achievable more economically. Furthermore, a hearer might well go on to draw some conclusions of his own for which the speaker can't be held responsible: for instance, he might be privately of the opinion that people who write autobiographies are egotists and thus conclude that Susan is an egotist. Once again, arriving at this conclusion depends on the independence of the assumption that Susan's book is an autobiography.<sup>10</sup> A wider range of cases is considered in Carston (forthcoming) to demonstrate that the principle of relevance quite generally ensures that redundant overextensions of the explicature do not occur.

Let us consider now the two pragmatic analyses of the temporal connotations of (4a): the one treating (4b) as the explicature of the utterance, the other taking it as an implicated assumption. On an implicature analysis we have a situation in which, schematising, the explicature is '*P* & *Q*' and the implicature is '*P* & then *Q*', that is, the implicature entails the explicature, so that any role that the explicature might have in memory or in reasoning processes could almost certainly be performed by the implicature, which is richer in content. So the principle of functional independence favours taking '*P* & then *Q*' as the explicature of the utterance. The same goes for the causal connotations of (5a): the explicature is either '*P* & *Q*' or '*P* & then as a result *Q*', with the latter favoured by functional independence.

What does the criterion of consistency with the principle of relevance have to say about these cases? It is clearly more economical to derive the single assumption '*P* & then *Q*' rather than both '*P* & *Q*' and '*P* & then *Q*', and whatever contextual effects '*P* & *Q*' gives rise to so will '*P* & then *Q*', as well as having the potential for more. Let us suppose that on a given occasion of utterance the most accessible context for interpreting (4a) is one which contains an assumption of the form 'If *Q* then *R*', say 'If he<sub>2</sub> opened the door he<sub>2</sub> must have seen the dead man' then the conclusion *R*, 'He<sub>2</sub> must have seen the dead man', is derived as a result of *and*-elimination performed on either '*P* & *Q*' or '*P* & then *Q*' with the appropriate detached assumption and the contextual assumption functioning as premises in an application of *modus ponens*. Let us suppose further that in deriving an adequate range of effects the proposition concerning the sequence of events is crucial, interacting with a contextual assumption of the form 'If *P* & then *Q* then *S*' to give the implication *S*. In general, whatever constitutes an adequate range of contextual effects, they can be derived entirely from the single assumption '*P* & then *Q*', which is more economical to derive and manipulate than the two assumptions. In fact if '*P* & then *Q*' were understood as an implicated assumption the derivation of *S* would follow from contextual assumptions alone. Then it would not qualify as a contextual implication since a contextual implication is defined as following from the propositional content of the

utterance and the propositional content of the context together, but from neither alone (Sperber & Wilson 1986: 107–8). So it would not count as a contextual effect involved in establishing the relevance of the utterance, which, however, it clearly is. So not only does the criterion of consistency with the principle of relevance predict that the explicature of the utterance is '*P* & then *Q*' the relevance-theoretic framework actually precludes an implicature analysis.

The argument for the inclusion of the causal connotations at the level of explicature will run in exactly the same way as will any case in which a putative generalised conversational implicature renders the putative explicature of the utterance functionally inert. Clearly then the guarantee of optimal relevance subsumes the predictions of the earlier functional independence guideline. In all aspects of utterance interpretation considerations of optimal relevance play a vital constraining and enriching role.

## 6 A problem solved

McCawley (1981: 6–10) points out that a question such as:

(18) Did John get up and fall down?

might be answered either *Yes* or *No* if the hearer knows that John in fact first fell down and then got back up. His choice would depend on whether the speaker is taken to have asked a symmetric-*and* question (Did John perform these two activities?) or a consecutive-*and* question (Did John perform these two activities in that order?), a choice dependent on context. McCawley, by the way, saw this as evidence for a lexical ambiguity at work, since a standard test for ambiguity at that time was to see if a sentence could be said to be simultaneously true and false with regard to exactly the same condition in the world. We are assuming that the semantic ambiguity of *and* is no longer a viable position, and will argue in the final section that this ambiguity test does not work: truth-conditional ambiguity cannot be used to establish the semantic ambiguity of a word, resting as it does on a conflation of natural language sentences with propositional forms. Horn (1984) recognises the pragmatic processing involved in deriving the temporal connotations but, being of the pragmatic=implicature persuasion, says that a negative answer to the question must be construed as taking into account the conversational implicature associated with *and*. But this is an odd sort of thing for the answerer of a question to do. In effect, what Horn is saying is that the hearer answers an implicated question rather than what he takes to be asked at the explicit level. The relevance-theoretic treatment of such a case would of course take the asymmetric conjunction to be the explicature and the answer *No* to be addressed to the question explicitly asked.

