Conversational and conventional implicatures

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Conversational and conventional implicatures

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1. Introduction

Pragmatics is now well defined. Its object is the study of the usage of language in context, and its domain is generally viewed as complementary to the domain of linguistics, which studies linguistic systems, including both their formal (phonological and syntactic) and content (semantic) structures. The history of pragmatics can be described as a conjunction of different moves, coming from epistemology and semiotics (Morris 1938), philosophy of language (Austin 1962; Searle 1969), logic (Frege [1892]1952; Russell 1905), and linguistics (Horn 1972; Wilson 1975; Kempson 1975; Gazdar 1979). Basic pragmatics was initially linked to reference and presupposition (Frege and Russell), semantic and pragmatic presuppositions (Wilson and Kempson; Stalnaker 1977), and illocutionary acts (Austin and Searle), and it was only in the mid-70s that the main pragmatics topic, implicatures, was introduced in Grice's seminal and programmatic article *Logic and Conversation*.

The first issue of a journal devoted to pragmatics was the third issue of Peter Cole's and Jerry Morgan's *Syntax and Semantics* (1975), which is renowned for the fact that certain of Grice's fundamental articles, as well as John Searle's *Indirect Speech Acts,* were published there. Three and six years later, Peter Cole edited two collections and the eighth issue of *Syntax and Semantics* (*Pragmatics*) and *Radical Pragmatics*. Both publications contained articles by Grice, respectively *Further Note on Logic and Conversation* and *Presupposition and Conversational Implicature*. These three books explicitly show how the domain of pragmatics changed very quickly, moving from classic philosophical issues such as speech acts to more linguistic concerns including presupposition, information structure, discourse, and irony. It is a striking fact that in less than ten years the concept of *implicatures* has become the core concept of the new pragmatic perspective on meaning.

During the 1980s the first textbook on pragmatics (Levinson's *Pragmatics* in 1983) gave substantial coverage to conversational implicature in a chapter that appeared between exposés on two other classic topics, deixis, and presupposition, topics which had long been associated exclusively with semantics, mainly in the domain of philosophy of language. In 1986, one of the main contributions to pragmatics, Sperber's and Wilson's *Relevance*, provided an extensive discussion of Grice's approach to non-natural meaning and implicature,

and defined implicature as a way in which relevance and successful communication can be achieved.

Levinson's *Presumptive Meanings*, published early in the 21st century, made important contributions to pragmatics and the theory of implicature, as did Laurence Horn's encyclopaedia on negation (Horn, 1989). Robyn Carston's *Thoughts and Utterances* (2002) initiated the current debate in pragmatics on the nature of communicated meaning (explicit or implicit). And finally, the first book on *Experimental Pragmatics* (2004), edited by Ira Noveck and Dan Sperber, bridged the gap between theoretical work in pragmatics and more classic issues in experimental psycholinguistics.

These milestone publications show two important points: firstly, that pragmatics has evolved rapidly since the 1970s; and secondly, that the concept of implicatures has moved closer and closer to the centre of theoretical proposal and empirical findings.

This chapter will give a general presentation of Grice's work on non-natural meaning (§ 2) and link Grice's theory of non-natural meaning with the concept of inference (§ 3). Section 4 introduces a preliminary definition of Grice's notion of conventional implicature, while section 5 introduces the original issue on implicature, logical connectives. Section 6 serves as an introduction to Grice's *Logic of conversation*. Section 7 discusses the criteria Grice proposed to define implicature. Section 8 is devoted to scalar implicatures and to informative implicatures. Section 9 returns to one of the criteria that define implicatures, truth-conditions, and distinguishes between explicit and implicit aspects of meaning. Finally, section 10 also explores the role of implicatures in comprehension and communication.

Although implicatures can, from a historical point of view, be considered as the core concept of pragmatics, it must be emphasised that pragmatics cannot be reduced to the implicature debate. A general theory of language in use must address a multitude of issues: What are speakers doing when they communicate? How is reference achieved in utterance and communication? How is context referred to and built into verbal communication? What is the role of background knowledge in utterance understanding? How is linguistic information dispatched in utterance structure? To what extent is pragmatics concerned with truth and truth-conditional aspects of meaning? And how is meaning achieved through utterances? Several of these issues will be addressed in the course of this chapter. For the moment I would like to explore some connections between implicatures and other classic topics in pragmatics.

2. What is meaning?

The notion of implicature can be defined is a new way of describing meaning. Grice's main contribution to the theory of meaning was his original, non-conventional way of treating meaning in conversation, *non-natural meaning*.

Before introducing Grice's key idea, I must stress that his approach contrasts strongly with the classic linguistic approach to meaning. In linguistics, and particularly in structural linguistics, meaning results from a set of conventions that define a specific natural language. According to Saussure, for instance, "Le signe linguistique unit non une chose et un nom, mais un concept et une image acoustique" (Saussure 1968: 98).[1] It is a well-known fact that the relationship between the *signifiant* (*acoustic image*) and the *signifié* (*concept*) is arbitrary and unmotivated. This is similar to the classic Chomskyan view of language, which defines grammar as a system in which strings of sounds and strings of meanings interface. In other words, the linguistic belief system states that meaning is one part of the linguistic sign (Saussure) as well as one aspect of grammar, computed at the intentional-conceptual interface (Hauser, Chomsky, and Fitch 2002). Whenever linguistic meaning, reduced to what syntacticians call *logical forms,* is expanded outside or inside grammar is a crucial issue. Although it is not addressed in this chapter, it is a core topic in post-Gricean pragmatics.

In rudimentary terms, Grice's conception of meaning is not a conventional one. The following examples, taken from his renowned *Meaning* article (Grice 1989: 213), define non-natural meaning as something that is a specific property of natural languages, and which can be contrasted with natural meaning:

(1) *Those spots mean measles*.

(2) *The recent budget means that we shall have a hard year*.

In these cases, "*x means that p* and *x means that p* entails *p*". In other words, it is impossible to cancel out what *x* means and entails, as shown in examples (3) and (4), which are contradictory:

(3) *Those spots meant measles, but he hadn't got the measles*.

(4) *The recent budget means that we shall have a hard year, but we shan't have*.

(1) and (2) are cases of natural meaning, and contrast with (5) and (6), which are cases of non-natural meaning:

(5) *Those rings on the bell (of the bus) mean the bus is full*.

(6) *The remark, 'Smith couldn't get on without his trouble and strife', meant that Smith found his wife indispensable*.

The '*but'* test is effective here: "I can use the first of these and go on to say, "But it isn't in fact full–the conductor has made a mistake"; and I can use the second and go on, "But in fact Smith deserted her seven years ago"." (Grice 1989: 214).

A sign and a sentence can, therefore, have non-natural meanings. In these cases, Grice states that a human agent (A) "means something by *x*", where *x* is an utterance. His definition of non-natural meaning is as follows: " "*A* meant_{NN} something by *x*" is (roughly) equivalent to "*A* intended the utterance of *x* to produce some effect in an audience by means of the recognition of his intention" " (Grice 1989: 220). Non-natural meaning, or meaning conveyed in verbal communication, therefore supposes (i) the recognition of the informative intention of the agent (the communicator or the speaker) and (ii) the recognition of his or her communicative intention.[2]

As far as meaning is concerned, Grice speculated on how an audience can understand the speaker's informative intention. Appealing to the recognition of the speaker's communicative intention is a necessary but certainly not a sufficient condition, because *x* means_{NN}, for *A*, a proposition *p* the audience must infer. In other words, the relationship between *x* and *p* is non conventional, because if it were conventional "*x means that p* entails *p*" would be implied. Therefore, either natural meaning, or, within natural languages, conventional meaning would be the cases.

