

# Narrowing and structuring the domain of conversational implicature<sup>1</sup>

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## *Abstract*

In this paper, we will address two issues regarding *conversational implicature*. The first concerns the range of application of the concept and the related definition of a motivated typology for this kind of inference. The second concerns the computability of the subtype of implicature that we will claim to involve in a comparatively high degree the notion of *relevance*. Regarding the first issue, we will argue for an extension of the field of *conventional implicature* to a subclass of inferences, namely those involving epistemic values or properties of speech acts, that have so far been treated as conversational. Once this is done, a clearer typological picture emerges. As for the second issue, the claim will be that conversational implicature is not the realm of purely contextual reasoning. Instead, we will claim that inference patterns can be defined, which involve both truth-conditional and other components of linguistic knowledge.

## 1. Narrowing the domain of conversational implicature

### 1.1. Fixing a concept of conversational implicature

Since Grice (1975), the range of application of the label **conversational implicature** has considerably changed from author to author, covering a wide range of inferential patterns. In our view, not all these patterns obey the restrictions established in Grice's seminal proposal. For clarity, we will summarise those that appear to be nuclear to the

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concept: (i) the guarantee that the Cooperative Principle is being obeyed; (ii) the given speaker's intention of conveying the *implicatum*  $q$  by means of the *implicans*  $p$  (possibly in addition to it); (iii) the shared knowledge, by speaker and hearer, of the relevant speaker's intentions; (iv) in Grice's own phrasing, the guarantee that "what is conversationally implicated is not to be thought of as part of the meaning of the expressions that are used to get over the implication" (1981: 185); (v) the cancelability of the implicature.

In the next subsections we will try to take all the above criteria simultaneously into account. As we will try to show, one of the typological problems regarding implicature stems from an apparent conflict between the above criteria (iv) and (v), when the non-conventionality of the meaning, which obeys criterion (iv), appears to come together with uncancelability, which violates criterion (v). Since we assume that cancelability constitutes a distinctive feature of conversational implicature, our way out of the problem comprises an extension of the area of conventional meaning (or, more generally, conventional information) to values that have been kept outside its domain. Among these we include illocutionary values and what can be taken as their entailments. All the cases to be discussed have been given in the literature as common examples of conversational implicature. In our view, they are suitable candidates for an extended domain of conventional implicature. Two subtypes will be considered, depending on the **trigger** of the inference: those that involve logical properties of expressions and those that involve properties of speech acts.

## 1.2. Borderline cases: intrinsic properties as the only source for inference

The following inferential sequences, where the proposition following the arrow is the presumed conversational *implicatum*, are found in Gazdar (1979: 50) as instances of conversational implicature. Our suggestion is that, with small variations, they all can be treated either as pure entailment or at least as conventional implicature.

- (1) It's possible that porosity leads to osmosis.  
→ It's possible that porosity does not lead to osmosis.
- (2) I believe he's ill.  
→ I don't know he's ill.

- (3) If John sees me then he will tell Margaret.  
 $\rightarrow$  I don't know that John will see me.

Let us concentrate on the first case. The reasons why Gazdar and other authors classified this kind of pattern as conversational implicature are obviously related to the fact that if the modal operator at stake is taken to be alethic – as *prima facie* it seems to be – and the alleged *implicatum* is taken to be an entailment of the uttered proposition, then, from the point of view of ordinary axiomatizations of modal logic, a paradox arises. In fact, as clearly shown in Levinson (1983: 140), in order for the entailment relation at stake to be legal, the required axiom system must incorporate axiom (4i) below, besides (4ii-iii):

- (4) i.  $\diamond p \rightarrow \diamond \neg p$                       ii.  $\Box p \rightarrow \diamond p$                       iii.  $\Box p \rightarrow \neg \diamond \neg p$

The unwanted result is that from (4i-iii) the following contradiction can be trivially derived:

- (5)  $\Box p \rightarrow \neg \Box p$

Things being so, the inferential pattern in (1) cannot, within the mentioned logical framework, be taken to involve entailment. Accordingly, those who argue that the relevant inference is cancellable, label it as “conversational implicature”. However, this categorisation and the associated cancelability contention are not indisputable, as shown in Burton-Roberts (1984). Without engaging here in this intricate discussion, we will assume that it can be proven that these cases do not involve cancellable inference and are therefore not conversational in nature. The way is then open for both an entailment and a conventional implicature analysis. We will not discuss this issue here, although we admit that the entailment path can be sustained, in case an epistemic rather than an alethic approach to the problem is adopted, as seems fit to the common use of the expressions under discussion. The viability of this latter solution is still more visible in connection with the patterns in (2) and (3), where the sources for inference are strictly epistemic – the verb *believe* and a conditional.