Grice (1967) noted a similar problem with the implicature account.<sup>11</sup> On that account, a denial of a conjoined utterance would sometimes apply only to what has been implicated and not to what has been explicated.

Taking an adaptation of his example (2), consider the following exchange, where (19a), in context implicates (20):

- (19) a. A: Jones has made a lot of visits to New York lately  
 b. B: No he hasn't

(20) Jones probably has a girlfriend in New York

The question is whether (19b) could be taken to bear, not on the explicit content of (19a), but only on its implicature (20), leaving the truth of (19a) intact. Surely the answer is no. Yet the implicature analysis of conjunctions predicts that denials can sometimes bear only on what is implicated. So consider (21b) and (21c) as replies to (21a), for example:

- (21) a. A: She gave him the key and he opened the door  
 b. B: No. He opened the door before she gave him the key  
 c. B: No. He opened the door and then she gave him the key

On the implicature analysis the denials in (21b) and (21c) would bear not on what has been explicated but on the alleged implicature. Both (21b) and (21c) concede that the two actions occurred, and deny only the alleged implicature that her action preceded his. Again this doesn't seem right. Only the explicature analysis of the temporal connotations, predicted by relevance theory, satisfies the intuition that these cases of denials and answers to questions do not refer to implicatures alone, totally ignoring explicit content, and it does so without having to attribute an unwarranted ambiguity to the lexical item *and*.

However, although the point holds for these particular examples it may well be that when we take a detailed look at denials there are instances where it is the implicature of an utterance that has the main relevance and that a denial response generally refers to the most highly relevant propositional form conveyed by the utterance.<sup>12</sup> The strongest evidence against an implicature analysis, usually presented by those who favour a lexical ambiguity, takes a slightly different form. It seems that the alleged implicatures of conjoined utterances fall within the scope of such logical operators as negation, disjunction, comparison and conditionals. Even advocates of the implicature approach, including Grice, have seen such cases as very worrying:

- (22) a. If the old king died of a heart attack and a republic was declared Sam will be happy, but if a republic was declared and the old king died of a heart attack Sam will be unhappy  
 (adapted from Cohen 1971)

- b. He didn't steal some money and go to the bank; he went to the bank and stole some money  
 (adapted from Gazdar 1980)

- c. It's better to meet the love of your life and get married than to get married and meet the love of your life  
 (D. Wilson)

- d. Either she became an alcoholic and her husband left her or he left her and she became an alcoholic; I'm not sure which

As Cohen (1971) has pointed out, if *and* is simply truth-functional and the temporal and causal connotations are captured by implicatures, then (22a) and (22b) should be contradictory at the level of explicit content (instantiating 'If *P* then *Q* but if *P* then not *Q*', and 'Not *P*; *P*' respectively).<sup>13</sup> Similarly, (22c) should be a nonsensical (equivalent to 'It's better to *P* than *P*') and (22d) redundant (equivalent to 'either *P* or *P*'). However, these examples are not understood as contradictory or redundant. Those who wish to maintain an implicature analysis have to say that the alleged temporal and causal implicatures contribute to the truth conditions of the utterance in which they occur, that is, to the explicit content (what is said) since they follow Grice in the view that the explicature is another term for the truth-conditional content of the utterance. This conclusion sits uneasily in his general framework, where the sole determinants of explicit content are supposed to be the sense of the sentence uttered, disambiguation and reference assignment. It looks as if the implicaturist is driving himself into a corner in which the only position left to him is that the implicatures of conjoined subordinate clauses contribute to the meaning of *sentences* – not just utterances – in which they occur. This looks like a *reductio ad absurdum* of the implicature analysis.