In other words, the only way to connect an utterance *x* and its $\text{meaning}_{\text{NN}}$ *p* is through inference. It is at this stage that we encounter the main proposals of *Logic and Conversation* now become relevant now be explored.

3. Meaning and inference

In *Logic and Conversation*, Grice makes a very general distinction between *what is said* by a speaker and *what he means or implicates*. Let us begin with one of his famous examples:

"Suppose that A and B are talking about a mutual friend, C, who is now working in a bank. A asks B how C is getting on in his job, and B replies, *Oh quite well, I think; he likes his colleagues, and he hasn't been in prison yet*." (Grice 1975: 43). Now what is interesting is Grice's comment: "I think it is clear that whatever B implied, suggested, meant, etc., in this example, is distinct from what B said, which was simply that C had not been in prison yet" (Grice 1975: 43). In his commentary, Grice used the words *implied*, *suggested* and *meant* to describe what the speaker intended to convey. The important point is that Grice distinguished between what *is said* and what *is meant*. His introduction of the concept of implicature was stated in this way: "I wish to introduce, as terms of arts, the verb *implicate* and the related nouns *implicature* (cf. *implying*) and *implicatum* (cf. what is *implied*)" (Grice 1975: 43).

What Grice meant by "what is said" must be defined. In his words, "In the sense in which I am using the word *say*, I intend what someone has said to be closely related to the conventional meaning of the word (the sentence) he has uttered" (Grice 1975: 44). According to conventional meaning, Grice means, such as defined the prevailing tradition in philosophy of language (see Austin for instance), sense and reference. The following passage, from Austin's eighth lecture: "… 'meaning' in the favourite philosophical sense of that word, i.e. with a certain sense and with a certain reference" (Austin 1962: 94), shows that Grice's use of the concept of meaning belongs to a classical definition in philosophy of language.

We will return to the way in which Grice saw a link between implicated and conventional meaning when the concept of *conventional implicature* is introduced. For the moment, however, it is important to state Grice's first criterion for distinguishing between what is said and what is implicated. As *what is said* must be understood in terms of what philosophers define as *meaning*, that is, *sense and reference*, *what is said* is the result of a linguistic computation implying the description of a full proposition with a truth value. According to philosophy of language, reference is not a property of linguistic sentences, but instead, as Strawson explicitly states, a property of utterances: "Mentioning, or referring to, something is a characteristic of a use of an expression, as 'being about' something, and truth-or-falsity, are characteristics of a use of a sentence" (Strawson 1971: 180) (see Bach 2006, for a precise description of a theory of reference). This implies that Grice's idea of *what is said* cannot be restricted to a merely linguistic notion of logical form: it is a full proposition with a truth value, as implied in the work of Austin and Strawson. It was also used by Searle in his seminal article on literal meaning (Searle 1979: 117), when he stated that "… the notion of literal meaning of a sentence only has application relative to a set of contextual or background assumptions (…)".

This is a crucial step in the comprehension of non-natural meaning: one part of non-natural meaning is what is said, which can be reduced to the truth-conditional aspect of meaning, while the other part is the non-truth-conditional aspect of meaning, known as *implicature*. In section 2, I mentioned Grice's '*but'* test, which allows one part of the meaning of the utterance under consideration to be cancelled. This is exactly what happens with implicatures: an implicature is a non-truth-conditional aspect of meaning.

4. Conventional implicatures

Before discussing Grice's theory of conversation, I would first like to examine his notion of conventional implicature: Grice stated that

"in some cases the conventional meaning of the words used will determine what is implicated, besides helping to determine what is said. If I say (smugly), *He is an Englishman; he is, therefore, brave*, I have certainly committed myself, by virtue of the meaning of my words, to its being the case that his being brave is a consequence of (follows from) his being an Englishman" (Grice 1975: 44).

This implies a consequence link between the two sentences. This link, however, does not contribute to the truth conditions of the sentence, since if a sentence *p therefore q* is true, it follows that *p & q* is the case, and that *p* is true and that *q* is true too. The contribution of *therefore* is thus non-truth-conditional. Using current terminology, I would say that the meaning contribution of *therefore* is not semantic – semantics being restricted to the domain of truth-conditions – but pragmatic.

An example of a word that explicitly demonstrates the difference between *what is said* and *what is conventionally implicated* is *even* (Karttunen and Peters 1979). Karttunen and Peters give example (7):

(7) *Even Bill likes Mary*.

For them, *even* plays no role in the truth conditions of the sentence. In other words, (7) is true if (8) is true, and false otherwise:

(8) *Bill likes Mary*.

This dos not mean that *even* plays no role in the meaning of (7). For Karttunen and Peters, (7) conveys the information given in (9):

(9) a. *Other people besides Bill like Mary*.
b. *Of the people under consideration, Bill is the least likely to like Mary*.

According to Karttunen and Peters, (8) corresponds to what is *said*, or to the truth-conditional meaning of (7), whereas the propositions in (9) are *conventional implicatures*: "they cannot be attributed to general conversational principles in conjunction with the peculiarities common to certain contexts of utterance: they simply arise from the presence of the word *even*" (Karttunen and Peters 1979: 12). Here again the test for a conventional implicature is the '*but'* test, which leads to a contradiction when *but* introduce the negation of one of the conventional implicatures.

(10) * *Even Bill likes Mary, but no one else does*.

Before introducing the core concept of Grice's approach to utterance interpretation, *conversational implicatures*, I would like to start with the initial topic of *Logic and Conversation*; that is, with logical connectives.

5. Logical connectives: the formalist vs. non-formalist debate

Initially, Grice's philosophical concern was to explain the difference in meaning between logical words such as ¬, ∧, ∨, ⊃, ∀, ∃ and their linguistic counterparts *not, and, or, if, all,* and *some*. The originality of Grice's approach was to avoid the classic philosophy of language debate between the formalist and the non-formalist approaches. According to the formalist approach, the main disadvantage of natural languages is that they are imperfect; that is, that they give rise to ambiguity and that they cannot ensure valid inferences. The use of formal languages as logic is thus a necessary condition to bring about a robust approach of valid inferences. The non-formalist view, on the other hand, states that many inferences in natural language are valid, and that "there must be a place for an unsimplified, and so more or less systematic, logic of the natural counterparts of these devices" (Grice 1975: 43). For Grice, one way of avoiding the mistake brought about by the formalist/non-formalist

alternative lies in inquiring "into the general conditions that, in one way or another, apply to conversation as such, irrespective of its subject matter" (Grice 1975: 43). The main purpose of Grice's logic of conversation was therefore to understand how and why logical words have such different uses in natural languages.

Before giving the classic pragmatic solution proposed by Grice's followers (principally Gazdar, Horn and Levinson), let us have a look at how formalists and the non-formalists solved this problem (Moeschler and Reboul 1994: chapter 6). Gazdar's formalist solution, which appeared after Grice's seminal article (Gazdar 1979), defines truth-functional connectives (TFC) in the following way: TFC are "functions which take a SET of truth-values as their sole argument" (Gazdar 1979: 75). This set is given in (11):

(11) $S = \{\{0\},\{1\}, \{1,0\}\}$

If T is defined as the set of truth values - $T = \{\{0\}, \{1\}\}$ -, a TFC is a function from S into T:

(12) $C = T^S$

If this definition is applied to all possible TFC, the following list of connectives, with their truth-conditions, is obtained (Gazdar 1979: 75):

A*	D*	E*	J*	K*	O*	V*	X*	Argument
1	0	1	0	1	0	1	0	{1}
1	1	0	1	0	0	1	0	{0,1}
0	1	1	0	0	0	1	1	{0}

Table 1: Truth Conditional Connectives (Gazdar, 1979:75)

What, then, is a possible connective in a natural language? If one admits that one of the criteria that must be satisfied by a connective is the *principle of confessionality*, the list given in Table 1 becomes more restrictive.