### 1.3. Conventional implicature involving properties of speech acts

We now move to a class of inferential schemata involving properties of speech acts, a specificity that extends their treatment from purely semantic considerations to the pragmatic domain of linguistic knowledge. Interestingly enough, this move could work as a crucial motivation for taking these patterns as genuine instances of conversational implicature. However, since cancelability, not confinement to semantics, is our main criterion, they will be considered conventional implicatures. They are exemplified below:

- (6) John has two PhDs.  
 → I believe he has and have adequate evidence that he has.[Levinson 1983: 105]
- (7) My sister is either in the bathroom or in the kitchen.  
 → I don't know that my sister is in the bathroom and I don't know that she's in the kitchen. [Gazdar 1979: 50]

The source for this kind of inference being the speech act, not the propositional content, it is quite obvious that it constitutes an omnipresent ingredient in natural language interpretation. This is, we think, a strong additional reason for subtracting it from the realm of conversational implicature, to which it only adds obscurity.

From a processing perspective, our main contention regarding this sort of implicature is that general rules can be formulated which systematically generate the inferences at stake. Taking a speech act as input, these rules are pragmatic in nature. However, their content, relating propositional attitudes, is clearly semantic. In (8) below, a possible form of one of these pragmatic and semantic inferential patterns is given. It would directly extract the *implicatum* in (6) from the utterance of the *implicans*. The rule clearly implies that the CP is being obeyed:

- (8) ASSERTS ( $x, p$ ) → BELIEVES ( $x, p$ ) ∧ HAS-EVIDENCE-FOR ( $x, p$ )

As for the sequence in (7), if we take the inferential pattern in (8) into account, the relevant *implicatum* can be seen as an entailment – within an epistemic logic – of the first member of the consequent of that pattern, namely a proposition of the form BELIEVES ( $x, [p \vee q]$ ):

- (9) My sister is either in the bathroom or in the kitchen.  
 → I believe that my sister is in the bathroom or that she is in the kitchen.

The inference involving *not to know* can be logically derived – given the appropriate epistemic logic – from the information relative to *believe*.

The pattern applying to questions can easily be formulated from the analysis of the proposition given as implicature, as exemplified with Levinson’s inference in (10). The logic would now have to be enriched with boulomaic values, given the need for computing *want*.

- (10) Does your farm contain 400 acres? [Levinson 1983: 105]  
 → I don’t know that it does and I want to know.

## 2. Structuring the domain of conversational implicature

In the previous section, we made use of the notion of **trigger** of an implicature. In the present section, where we will try to bring some structure into a narrowed domain of conversational implicature, we will need to consider, as an operational concept, the **information levels** that have to be summoned into the process of computing the implicature. With these two concepts in mind, we think that clarification arises if a distinction is drawn between two basic kinds of conversational implicature. For the sake of terminological parsimony, we will borrow the opposition **inner/outer-system**, used by Kas (1994) to distinguish between those monotonicity “inferences [that] need not refer to data outside the inferential engine itself” and those “that rely on data outside the inferential system”. Since this kind of opposition is very close to the one we want to bring into the implicature domain, we will adapt it to our field.

**Inner-system conversational implicature** can be briefly characterised as follows: (i) the trigger of the implicature is some expression in the relevant utterance that is vague in some respect (allowing, for instance, different assignments of values in a scale); (ii) the *implicatum* can either be closely related to the propositional content of the *implicans*, from which it is derived by selection of one of the possible interpretations that it leaves open – generally, but not always, the less specific one –, or it can instead be of an epistemic nature, focusing on the knowledge of the relevant speaker regarding

the relevant situation (namely, on his inability or his unwillingness to be more specific); (iii) the role of common ground information is limited to directly prompting one of these kinds of *implicata*.

This wide and complex category should include, possibly among others, cases related to the following areas of meaning: (i) **nominal quantification** (namely, with plural *some* and numerals); (ii) **indefiniteness**; (iii) **scales of situations** (cf.: *Herb hit Sally* → *Herb didn't kill Sally by hitting her* – Levinson 1983: 117; *Mary tried to cash a check* → *Mary did not succeed in cashing a check* – Gazdar 1979: 50); and (iv) **temporal ordering in discourse** (seen as a projection of real temporal sequence).

**Outer-system conversational implicature** has at least three distinctive features: (i) it is triggered by the uttered propositions taken as a whole, not by a particular semantic property of any expression; (ii) the *implicans* is typically not vague, and therefore the *implicatum* does not have to be derived from it in terms of more or less specific information; and (iii) the inference process crucially involves propositions that are introduced in the dependence of both belief systems and a common ground. The complex inferential process may, we think, involve a combination of concepts and calculi from the following domains: a Logic of Conversation (with Grice's ideas plus the concepts of 'common ground' and 'relevance'; an appropriate version of the Propositional Calculus; an appropriate version of an Epistemic Logic, including relativisation of truth to belief systems; a Calculus of Questions, incorporating the notion of 'satisfaction of an interrogative', possibly in connection with a cognitive theory of Problem Solving.