Pragmatists generally see only two ways in which to try to cope with these facts: either to reject the implicature analysis and to find a semantic solution, the ambiguity one or Cohen's (1971) boosted semantic account (see note 13 of this chapter); or to assume that, since the implicature analysis must be right, some solution to the problems it raises has to be sought. However, as this chapter shows, there is a third option: a pragmatic account in which the temporal and causal connotations of conjoined utterances, along with many other aspects of nonlinguistically determined meaning, are recovered at the level of explicit content. Given this position the problems we have been contemplating disappear: if these connotations are determined at the level of explicature, then it is not surprising to find them falling within the scope of denials, negation, conditionals, disjunctions, etc., and contributing to the truth conditions of complex utterances in which they occur. Happily, as we've seen, this explicature position is independently supported and predicted by the pragmatic principles of relevance theory.

## 7 Generalised quantity implicatures?

I have concentrated in this paper on a very small range of examples but the point is intended to be quite general. Pragmatic processing makes a far greater contribution to determining explicit content than has generally been assumed. One consequence for pragmatics is that it should not automatically be assumed that every pragmatically determined aspect of utterance mean-

Understood as 'exactly three books by Chomsky' the utterance in (25a) may be true while understood as 'at least three' it may be false, in the same set of circumstances. This is no problem for the explicature analysis, indeed it is predicted, while it creates an apparently unresolvable problem for the implicature approach as shown in the previous section. Similarly, the implicature approach leads to the paradox that both (25b) and (25c) are consistent statements, although at the explicit level in both cases *three* has to be understood as 'at least three'.<sup>15</sup> Again there is no paradox in the explicature approach, since the sense of *three* is simply augmented differently at that level in the two cases.

The same line of reasoning leads to a reanalysis of the alleged implicatures in (7)–(9) as aspects of explicit content.

## 8 Two kinds of semantics

Grice introduced the maxims governing conversation and giving rise to implicatures in order to channel off as much of utterance meaning as possible into pragmatics, leaving as spare a semantics as possible. The semantics at issue was the sense of words in natural language such as *and*, *or*, *if*, quantifiers, etc. which seemed to diverge from that of their counterparts in formal logic. A second interest of his was to distinguish the truth conditional content of an utterance from the non-truth-conditional, that is, to determine that on the basis of which the speaker can be judged to have spoken truly or falsely. So, for example, two sentences of the forms: 'P and Q' and 'P but Q', are taken to have identical truth conditions although there is clearly some crucial difference in linguistic sense between the two (see note 7 of this chapter). Not all grammatically given information, then, is part of the logical form of the utterance. For Grice the first concern is simply a part of the second, so that if it can be shown that some aspect of meaning is pragmatically derived, such as the temporal and causal connotations of *and*, it is not to be attributed to the semantics of the term but is an implicature and makes no contribution to the truth conditions of the sentence/utterance.

It should be clear by now that this equation of linguistic sense with truth-conditional semantics simply won't work, that while linguistic sense makes a crucial contribution to truth conditions it almost never supplies a truth evaluable propositional form. As long as linguistic sense and truth-conditional semantics are not distinguished, Grice's two concerns are at odds with each other, pulling in opposite directions: disambiguation, reference assignment, recovery of ellipsed material are all pragmatically driven processes, so the content derived by them should not contribute to the truth-conditional content of the utterance, but if this is so then most utterances do not have any truth conditions, a conclusion which no one would endorse.

Pragmatists in the Gricean tradition have generally followed his example, more or less equating linguistic sense and truth-conditional content (Gazdar 1979, 1980; Levinson 1983; Posner 1980) and, assuming the formula

ing is an implicature. Many examples of generalised conversational implicature should be reconsidered in the light of relevance theory; there is not space here to deal adequately with examples (6)–(9), though a brief discussion will indicate the direction a full analysis would take.<sup>14</sup> The standard approach is represented by Horn (1972) who has a notion of scales of predicates arranged in order by degree of informativeness or semantic strength:

- (23) a. <... few, some, many, most, all>  
 b. <... three, four, five...>  
 c. <or, and>

A simple sentence containing an item on the scale entails another simple sentence which differs from the first only in containing an item lower on the scale. The reverse is not the case. So (24a) entails (24b) and (24b) does not entail (24a). However, when used in conversation such sentences frequently strongly suggest the negation of sentences in which a word is replaced by an item higher on the scale, so (24a) strongly suggests (24c), though this is cancellable as in (24d):