The principle of confessionality states that a TFC must confess the falsity of its argument. A connective c is therefore confessional iff $c(\{0\}) = 0$. A connective in a natural language must therefore be confessional. In other words, it cannot yield a true proposition

with a false argument. According to this principle, connectives D*, E*, V* and X* can be removed from Table 1. O* can be removed because it gives uninformative results (the truth value is always false). The remaining connectives, A*, J* and K*, correspond respectively to the inclusive *or* (A*), the exclusive *or* (J*) and the conjunction *and* (K*). Since the exclusive *or* can be pragmatically inferred from its inclusive counterpart (see § 8), this implies that the only possible natural language connectives are *and* and *or*.

From an epistemological point of view, Gazdar's analysis is reductionist, and thus leads to a very small number of TFCs in natural languages. This analysis does not, however, address the meaning of connectives like *if* and negation.

On the other hand, the non-formalist approach to TFCs is based on examples in which the logical meaning of connectives is ruled out, in the case of the antecedent in a conditional (Cohen 1971):

(13) a. *If the old king has died of a heart attack and a republic has been declared, then Tom will be quite content*.

b. *If a republic has been declared and the old king has died of a heart attack, then Tom will be quite content*.

The issue raised in (13) is the following: if *and* has a logical meaning, these sentences should have the same truth conditions, since *p and q* is logically equivalent to *q and p*. But this is not the case in (13) and (14), since *p and q* means *p and then q* and *q and p* means *q and then p*.

Ducrot's very convincing article (Ducrot 1989) showed that the reductionist approach to connectives makes some false predictions, even if it makes correct predictions in (14) and (15), which are semantically equivalent to (16) and (17):

(14) *If Peter is coming, we'll play bridge*.

(15) *Peter and Mary came*.

(16) *If we don't play bridge, then Peter is not coming*.

(17) a. *Peter came*.

b. *Mary came*.

Problems arise in (18) and (19), which are not equivalent to (20) and (21):

(18) *If you are thirsty, there is some beer in the fridge*.

(19) *He wants you to give him a whisky and some water*.

(20) *If there is no beer in the fridge, then you are not thirsty*.

(21) a. *He wants you to give him a whisky*.
b. *He wants you to give him some water*.

What Ducrot shows is that some uses of the conjunction not only allow an *and*-elimination, but can be explained logically through a conditional (*if p, then q and if r then s*), which explains the application of the *and*-elimination rule and the meaning obtained by the detachment of *and*. In effect, (22) yields (23) in accordance with the *and*-elimination rule. This is also the case for its underlying conditional structure, given in (24), which yields (25) for the same reason:

(22) *He wishes to visit the North Pole and Africa*.

(23) a. *He wishes to visit the North Pole*.
b. *He wishes to visit Africa*.

(24) *If he visited the North Pole, he would be happy, and if he visited Africa, he would be happy*.

(25) a. *If he visited the North Pole, he would be happy*.
b. *If he visited Africa, he would be happy*.

However, (19) cannot be analysed in the same way, since its conditional analysis yields (26) and not (27), which shows that the *and*-elimination rule cannot be applied here:

(26) *If you give him a whisky and you give him some water, he will be happy*.

(27) *If you give him a whisky, he will be happy, and if you give him some water, he will be happy*.

What conclusion can be drawn from this excursus? It has shown that, from a logical point of view, connectives cannot be explained in their meaning with the classic tools of logic: the formalist view (Gazdar) is so reductionist that no generalization can be drawn to explain the linguistic meaning of TFCs. The non-formalist view (Ducrot) leads to a non-reductionist approach that equally enables to result in a generalization. At this stage, it would appear that the problem is a difficult one to solve, and that the semantics of natural language should not yield to the temptation of using the tools of logic to solve it, thereby abandoning the traditional views of Frege, Russell and other philosophers of language.[3] This was the situation up to Grice's proposal in *Logic and Conversation*.

6. Grice's logic of conversation

Grice's logic of conversation is based on the idea that contributors to a conversation are rational agents; that is, that they obey a general principle of rationality known as the *cooperative principle* (CP). This principle is formulated as follows (Grice 1975: 45): "Make your conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged". In order to fulfil the cooperative principle, the speaker must follow nine maxims of conversation, grouped in four Kantian categories: Quantity, Quality, Relation and Manner. Grice's definitions of these maxims are as follows (Grice 1975: 45-6):

Gricean maxims of conversation

Maxims of Quantity: 1. Make you contribution as informative as is required. 2. Do not make your contribution more information than is required.

Maxims of Quantity: 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 adequate evidence.

Maxim of Relation: Be relevant.

Maxims of Manner: Be perspicuous. 1. Avoid obscurity of expression. 2. Avoid ambiguity. 3. Be brief. 4. Be orderly.

What is the connection between the CP and the maxims? First, the speaker is able to obey the maxims, or at least some of them. The default case occurs when the maxims of quantity, relation and manner are satisfied. For instance, as an illustration of the sub-maxim of manner "be orderly", the interpretation of (28a) will not be exactly the same as the interpretation of (28b):

(28) a. *Paul and Mary got married, lived happily and had four children*.
b. *Paul and Mary had four children, lived happily, and got married*.

Second, the speaker may exploit the maxims, that is, (i) violate the maxims, (ii) opt out of both the maxims and the CP, (iii) face a clash by fulfilling one maxim and violating another, and (iv) flout a maxim. Examples (29) to (32) illustrate these four cases:

(29) *I have little money with me*.

(30) *I cannot say more; my lips are sealed*.

(31) A: *Where does C live?*
B: *Somewhere in the South of France*.

(32) *War is war*.

In (29), in a situation where the speaker is carrying a lot of money, he violates the first maxim of quantity, and thereby misleads his audience. In (30), the speaker refuses to cooperate, and the audience understands that even if he cannot say more, he knows more than he says. In (31), the speaker is confronted with a possible contradiction between satisfying the first maxim of quantity – and thus violating this maxim – and satisfying the last maxim by violating the first maxim of quantity. In this case, the implicature will be that the speaker does not know precisely where C lives.[4] Finally, in (32), there is a blatant violation of the first maxim of quantity: sentences of the form *a is a* are under informative. Manifestly, in (32) the speaker uses a formula to convey some implicature (in a wartime situation, anything is allowed).[5]

As shown above, the use of a maxim or a violation of a maxim gives rise to what Grice calls a *conversational implicature*. How is such an implicature obtained? Grice gives the following rationale (Grice 1975: 50):

Procedure of working out a conversational implicature

1. The speaker (S) said that p.

2. The hearer (H) has no reason to suppose the S is not observing the conversational maxims or at least the CP.

3. (2) implies that S thinks that q.

4. S knows, and knows that H knows that S knows that H understands that it necessary to suppose that S thinks that q.

5. S has done nothing to stop H to think that q.

6. S wants H to think that q.

7. Therefore, S has implicated that q.

This heuristics shows that the working out of an implicature is the result of rational reasoning that takes the CP and the conversational maxims into account. This is a very important point in Grice's definition of a conversational implicature, because only conversational implicatures are supposed to be worked out. When an implicature is automatically triggered, through a reference to the meaning of a word, the implicature is conventional. More specifically, the working out of a conversational implicature relies on the following conditions (Grice 1975: 50): (1) the conventional meaning of the word; (2) the CP and the conversational maxims; (3) the linguistic context; (4) (the) background knowledge; (5) the fact that (1) to (4) are available to S and H. As far as conversational implicatures are concerned, Grice's view of implicature is mainly anti-contextualist: no reference to the construction of a shared context (as a set of propositions, as in Stalnaker 1977) is conveyed (Recanati 1994).