Quite obviously, what we have called "outer-system implicature" is an immense field, where fine-grained typologies can be established from different points of view. In the next section, we will take the point of view of computability, without any purposes of exhaustivity. We will try to show that the inferential processes under scrutiny can be reduced to a very small number of patterns, three of which will be subsequently presented. If our guess is good, the conclusion should be drawn that conversational implicature, although encompassing both semantics and pragmatics, is to a large extent rule-governed and that, as a consequence, ultimately is not outside the scope of rich systems of natural language computational processing. For the sake of brevity, we will restrict ourselves to the subtype of conversational implicature where the topic of the conversation is directly maintained and where the *implicans* is true.

### 3. On the computability of outer-system conversational implicature

The three inference patterns for computing outer-system conversational implicature considered in this section all stem from the inadequacy of some proposition as a solution to some problem (as we assume to be the case with every instance of this type of implicature), expressed by an assertion or a question. Accordingly, the three steps in (11) will constitute the initial part of all the arguments (where  $S2$ ,  $d$  and  $P$  are constants standing, respectively, for the speaker that interprets the *implicans*, the uttered discourse – or proposition, for that matter – and the problem demanding for a solution).

- (11) 1     $SAYS(S2, d)$  ..... conversational *datum*  
       2.     $d$  ..... 1, CP (maxim of quality)  
       3.     $\neg SOLVE(d, P)$  ..... problem resolution assessment

At this point different inference schemata may develop, depending on a choice between two paths: (i) searching for direct consequences of the uttered proposition and checking their capacity for solving the problem at stake, or (ii) taking the global utterance situation as the point of departure for reasoning. If the latter path is adopted, another alternative arises, between adding extra information until the problem is solved or blocking such monotonic process and indirectly reaching a conclusion. Clearly, the process is heuristic, rather than algorithmic.

#### A. Deducing a consequence directly from the uttered proposition

The following is a classical example of this sort:

- (12)  $S1$ : Can you tell me the time? ( $P$ ) /  $S2$ : Well, the milkman has come. ( $d$ )  
       *Implicatum*: It's past some contextually definable time. [cf. Levinson 1983: 97]

After step 3, we hypothesise that the inference proceeds following a computational instruction close to “EXTRACT RELEVANT (FACTUAL, NOT LOGICAL) CONSEQUENCES FROM THE UTTERED PROPOSITION UNTIL ONE IS FOUND THAT SOLVES THE PROBLEM”. At this stage, the common ground that constitutes the intersection of the belief systems of the speakers is the relevant knowledge base for the inference process. The procedure is rep-

resented in a more formal manner in (13), where superscripted ‘*BS / S1-S2*’ stands for the common ground seen as a parameter of truth evaluation.

- (13) 4.  $[d \rightarrow [p_1 \wedge \dots \wedge p_n]]^{BS / S1-S2}$ , for  $n \geq 1$  .....belief system / common ground
5.  $p_1 \wedge \dots \wedge p_n$  .....2, 4, Modus Ponens
6.  $p_i$ , for  $1 \leq i \leq n$  ..... 5, simplification
7.  $SOLVE(p_i, P)$  ..... satisfaction of interrogative
8.  $p_i \wedge SOLVE(p_i, P)$  ..... 6, 7, addition

Clearly, the implicature emerges at step 4. In fact, if the process of extracting belief-controlled consequences from the uttered proposition  $d$  is not activated, no implicature can be obtained. The relevant consequence in this case is a proposition close to “it is past  $x$  hours”.

Examples of the same kind are as follows (where, for brevity, we omit the *implicatum*): [*S1: What on earth has happened to the roast beef? S2: The dog is looking very happy.* (Levinson 1983: 126)]; [*S1: Can I borrow two hundred pounds from you? S2: It’s the end of the month.*]; [*S1: It’s cold in here.*]. In this latter subtype, the problem to be solved can be described as “making the intended message explicit”.

## B. Adding information up to solving the problem

- (14) *S1:* (to a passer by): I’ve just run out of petrol. ( $P$ )  
*S2:* Oh, there’s a garage just round the corner. ( $d$ )

Likely *Implicatum*: The garage is open and has petrol. [Grice 1967/1975: 51]

Crucially differing from the previous subtype of outer-system implicature, the present one, as exhibited in example (14) above, does not provide any direct (again, factual, not logical) consequence of the situation described in the uttered proposition that constitutes a solution to the problem at issue (of course, assuming that a garage being open and having petrol for sale is not a strict consequence of its mere existence). Accord-

ingly, the next step does not consist of extracting information from the utterance, but instead of adding information to it, until the problem finds a solution. In the present case, this addition is likely to involve the information that the existing garage is open and has petrol. Technically, the added information can be seen as information (say, a proposition  $p_i$ ) that, within the belief systems at stake, presupposes the uttered proposition  $d$ , a relation represented below by the formula  $PRESS(p_i, d)$ , to be read as “ $p_i$  presupposes  $d$ ”.