- (24) a. Mrs Smith has three children  
 b. Mrs Smith has two children  
 c. Mrs Smith does not have four children  
 d. Mrs Smith has three children; indeed she has four altogether

A semantic ambiguity theorist would have to treat all number terms in all languages as having two senses: 'at least x' and 'exactly x' so that in (24d) the 'at least' sense is being used, while in (24a) it is the 'exactly' sense, thus entailing (24c). I reject this for the familiar reasons. On the pragmatic approach of Horn and others, number terms have one sense only, 'at least x', and in many contexts utterances containing them must be understood as implicating 'at most x' in order to preserve the assumption that Grice's Quantity maxim (Be as informative as required) is being observed: the two propositions together give the meaning 'exactly x'. Again this approach is based on the assumption that anything pragmatically derived (apart from reference assignment and disambiguation) is an implicature, an assumption that simply cannot be maintained as I have argued above. We have here another case where an alleged implicature entails the explicature of the utterance: 'Mrs Smith has exactly three children' entails 'Mrs Smith has at least three children', which should immediately alert us to the possibility that the supposedly implicated material is actually part of the explicature. This is the line I would wish to pursue, taking all the numerals as having a single sense, neither an 'at least', an 'at most' nor an 'exactly' sense, these being determined pragmatically at the level of explicit content. This line is again supported by examples of numerical sentences falling within the scope of logical operators:

- (25) a. If there are three books by Chomsky in the shop I'll buy them  
 all  
 b. Mrs Smith doesn't have three children; she has four  
 c. Mrs Smith does have three children; in fact she has four

'pragmatics=meaning – truth conditions'. But faced with examples such as (22a) to (22d), where implicatures seem to contribute to truth conditions, Gazdar (1980: 11) says: 'There is increasing evidence that the semantic component of the theory [of meaning] must sometimes have access to the pragmatic properties of constituent clauses when assigning the truth conditions of compound sentences. This evidence indicates that the semantic component is not autonomous with respect to the pragmatic component.' This is certainly so where by semantics we mean truth-conditional semantics and provided 'pragmatic properties' are not equated with implicatures. Nor is it confined to examples like (22); the truth conditions of the vast majority of utterances depend on input from pragmatic processes, as practically every example above demonstrates.

However, talk of *the* semantic component is misleading, since as we've seen the semantics of a lexical item such as *and* may be unitary and unvarying while the connotations it acquires in utterances may be several and variable, those connotations contributing to the truth-conditional content of utterances. It seems then that we must distinguish two kinds of semantics, linguistic and truth conditional, the former naturally figuring only in a theory of utterance meaning, the latter taking as its domain propositional forms, whether of utterances or unspoken thoughts. 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. Once this distinction is made, the computation to treat all pragmatically derived meaning as implicature subsides; there is no reason why pragmatics cannot contribute to the explicature, the truth-conditional content of the utterance. Whether some particular pragmatically derived meaning is an implicature or not will fall out from the process of finding the interpretation consistent with the principle of relevance.

What does it mean to give a semantic interpretation of an expression in a language? For the truth theorist the answer is obvious: if the expression is a sentence, it is to give its truth conditions; if subsentential, it is to specify the contribution it makes to the truth conditions of sentences. In discussing what constitutes the proper subject matter of semantics, Cresswell (forthcoming) asks the question what sort of ability it is that demonstrates that a speaker knows the meanings of the expressions in a given language, and answers 'The most promising candidate for such an ability seems to be the ability to distinguish situations in which a sentence is true from those in which it is false.'