7. On testing for implicatures

So far I have discussed three concepts of Grice's theory: what is said, conventional implicatures and conversational implicatures. The difference between what is said and what is implicated lies in the truth- vs. non-truth-conditional aspect of meaning: implicature, either conventional or conversational, is a non-truth-conditional aspect of meaning.

Grice defined two further distinctions. The first one concerns what he calls non-conventional implicatures. If conversational implicature are non-conventional, in that they require a working out procedure, this gives rise to a final type of non-conventional implicatures, which are also non-conversational: they are triggered by "other maxims (aesthetic, social, or moral in character) such as 'Be polite' " (Grice 1975: 47). For instance, if I say to my TA in response to her question (33), I certainly mean something like (34), without having conversationally implicated it:

(33) TA: *Jacques, pouvez-vous lire l'examen de pragmatique*?
Jacques: *Peux-tu le poser sur mon bureau*?
TA: 'Jacques, can you read the pragmatics test?'
Jacques: 'Can you put it on my desk?'

(34) *You can use 'tu' instead of 'vous', because we are working together and entertain proximal professional relationships*.

The use of the French *tu* (second person singular) instead of the French *vous* (second person plural) means my TA to be a close person. *Tu* therefore non-conversationally implicates a proximal social relationship, whereas the use of *vous* non-conversationally implicates a distal social relationship.[6]

Second, Grice introduces a distinction between two types of conversational implicatures: generalized as opposed to particularized implicatures. A particularized implicature is an implicature "carried by saying that *p* on a particular occasion in virtue of a special feature of the context" (Grice 1975: 56).[7] On the contrary, generalized conversational implicatures are implicatures that are "NORMALLY carried by saying that *p*" (Grice 1975: 56). As an example of generalised conversational implicature, Grice suggests the use of *an X*, which carries the implicature that *X* "is only remotely related in a certain way to some person indicated by the context" (Grice 1975: 56). When someone says (35), he certainly means – that is, conversationally implicates – (36):

(35) *John is meeting a woman this evening*.

(36) *The woman John is meeting this evening is not his mother, his sister or his wife*.

The general picture of Grice's theory of meaning can be summed up in the following schema (adapted from Sadock 1978: 283):

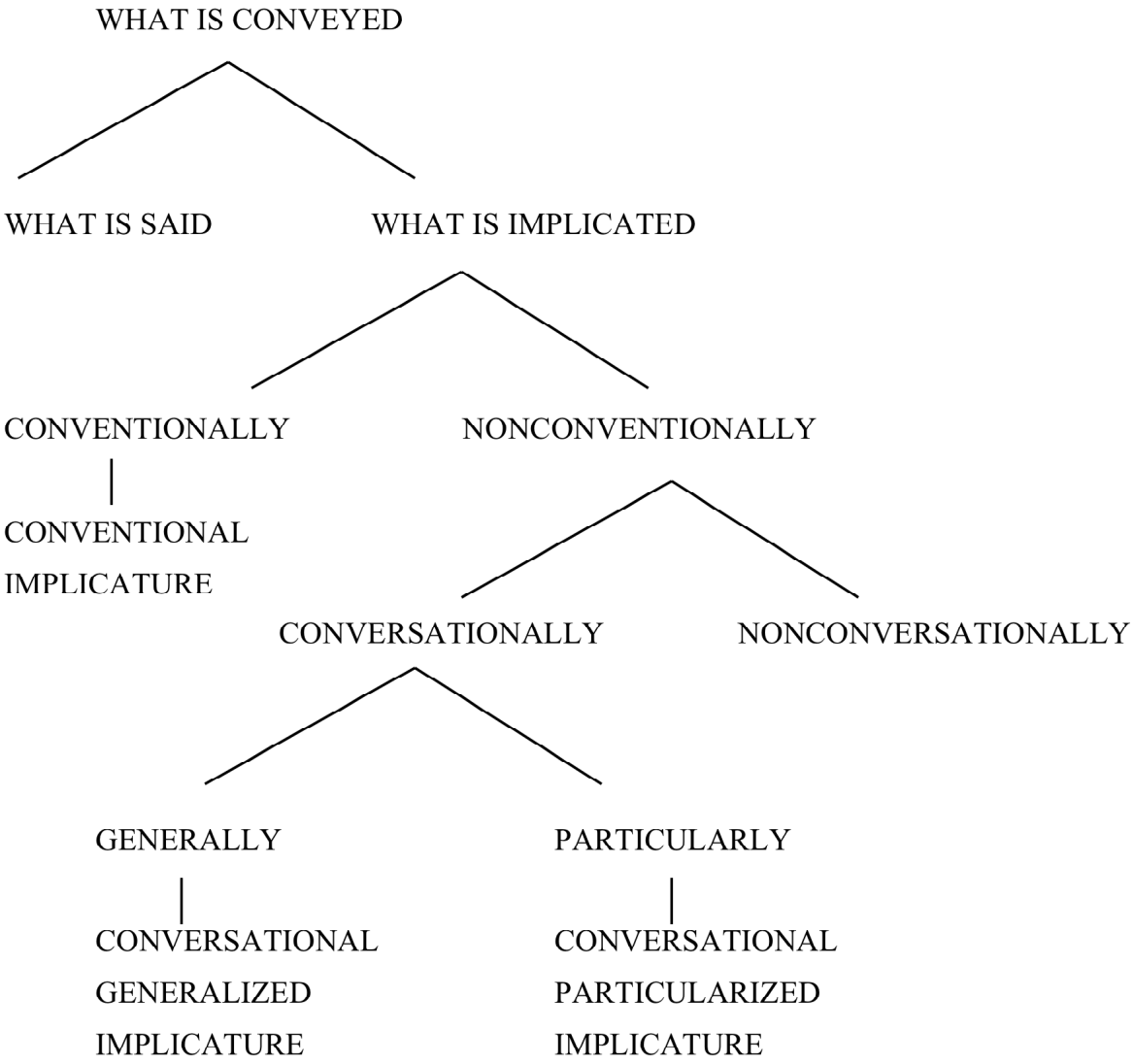

Figure 1: types of implicatures

How is it possible to test for implicatures? In other words, are the three types of implicatures defined by Grice characterised by a set of necessary and sufficient conditions? In *Logic and Conversation*, Grice (1975: 57-8) lists five criteria that distinguish between conventional and conversational implicatures. Sadock (1978) completed this list and proposed six criteria to test for conversational implicatures: conversational implicatures are (i) calculable, (ii) cancellable, (iii) non-detachable, (iv) non-conventional, (v) carried not by what is said but by the speech act, and (vi) indeterminate. Conversely, conventional implicatures are non-calculable, non-cancelable, detachable, conventional, carried by what is said and determinate.

A description of these criteria is as follows:

(i) *Calculability*: Conversational implicatures (CONVER-Is) are calculable, because they are the result of a working-out procedure. Conventional implicatures (CONVEN-Is) are not calculable, because they are triggered by the meaning of the words that carried them.

(ii) *Cancellability*: CONVER-Is are cancellable, because they do not contribute to the truth conditions of the utterance. They can therefore be cancelled without contradiction. CONVEN-Is cannot, because they are conventional and cannot be cancelled without contradiction.

(iii) *Detachability*: CONVER-Is are non-detachable, because the implicature is attached to the content of the utterance rather than to the form of the expression that triggers it. So, in CONVER-Is, the implicature cannot be detached from the content of the utterance.