- (15) 4.  $[PRESS(p_i, d)]^{BS/S1-S2} \wedge [SOLVE(p_i, P)]^{BS/S1-S2}$  .belief system / common ground
5.  $[SAYS(S2, d) \wedge [PRESS(p_i, d)]^{BS/S1-S2} \wedge [SOLVE(p_i, P)]^{BS/S1-S2}$  . 1, 4, addition
6.  $[SAYS(S2, d) \wedge [PRESS(p_i, d)]^{BS/S1-S2} \wedge [SOLVE(p_i, P)]^{BS/S1-S2}] \rightarrow p_i$  .....  
 .....5, CP (maxim of Relevance)
7.  $p_i$  .....4, 5, Modus Ponens
8.  $p_i \wedge SOLVE(p_i, P)$  ..... 4, simplification; 7, addition

An intermediate step can be added where the direct deductive path of the previous type is tested, the conclusion being reached that, according to the belief systems being accessed, no consequence of  $d$  solves the problem. Notice that the implicature emerges at step 4 and becomes definitely grounded at step 6, where a conversational logic intervenes.

### C. Blocking any addition of information

In intuitive terms, the last schema amounts to sticking to the uttered proposition and taking it to mean that what could be appropriately said but is instead omitted is false. See (16):

- (16) *S1*: Did you like the boy you had dinner with last night? ( $P$ )  
*S2*: Well, he was wearing a nice shirt. ( $d$ )

Likely *Implicata*: He had no other motives of interest. / I didn't like him.

In this particular case, the problem to be solved is a *yes/no* question. Informally the reasoning proceeds as follows: (i) given the relevant belief systems,  $P$  having a positive answer (represented as  $A_{pos}(P)$ ) is equivalent to one or more propositions (say the ‘expected propositions’) being true; (ii) none of the expected propositions is implied by the uttered proposition; (iii) this latter fact is, by Relevance, taken as an indication that the expected propositions are false; (iv) the falsity of the expected propositions is *grosso modo* taken as equivalent to a negative answer to the initial question. More formally:

- (17) 4.  $[A_{pos}(P) \leftrightarrow [p_1 \vee \dots \vee p_n]]^{BS/S1-S2}$ , for  $n \geq 1$  belief system, common ground  
 5.  $\neg[[d \rightarrow p_1] \vee \dots \vee [d \rightarrow p_n]]^{BS/S1-S2}$  ..... belief system, common ground  
 6.  $[SAYS(S2, d) \wedge \neg[[d \rightarrow p_1] \vee \dots \vee [d \rightarrow p_n]]^{BS/S1-S2}] \rightarrow \neg[p_1 \vee \dots \vee p_n]$ ...  
 ..... 1, 5, addition; CP (Relevance)  
 7.  $\neg[p_1 \vee \dots \vee p_n]$  ..... 1, 5, addition, 6, Modus Ponens  
 8.  $SOLVE(\neg[p_1 \vee \dots \vee p_n], P)$  ..... satisfaction of interrogative  
 9.  $\neg A_{pos}$  ..... 4, 7, negation of equivalents

Other instances of this type are found in the literature: [ $S1$ : Is your mother well and back?  $S2$ : *Well she's back yes. / Possible implicatum: She's not well.* (Gazdar 1975: 51)]; also Grice's cases of the recommendation letter for the philosophy student (cf. 1967/1975 : 52) and the hilarious *Miss Singer produced a series of sounds corresponding closely to the score of an aria from Rigoletto* (cf. 1975: 55). Of course, when assertions rather than questions are at issue, as in the latter case, the problem solving component of the heuristic process has to undergo an adaptation.

## Conclusion

In this paper, we tried to improve the characterisation of conversational implicature, by narrowing the range of applicability of the concept and by imposing some structure into the remaining area. The first endeavour was reached by proposing a reanalysis of some inferences of implicature as conventional instead of conversational implicature. The second was hopefully achieved by establishing a typology of conversational implicature which organises the domain into two main subgroups: inner-system and outer-system

implicature. Within the second subgroup, we distinguished three classes, depending on the inferential strategies that are enforced, namely: direct deduction, monotone increase of information and blocking of additional information. The way is, of course, open for more fine-grained analyses.

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