Sperber & Wilson (1986: 173) take a wider view: 'A formula is semantically interpreted by being put into systematic correspondence with other objects: for example, with the formulas of another language, with states of the user of the language, or with possible states of the world.' Since we are distinguishing natural language sentences and the propositional forms they may be used to express as two different kinds of entity, we might consider the

semantics of each individually. Speakers and hearers map incoming linguistic stimuli onto conceptual representations (logical forms), plausibly viewed themselves as formulas in a (mental) language. The language ability – knowing English – according to this view, is then precisely what Lewis and others have derided (see Kempson's introduction): it is the ability to map linguistic forms onto logical forms matching to a high degree the mappings made by a certain group of others (the speakers of English). In theory this ability could exist without the further capacities involved in matching these with conditions in the world. A computer might be programmed so as to perform perfectly correct translations from English into a logical language without, as Lewis and Searle have said, knowing the first thing about the meaning (=truth conditions) of the English sentence. Distinguishing two kinds of semantics in this way – a translational kind and the truth conditional – shows further that the semantic representation of one language may be a syntactic representation in another, though the chain must end somewhere with formulas related to situations and states of the world or possible worlds.<sup>16</sup>

It may be a biological fact about humans that the two abilities develop in tandem, or that the linguistic ability depends on the other perceptual and pragmatic capacities for its development, but that does not make them the same ability. Cresswell is probably right that the best way to demonstrate that one has knowledge of a language is to show that one can correctly pair up utterances in that language with situations in the world. This does not of course expose the particular abilities involved in this demonstration. The main argument of this paper has been to show that a hearer must do a lot of pragmatic work (which involves quite distinct abilities from his linguistic ones),<sup>17</sup> on the basis of the logical form derived from the linguistic form of the utterance, before he has a representation which is truth-evaluable, and that there is even more to be done before he has *THE* truth-evaluable propositional form he can reasonably take the speaker to have intended to convey.

Cresswell (1982: 69) gives the following as his 'most certain principle' in the field of semantics: if we have two sentences, A and B, and A is true and B is false in exactly the same situation in the world, then A and B do not mean the same. However, this is simply not true of natural language sentences:

- (26) a. Mary hit Bill and Bill fell  
b. Bill fell and Mary hit him

The linguistic semantics of these is identical, given an unambiguous truth-functional semantics for *and* and the standard principle of semantic compositionality, yet a speaker demonstrating her knowledge of language in the way Cresswell prescribes will almost certainly judge them as not both true in the one situation (say, a situation in which Mary hit Bill and as a result he fell over). If there is any doubt about this, embedding them so that they fall within the scope of logical operators as in (22), should dispell it. So it seems that Cresswell's most certain principle is not one concerning linguistic enti-

ties but rather the propositional forms which linguistic forms may be used to express. Similarly, the truth-conditional ambiguity test mentioned in section 6, takes as its domain propositional forms rather than natural language sentences, and cannot lead to conclusions about lexical ambiguities.

The picture we end with has a clear semantics/pragmatics distinction, where semantics is understood as translations of linguistic forms into logical forms, partially articulated conceptual representations which are the output of the grammar. Natural language semantics, then, is autonomous and provides the input to pragmatics, which plays a major role in determining the explicature of an utterance as well as determining implicatures, both of which are distinct and complete propositional forms, and as such are the domain for truth-conditional semantics.<sup>18</sup>

#### NOTES

- 1 For the sake of a simple clear distinction between explicature and implicature I consider only literal assertions in this paper. Thus questions and imperatives are ignored, as are such figurative uses as metaphor and irony. Sperber & Wilson (1986) use the term *propositional form of the utterance* for what I am calling the explicature. Explicatures are assumptions which have two properties: they are explicitly conveyed and the speaker wants to make them manifest to the hearer (that is, available to him as assumptions he can represent to himself as true). An utterance generally has a set of explicatures: this includes the propositional form of the utterance in the case of literal assertions but does not in the case of tropes or non-assertive speech acts.
- 2 The term proposition is a notoriously slippery one. I sidestep the ontological issues it raises and use the term *propositional form* in the sense of Sperber & Wilson (1986: 72–3). A propositional form is a well-formed formula which (a) undergoes formal logical (truth preserving) operations determined by its structure, and (b) is semantically complete in that it is capable of being true or false.
- 3 For summaries of relevance theory see Wilson & Sperber (1986b), Sperber & Wilson (forthcoming) and Wilson & Sperber in this volume.
- 4 The problem of where this implicated assumption comes from is the central unanswered question raised by the calculability requirement; it is confronted in Wilson & Sperber 1986a and in Sperber & Wilson 1986 (193–202).
- 5 Another characteristic mentioned by Grice is that of the indeterminacy of implicatures, which is indeed a property which distinguishes them from explicatures. The implicit import of an utterance need not comprise solely fully determinate assumptions each of which was individually communicated by the speaker. For example, the hearer of (3) might have a readily accessible assumption that people who don't read autobiographies are not much interested in other people's lives, and conclude on that basis that B isn't much interested in other people's lives. This is not a conclusion that the speaker can be held to have communicated to the hearer; while the indirectness of her answer has encouraged the hearer to access further assumptions and draw further conclusions, the hearer has the primary responsibility for the particular assumptions made and conclusions drawn.
- 6 In most contexts, then, an utterance of (5a) has the same propositional content as utterances of sentences in which the causal connection is recovered by linguistic decoding: for example, *Mr Jones has been insulted and as a result (or: because of this) he is*