(iv) *Conventionality*: By definition, CONVEN-Is are conventional, since they are attached to the conventional meaning of the word. Generalised CONVER-Is are not conventional, because they are non-detachable, cancellable, and not carried by what is said, but by the act of saying.

(v) *Saying*: CONVER-Is are the by-product of the meaning of a sentence, the CP, the conversational maxims, and the act of saying a particular sentence on a particular occasion. The pragmatic meaning of any expression in CONVER-Is (generalized or particularized) is therefore the result of the utterance act. CONVEN-Is are not dependant of this condition, because the implicature is attached to the word.[8]

(vi) *Determinacy*: Whereas CONVEN-Is are determinate (because they are conventional), CONVER-Is are not. This means that a precise content cannot be attached to the implicature.[9]

The description of these criteria fills only one page in Grice's article, and only a few articles have seriously explored them. Jerrold Sadock's very important contribution (Sadock, 1978) demonstrated that these conditions are neither necessary nor sufficient conditions for testing for implicatures. For instance, calculability is trivially entailed by the definition of CONVER-Is; conventionality is also trivial because it is part of the definition of CONVEN-Is. Detachability is problematic, as is determinacy, due to the delimitation of CONVEN-Is and GCIs; the saying/said distinction is also included in the definition of what a CONVER-I is, which means that the implicature status of CONVEN-Is is problematic. In other words, the

only criterion that seems to resist is *cancelability*. I will return to this criterion in section 9, while discussing truth-conditionality of implicatures.

Finally, the most seminal contribution of Grice is his dividing of the conventional aspect of meaning between semantics and pragmatics, as Sadock (1978: 284) summarizes it:

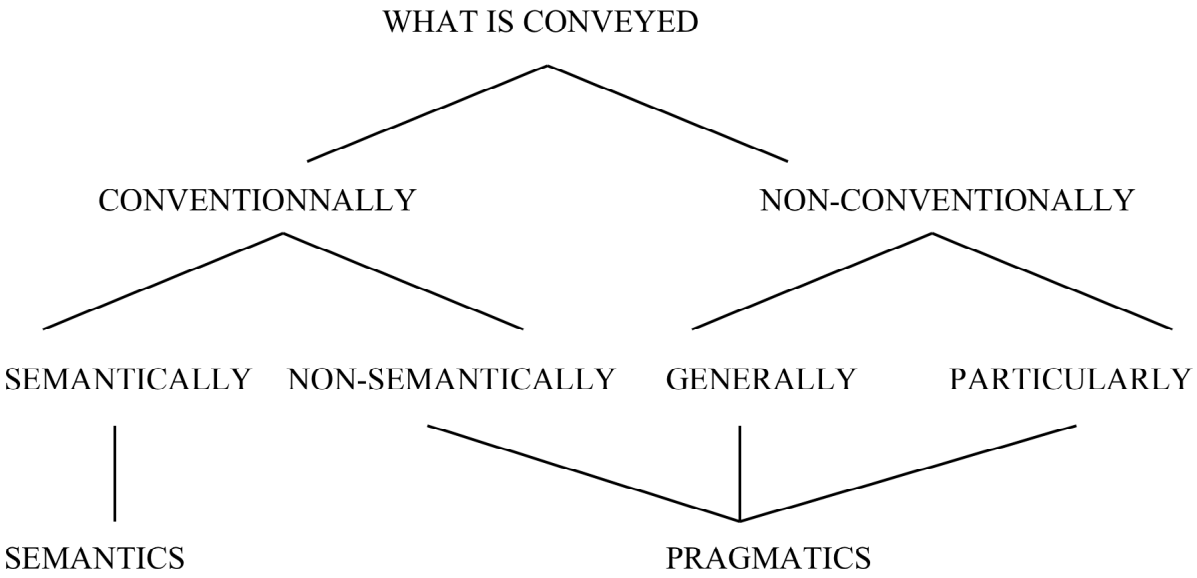

Figure 2: Implicatures, semantics and pragmatics

8. Scalar and informative implicatures

The domain of implicature has primarily been investigated over the last few decades within the concept of scalar implicatures, which correspond to Gricean generalized quantitative implicatures.

The first research to demonstrate the general and systematic behavior of logical words was carried out by Gazdar (1979), who observed the (corresponding) semantic and pragmatic relationships between quantifiers: in (37), the (a) sentence quantitatively implicated the (b) sentence, which is cancelled in the (c) sentence, whereas the (d) sentence(s) entails the (a) sentence:

(37) a. *Some of the students were at the party*.
b. *Not all the students were at the party*.
c. *Some, in fact all, the students were at the party*.
d. *All the students were at the party*.

Horn took this generalization one step further in his theory of quantitative scale (Horn 1972, 1984, 1989, 2004). If such relationships exist, it is because the expressions triggering the scalar or quantitative implicatures are ordered in a scale. In a quantitative scale, the strong term semantically entails the weak term, and the weak term implicates the negation of the strong term. This generalization can be expressed by the following rules:

(38) In a quantitative scale <*S, W*>, where *S* is a strong term and *W* a weak term, the following relations hold:

a. $S(x) \rightarrow W(x)$

b. $W(x) +> \neg S(x)$,

where '→' stands for the entailment relationship and '+>' for the implicature relationship.

The theory of Horn's scale is very powerful: it adequately describes one part of the lexicon. (39), illustrates some such quantitative scales (see also Gazdar 1979: 56; Levinson 1983: 134):

(39) <*all, some*>
<*and, or*>
<*necessary, possible*>
<*certain, probable, possible*>
<*none, some not*>
<*outstanding, good*>
<*hot, warm*>
<*cold, fresh*>

Second, the asymmetry between semantic entailments (truth-conditional meanings), and scalar implicatures (non-truth-conditional meanings) explains why lexical items are not genuinely ambiguous, but are simply constrained in their meaning by general pragmatic principles. This provides a good illustration of Grice's recommendation, as formulated in his Modified Occam's Razor (M.O.R.) (Grice 1979: 118-9): "*Senses are not to be multiplied beyond necessity"*.[10]

The example of *or* provides a spectacular example of how scalar implicature and the M.O.R. principle can produce new answers to the question of lexical meaning. The logical meaning of *or* is its inclusive one, which allows both disjuncts to be true together. If *or* had an inclusive meaning in use, (40) would be ambiguous as compared to (41) and (42):

(40) *Peter or Mary will come tonight.*

(41) *Peter will come tonight and Mary will come too.*

(42) *Peter will come tonight and Mary will not, or Peter will not come tonight and Mary will.*

(41) is an illustration of the inclusive reading, while (42) is an illustration of its exclusive one. How can we explain that a speaker who says (40) generally intends to communicate (42) rather than (41)? One explanation is that by choosing *or* with the intention of communicating *and*, the speaker simply made a mistake in his lexical selection. Another is that the speaker is a follower of Grice, and cannot say *and* because he knows that only one person is coming, but he does not know who: in this case, he uses the word that is most compatible with the first maxim of quality. A third, the use of *or* triggers a default scalar implicature, implicating that (41) is false, explicitly reformulated in (43):[11]

(43) *It is not the case that Peter and Mary will come*.

The scalar implicature reading explains two things: that *or* is semantically connected with a stronger one (*and*); and that the specific pragmatic exclusive reading of *or* is the result of the conjunction of its logical inclusive meaning and its scalar implicature. In other words, the scalar implicature of *or* is given in (44), and its pragmatic exclusive meaning is given in (45):[12]

(44) (*p or q*) +> *not* (*p and q*)

(45) (*p or q*) *and* (*not* (*p and q*))

Horn's theory of scalar implicatures also elegantly describes why certain logical expressions are not lexically realized in natural languages. Horn observed that the lexicons of natural languages do not contain words for negative particulars. Although languages do have words for positive universals (*all*) and particulars (*some*) as well as for negative universals (*none*), there are no words for negative particulars. Table 2 demonstrates this discrepancy for English:

A	I	E	O
all	*some*	*no*	**nall*
always	*sometimes*	*never*	**nalways*
both	*one (of them)*	*neither*	**noth*
and	*or*	*nor*	**nand*

Table 2: lexical realizations of the corners of the logical square

The designations A, I, E and O stand for the four corners of the logical square (*AffIrmo*, *nEgO*), given in Figure 3:

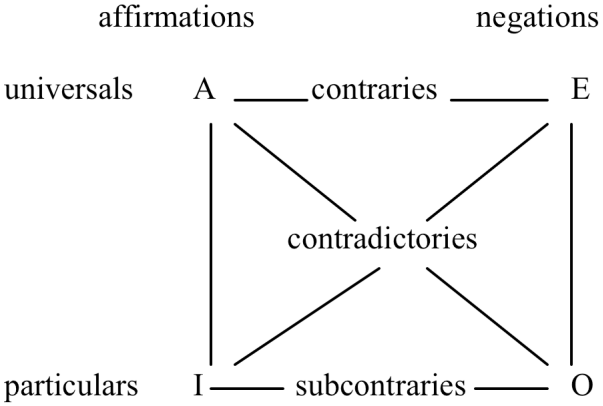

Figure 3: the logical square (Horn, 2004: 11)

Negative particulars are not lexicalized in natural language according to Horn because they have complex values. It is possible to express this property through what I refer to Horn's conjecture (Horn 2004: 11):

Horn's Conjecture

Natural languages tend not to lexicalize complex values, since these need not be lexicalized.

Now, what is interesting with connecting scalar implicatures and the logical square is that positive particulars appear as weak terms in the scale. The logical square illustrates the following positive scales: <*all, some*>, <*always, sometimes*>, <*both, one*>, <*and, or*>. *Some*, for instance, implicates the negation of *all*, as shown in (46):

(46) *Some of Jacques' students passed their pragmatics exam*.

(47) *All of Jacques' students did not pass their pragmatics exam*.

Horn was unable to create a scale of negatives such as <*no, nall*> because *nall* is not a word in English.[13] He instead proposed that the negative particular that corresponds to *no* is a complex one: *some…not*, in which case <*no, some…not*> would be the negative counterpart of <*all, some*>. If this is the case, *some…not* implicates the negation of *no*, which cannot be rendered in a simple sentence, but only in a complex one. (48), therefore, quantitatively implicates (49):

(48) *Some of Jacques' students did not pass their pragmatics exam*.

(49) *It is not the case that none of Jacques' students passed their pragmatics exam*.

What does (49) mean, and conversely, what does (47) mean? The logical square gives a simple answer: the negation of E is I, and the negation of A is O. By asserting (46), the speakers implicates (48), and by asserting (48), she implicates (46). This lead Horn (2004: 11) to claim that "While what is said in *Some men are bald* and *Some men are not bald* is distinct, what is communicated is typically identical: *Some men are bald and some men aren't*".[14]

What, exactly, is the status of scalar implicatures? Where do they come from? Different solution have been proposed, but the classical neo-Gricean approach (based mainly on Horn's and Levinson's research) is predicated on making the first maxim of quantity and the sub-maxims of manner 'Avoid ambiguity' and 'Avoid obscurity' into a principle, the Q-Principle (Horn 1984: 13):[15]

The Q-Principle

Make your contribution sufficient. Say as much as you can (given R).

For Horn, the Q-Principle is Hearer-based, and is opposed to the R-principle, which is Speaker-based (Horn 1984: 13):

The R-Principle

Make your contribution necessary. Say no more than you must (given Q).

The R-Principle is based on the maxims of Relation, the second maxim of Quantity and the maxims of Manner ("Be brief" and "Be orderly"). While the Q-Principle is illustrated by scalar implicatures, the R-Principle is typically exemplified by indirect speech acts. In (50), the speaker is not saying any more than necessary in conveying his request: a question is a more economical way of conveying a request than is the explicit performative given in (51):

(50) *Can you pass me the salt?*

(51) *I request that you pass me the salt*.

The main advantage of the neo-Gricean approach to implicature (mainly scalar implicatures)[16] is that it reduces the nine Gricean maxims to two principles, which, are supposed to balance each other. The principle that corresponds to Horn's R-Principle is Levinson I-Principle, or Principle of Informativeness:[17]

I-Principle

Speaker's maxim: the maxim of Minimization. "Say as little as necessary."

Recipient's corollary: the Enrichment Rule. Amplify the informational content of the speaker's utterance, by finding the most *specific* interpretation.

Levinson (2000: 117-118) gives a series of examples illustrating the informational amplification of utterances, which are arranged in categories observed elsewhere:

(52) Conditional perfection (Geis and Zwicky 1971)

If you mow the lawn, I'll give you five dollars.

+> If you don't mow the lawn, I won't give you five dollars.

(53) Conjunction buttressing (Atlas and Levinson 1981)
John turned the key and the engine started.
+> *John turned the key and then the engine started*.

(54) Bridging (Clark and Haviland 1977)
John unpacked the picnic. The beer was warm.
+> *The beer was part of the picnic*.

(55) Inference on a stereotype (Atlas and Levinson 1981)
John said 'Hello' to the secretary and then he smiled.
+> *John said 'Hello' to the female secretary and then he smiled*.

(56) Negative strengthening (Horn 1989)
I don't like Alice.
+> *I positively dislike Alice.*

(57) Mirror maxim (Harnish 1976)
Harry and Sue bought a piano.
+> *They bought it together*.

How are such implicatures triggered? The I-Principle obviously does not offer a sufficient explanation. In example (53), a causal reading is one possible more specific reading: John turned the key and, because of that, the engine started. Indeed, the I-Principle must be completed by reference to information that makes up background knowledge. Levinson (1987) makes an explicit reference to the maxim of relativity and the convention of non-disputability. Thus the principle of informativeness simply states that the best interpretation for an utterance is the most informative interpretation consistent with what is not disputable.

Gazdar's theory of potential implicature, which he calls *im-plicatures*, presents a slightly different and formally most convincing approach. A potential implicature is an implicature "which the sentence could possibly have prior to contextual cancellation" (Gazdar 1979: 55). In other words, the im-plicature, in order to be promoted from a potential to an actual implicature, should be consistent with propositions defining the context. According to this perspective the context is given and any implicature is a new contribution to it.

Relevance Theory has challenged this classic view of implicature. The next section explains how and why this occurred.

9. Explicatures and weak implicatures

Implicatures have a very different status in Relevance Theory: according to this theory, implicatures can be false. If this is the case, it is because one of the required contextual premises is false. In other words, implicatures are defined as contextual implications; that is, as implications based on a contextualization (Sperber and Wilson 1986: 107-8):

Contextual implication

A set of assumption {*P*} contextually implies an assumption *Q* in the context *C* if and only if

(i) the union of {*P*} and {*C*} non-trivially implies *Q*,

(ii) {*P*} does not non-trivially imply *Q*, and

(iii) {*C*} does not non-trivially imply Q.[18]

This very general definition of contextual implication is a result of a strong reductionist of Grice's theory of implicature. Whereras neo-Gricean reduced the nine Gricean maxims of conversation to two principles, the Q-Principle and the R(I)-Principle, post-Griceans as Sperber and Wilson reduced all maxims to one principle, the principle of relevance; which states that the speaker has produced the most relevant utterance in the circumstances. More precisely, the Principle of Relevance can be stated as follows (Sperber & Wilson 1986:158):

Principle of relevance

Every act of ostensive communication communicates the presumption of its optimal relevance.[19]

A contextual implication is one way for an utterance to be relevant, relevance being defined as a balance between positive cognitive effects (addition of a new information, strengthening of an old information, suppression of an old information) and cognitive efforts, due to the length of the utterance, the deductive rules implied in non-trivial implication, the access to the concept forming the logical form of the sentence among others.