*going to resign*. More interesting is the case of *and so* discussed by Blakemore (1987 and this volume). She argues that the meaning of *so* cannot be analysed in terms of conceptual content but rather in terms of a processing instruction to the hearer and that the causal connection frequently derived from a use of *so* illustrates one way in which an explicature may be enriched so as to satisfy that instruction.

- 7 Certain linguistically given (hence explicit) aspects of the utterance are not part of the explicature of the utterance because their role is not to supply conceptual content but to guide the hearer's *processing* of the utterance. They may place constraints on the sort of context in which the explicature is to be processed or direct the inferential role of the explicature in the context. Examples of such linguistic expressions are *but*, *after all*, *anyway*, *so*. They have been studied in detail by Blakemore (1987).
- 8 Note that it's not enough that the interpretation is optimally relevant to the addressee: a hearer might hit on a readily accessible interpretation with a good range of contextual effects but have to dismiss it as what the speaker intended, perhaps because he knows that the speaker couldn't possibly have the beliefs that this interpretation depends on.
- 9 Wilson & Sperber (1981) deals specifically with this.
- 10 Furthermore, since B has chosen to answer A in this indirect way rather than simply saying *No*, which would have saved him the effort of accessing the assumption and deducing the conclusion, it follows by the principle of relevance that she is encouraging him to access further assumptions and draw further conclusions. She must have expected this indirect response to yield cognitive effects not derivable from the direct answer which would compensate for the extra processing costs. For instance she might know that A is in the throes of writing an autobiography and that he can thereby arrive at the implication that she will not read his book.
- 11 Grice actually raises the problem in connection with his analysis of *if*, but it carries over intact to the analysis of *and*.
- 12 The most likely counterexamples to a general statement that denials must refer to explicatures are ironical and metaphorical statements. See footnote 1. It remains to be seen whether the generalisation could be salvaged by tightening it up along the lines that a denial cannot refer to an implicature alone when the propositional form of the utterance is an explicature.
- 13 Given this sort of counterexample to the implicature approach Cohen (1971) advocates a semantic solution, though not the ambiguity one. He wants a single complex lexical entry for *and* incorporating temporal, causal and other features, with some (pragmatic) mechanism for cancelling features in particular contexts. Posner (1980) discusses problems with this meaning-maximalist position.
- 14 For a more detailed reanalysis of a range of examples standardly treated as generalised quantity implicatures see Carston (forthcoming).
- 15 Horn (1985) tackles this problem by analysing the negation here as metalinguistic. This looks like a promising approach and may well replace the explicature treatment in some cases; this is considered in Carston (forthcoming) where a broader notion of metarepresentation is advocated.
- 16 In addition to a linguistic semantics mapping linguistic forms onto concepts and a truth-conditional semantics relating propositional forms to the real world there is a third kind of semantics, a logical or conceptual role semantics, concerned with relations of entailment, contradiction, etc., amongst logical and propositional forms.

- 17 Fodor (1983) and Sperber & Wilson (1986) take the language processing system to be a specialised automatic decoding system. The pragmatic processing of utterances employs relatively unspecialised inferential processes and encyclopedic knowledge which are involved in processing all incoming information, whether linguistic or perceptual, and in general thought processes.
- 18 Even more than usual this paper has benefited from the ideas and advice of Deirdre Wilson to whom I am very grateful. Thanks also to Diane Blakemore, Max Cresswell, Pierre Jacob, Ruth Kempson, Ewan Klein, and François Recanatani for comments on an earlier version.

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