Implicatures are thus defined in Relevance Theory as a type of cognitive effect. More precisely, they are the results of *non-demonstrative inference*, whose premises are based on a utterance (more precisely, on the logical form of the sentence uttered) and on a set of *contextual assumptions*. The result of interpreting a sentence in a context yields an *implicated conclusion*, which is arrived at by deduction. This approach contrasts with the classic Gricean procedure of working out an implicature, as well as with the neo-Gricean heuristics based on the Q- and the R(I)-Principles. In the recent version of Relevance Theory, implicatures are the result of a general procedure of comprehension, stated as follow (Wilson and Sperber 2004: 613):

Relevance-theoretic comprehension procedure

a. Follow a path of lest effort in computing cognitive effects: Test interpretive hypotheses (…) in order of accessibility.

b. Stop when your expectations relevance are satisfied (or abandoned).

In order to get a contextual implication, the hearer must access contextual assumptions. How is this possible? In Relevance Theory, the context is constructed, a, utterance after utterance, rather than given at the outset. Consider the following example:

(58) Paul: *How was the party?*
Peter:*People left late at night*.

Peter's answer must be interpreted against the contextual assumption (59a), which yields the implicated conclusion (59c) when combined with Peter's utterance:

(59) a. *If people leave a party late, then the party is a success*.
b. *People left Peter's party late*.
c. *Peter's party was a success*.

It is obvious that context is not based on a set of background assumptions, but rather on a restricted set of propositions accessible in real time as the utterance is being interpreted. Some premises must be constructed during the interpretation of the utterance, even if they do not belong to the set of shared information. For example, suppose I invite Ahmed to dinner, and do not realize that Muslims don't drink alcohol. In this case, the implicature conveyed by

Ahmed's utterance in (60) – that is (61) – is not impossible to understand, because I can, in the setting of conversation, construe the missing contextual premise (62). Sperber and Wilson call this type of premise *implicated premise*:[20]

(60) Jacques: *Ahmed, would you like a glass of wine?*
Ahmed: *I am Muslim*.

(61) *Muslims don't drink alcohol.*

(62) *Ahmed does not want a glass of wine.*

According to Relevance Theory, implicatures therefore belong to the Gricean category of particularized conversational implicatures. Almost all the research carried out on implicatures by neo-Griceans[21], however, has explored generalized conversational implicatures.[22]

One of Relevance Theory's most important contributions to pragmatics, as well as to a general approach to implicature, was to elaborate the fifth Gricean criterion defining implicatures: determinacy. Sperber and Wilson (1986: 217-224, and 231-237) developed a very interesting theory of implicature. According to them, implicatures are not different in nature to what is said – or in Relevance Theoretic terms, to explicatures – but differ mainly in the strength through which they are entertained. Sperber and Wilson distinguish between two types of (*nonce*) implicatures: strong and weak implicatures. Strong implicatures are characterized by the strength through which they are conveyed; that is, are under the responsibility of the speaker. In most cases, they are thus determinate in content. Some typical cases of strong implicatures follow:

(63) Jacques: *Axel, please go and brush your teeth*.
Axel: *Dad, I'm not sleepy*.

(64) Anne, looking at Nat's room: *Your room is a pigsty*.

(65) Peter: *Jacques, where do you live?*
Jacques: *I live in Cluny*.

In (63), Axel implicates that he does not want to brush his teeth and then go to bed; in (64) Anne implicates that Nat's room is dirty and should be cleaned; finally, in (65), Jacques, who lives in a small village near Cluny, implicates that he is living close to a famous medieval town.

Weak implicatures, on the contrary, are less determinate, and left to the responsibility of the hearer. In these cases, the utterance gives rise to a number of weak implicatures. Creative metaphors are typical cases of weak implicatures, as in these well-known metaphors in English and French:

(66) *No man is an island*. (John Donne)

(67) *Juliet is the sun*. (Shakespeare)

(68) *La femme est l'avenir de l'homme.* (Aragon)
'Woman is the future of man'.

(69) *L'homme est un roseau pensant*. (Pascal)
'Man is a thinking reed'.

One of the main issues raised by any theory of implicature now arises. Are implicatures in fact non-truth-conditional aspects of meaning? The classical Gricean answer is yes, but the neo- and post-Gricean are very cautious about their answer. Scalar implicatures and informative implicatures will be used to illustrate this point.

In scalar implicature, the pragmatic meaning of *some*, as well as for the conjunction *or*, the implicature has a restricted meaning; that is, a more specific meaning than its logical one: logically, *some* is compatible with *all*, and *or* can be read as inclusive. The following question must be asked: Which part of the meaning of the sentence is truth-conditional? Is it the logical meaning or the implicature? If the restricted meaning determines the truth conditions of the utterance, it can no longer be interpreted as an implicature. So the question is now to what extent pragmatic meaning can be considered to be truth-conditional. Several scholars have given positive answers to this issue, using different labels: *explicatures* (Sperber and Wilson 1986), *pragmatic primary processes* (Recanati 2004) and *impliciture* (Bach 2004).
In this context I will simply cite the argument given by Wilson and Sperber (1998) as an explanantion for the I-implicature of the temporal *and*. In the following examples, the

complex proposition *p and q* is not truth-conditionally equivalent to *q and p*, because if it were true (70) would be a tautology and (71) a contradiction. The temporal meaning of *and*, therefore, cannot be an implicature:

(70) *It's always the same at parties: either I get drunk and no one will talk to me or no one will talk to me and I get drunk.*

(71) *What happened was not that Peter left and Mary got angry but that Mary got angry and Peter left.*

The explanation is therefore as follows: temporal enrichment, as well as all cases of I-implicatures (see examples 52-57) are cases of pragmatic enrichment arising at the level of explicatures. Pragmatic meaning is therefore truth-conditional, when it deals with the development of a full proposition.

10. Conclusion: the role of implicatures in comprehension and communication

In this chapter, we have seen how a theory of implicature has become possible through Grice's seminal work on non-natural meaning and the logic of conversation. For the last thirty years or so pragmatics has developed in many fields including philosophy of language, logic, linguistics, psycholinguistics, and in the past few years in neuroscience. As will be shown, a variety of directions have been taken in explaining what it is to understand an utterance. These have yielded a variety of answers.

The first move, which is represented by approaches that mainly explore generalized conversational implicatures, defines the understanding of an utterance as a process implying automatic and default reasoning. Generalized conversational implicatures and conventional implicatures are therefore defined as being part of the lexicon, and are not the result of any particular contextual device.

Another development, which is currently inciting research, tries to include aspects of non-explicit meaning (primarily presuppositions and implicatures) in a very general layered theory of meaning. For instance, Potts (2005: 23) has developed a theory of meaning that distinguishes between context-dependant meanings, including conversational implicatures and pragmatic presuppositions, from entailments, including at-issue entailments, conventional presuppositions and conventional implicatures. This development represents a strong

intrusion of formal semantic techniques and of the semantic agenda into the classic domain of pragmatics.

Finally, Relevance Theory presents a layered picture of meaning: pragmatics inferences intervene at the level of explicatures and implicatures. First, the explicature level contains three different meanings: basic explicature (propositional form), propositional attitude and illocutionary force, the last two being higher-order explicatures. Second, the implicature level contains two types of implicit meaning: the implicated premises and the implicated conclusions. Finally, an implicated conclusion can be, as we saw in § 9, strong or weak, depending on the strength of the entertained implicated premises.

Even if the general picture of a theory of implicature is far from being homogeneous now, it is interesting to connect implicature and non-natural meaning. As defined in section 2, non-natural meaning (Grice) is what corresponds to the speaker's informative intention (Sperber and Wilson). Now, what relation, if any, does exist between non-natural meaning and implicature? The picture is not as clear-cut as is could be drawn from a classical Gricean perspective. For Grice, there is a strong identity between non-natural meaning and implicature. However, in the neo-Gricean perspective, generalized conversational implicatures are default inferences, and since the speaker can deny having intended to implicate such and such proposition, it is not clear whether implicatures equate informative intention. Finally, in Relevance Theory, successful communication is not an absolute concept, but is more precisely associated to a continuum between the intended meaning and the interpretation of the speaker's utterance. In that case, it is not surprising that the hearer can be in a situation where he cannot grasp some or most of the speaker's implicatures. In that case, he should at least be capable of grasping the explicatures of utterance, which seems to be a minimal condition to insure inferential communication.[23]

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Notes

[1] "A linguistic sign does not unite a thing and a noun, but a concept and an acoustic image".
[2] The concepts of informative and communicative intentions are mentioned in Sperber and Wilson (1986: 29): "*Informative intention*: to inform the audience of something; *Communicative intention*: to inform the audience of one's informative intention".
[3] In linguistic theory, there is a permanent move to renounce to logic. Ducrot, as a semanticist, is one paradigmatic example of Continental linguistics, inspired by Saussure and Benveniste (1966, 1974), although the body of his work has been consistently influenced by the Oxonian philosophy of language. See Ducrot (1973) and Ducrot (1972), respectively. In the New World linguistics, George Lakoff (Lakoff 1987; Lakoff and Johnson 1980) is another paragon of this renunciation.
[4] This reading of Grice example is somewhat different from that of Robyn Carston in her article on quantitative implicature (Carston 1998), in which the implicature is caused by the violation of the first maxim of quantity. In this case, the speaker knows where C lives but does not want to tell her audience. In Moeschler (2010), I explain both readings as examples of a preeminence of one maxim over the other: quantity > quality (Carston) vs. quality > quantity (Grice).
[5] The French corresponding proverb is *à la guerre comme à la guerre*.
[6] These implicatures are not conversational because they are not triggered by any conversational maxims. They are not conventional, either, because they are not part of the meaning of the word.
[7] In Relevance Theory (Carston 2002), these implicatures are called *nonce implicatures*, and correspond to what Relevance Theory has defined as *contextual implications* or *implicated conclusions* (Sperber and Wilson 1986, 1995; Wilson and Sperber 2004).
[8] Certain difficulties occur when making a lexical contrast between the act of saying and the result of such an act - that is, an utterance – in English. The word *utterance* refers both to the

act of uttering and to its result, whereas French makes a conventional and technical difference between the act of uttering (*énonciation*) and its result (*énoncé*).

[9] This point is less obvious for GCIs (generalized conversational implicatures) because the implicature is carried by a specific expression. The restricted meaning 'only some' for *some* therefore is more determinate than indeterminate. This criterion is in fact restricted to particularized conversational implicatures.

[10] Horn (1985) provides substantial illustrations of the M.O.R. principle in relation to negation, modals and connectives.

[11] This reading is triggered by the Q-Principle (cf. *infra*).

[12] The following truth table is a demonstration of (46) (Moeschler and Reboul 1984: 198), where '∇' stands for the exclusive disjunction, '$\leftrightarrow$' for the logical equivalence, '$\vee$' for the inclusive disjunction, '$\wedge$' for the logical conjunction and '$\neg$' for the logical negation. In other words, the pragmatic meaning of *or* is equivalent to the meaning of the exclusive or (∇):

p	q	p ∨ q	p ∧ q	¬(p ∧ q)	(p ∨ q) ∧ ¬(p ∧ q)	p ∇ q	(p ∇ q) ↔ (p ∨ q) ∧¬ (p ∧ q)
1	1	1	1	0	0	0	1
1	0	1	0	1	1	1	1
0	1	1	0	1	1	1	1
0	0	0	0	1	0	0	1

[13] The same holds for French, where *nitous* is not a word for a negative particular:

(i) **Nitous les étudiants de Jacques ont réussi leur examen de pragmatique*.
'Nall Jacques' students passed their pragmatics exam.'

[14] In Moeschler (2007a), I give a detailed analysis of Horn's conjecture and propose a different solution, based on the Relevance Theoretical notion of explicature.

[15] Another classic Neo-Gricean formulation appears in Levinson (2000: 76):

"*Q-principle*

Speaker's maxim: Do not provide a statement that is informationally weaker than your knowledge of the world allows (…).

Recipient's corollary: Take it that the speaker made the strongest statement consistent with what he knows (…)."

For Levinson, it is the recipient's corollary rather the speaker's maxim that yields scalar implicatures.

[16] Different accounts of scalar implicatures have appeared in recent years. Danny Fox's highly interesting account is based on Gricean reasoning and avoids Horn's scale/does not take Horn's scale into account. This approach (Fox 2007) is based on the reformulation of the Maxim of quantity: "Maxim of Quantity (basic version): If S_1 and S_2 are both relevant to the topic of conversation and S_1 is more informative than S_2, if the speaker believes that both are true, the speaker should utter S_1 rather than S_2" (Fox, 2007:73). Fox reasons that "If we, the people who interpret the utterance [*Sue talked to John or Fred*], assume that s obeys the Maxim of Quantity, we conclude, for each disjunct, p, that it is false to claim that s believes that p is true, or if we keep to our convention of using the verb *know* instead of *believe,* we can state this as a conclusion that s does not know that p is true" (Fox, 2007:73).

[17] Atlas and Levinson (1981: 40-41) give an explicit and formal definition (I will not discuss here). I present a simpler version, from Levinson (2000: 114).

[18] A trivial implication is an implication that requires only one premise as input.

[19] In the recent version of Relevance (Sperber & Wilson 1995; Wilson and Sperber 2004), the principle of relevance has been split in two principles, the cognitive principle of relevance and the communicative principle of relevance:

Cognitive Principle of Relevance

Human cognition tends to be geared to the maximization of relevance. (Wilson and Sperber 2004: 610)

Communicative Principle of Relevance

Every ostensive stimulus conveys a presumption of its optimal relevance. (Wilson and Sperber 2004: 612)

[20] Grice's example *John is an Englishman, he is brave* can be analyzed in a similar way.

[21] It is usual to distinguish between two type of approaches that refer back to Grice: *neo-Gricean* approaches, represented mainly by Gazdar, Horn and Levinson, who attempted to reduce the nine conversational maxims to two principles; and *post-Gricean* approaches, whose main concern is to adjust the border between semantics and pragmatics, and to attribute truth-conditional properties to pragmatic content. Post-Griceans are mainly represented by Relevance Theory (Sperber and Wilson 1986, 1995; Wilson and Sperber 2000, 2004; Carston 2002, 2004), by Bach (2004, 2006) and Recanati (2004).

[22] The subtitle of Levinson's book is *The Theory of Generalized Conversational Implicatures*.

[23] See Moeschler (2007b) for an argument based on intercultural communication and misunderstandings.