

Exclusive disjunction without implicature

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For the purposes of this note, I will assume that the Gricean account of scalar implicature is correct. I admit that I don't have any qualms about making this assumption, since as far as I can tell, the Gricean account is the only game in town. But I thought I should mention it.

With this preliminary out of the way, let us proceed to the problem area, and start by considering the following example:

(1) Jill had some of the pears.

According to the standard story, the literal meaning of this sentence (what it "says") is that Jill had at least some of the pears. This meaning is complemented by a conversational implicature that results from the following reasoning: "If the speaker had known that Jill had all of the pears, he would have said so, and since he didn't, we are entitled to conclude that, for all the speaker knows, Jill didn't have all the pears." Thus, (1) is understood as conveying that Jill had at least some (literal meaning) but not all (scalar implicature) of the pears.

So far so good. But the received opinion is that the same analysis applies to disjunctive sentences (see, e.g., Horn 1989, and more recently Sauerland 2004, van Rooij and Schulz 2004, and Spector 2006):

(2) Jill had an apple or a pear.

In this case, the literal meaning is that Jill had an apple or a pear or both, and the implicature is derived as follows: "If the speaker had known that Jill had an apple as well as a pear, he would have said so, and since he didn't, we are entitled to conclude that, for all the speaker knows, Jill did not have an apple as well as a pear." Hence, (2) is understood as conveying that Jill had an apple and/or a pear (literal meaning) but not both (scalar implicature).

In a nutshell, this is the established Gricean doctrine. According to it, *some* and *or* are to be analysed in exactly the same way. From a logical point of view, this is what one should expect, given that \exists and \vee are so closely related. But the doctrine is flawed: it holds for *some* but not for *or*. That this is so becomes apparent when we start unpacking the sketchy analyses given above.

Fleshing out the Gricean analysis of (1), we get something along the following lines:

(i) Rather than saying (1), the speaker could have said:

(1') Jill had all the pears.

Why didn't he do so?

(ii) The most likely explanation is that the speaker doesn't know if (1') is true: $\neg K(1')$.

(iii) The speaker is knowledgeable about (1'), i.e. $K(1') \vee K\neg(1')$.

(iv) Between them, (ii) and (iii) entail $K\neg(1')$: the speaker knows that Jill didn't have all the pears.

(I have chosen to formulate the argument in terms of speaker's knowledge, where belief or commitment would have been more appropriate. This choice is immaterial: the logical structure of the argument would be the same in any case.) Now that we are looking at it more closely, it turns out that what appeared to be an immediate inference is actually derived in two steps: first we obtain a weak implicature, $\neg K(1')$, which is subsequently strengthened to $K\neg(1')$. In order to proceed from the weak implicature to the strong one, we need the premiss that the speaker is knowledgeable about the alethic status of the stronger statement he could have made (iii). There are various ways of formulating this, but the leading intuition is simply that the speaker knows what he is talking about. In the case at hand, this is to say that he knows whether or not (1') is true. Following van Rooij and Schulz (2004), I will call this the "competence assumption". In a scenario in which the competence assumption cannot be accepted, the strong implicature cannot be derived, either.

It should be stressed that "competence assumption" is a term of art, which can be somewhat misleading. What we need is just that the speaker is not in doubt about the stronger proposition. I take it that, in the majority of cases, this premiss is motivated by the assumption that the speaker knows what the relevant facts are—and this is what justifies the term "competence assumption". But the argument will work equally well if the speaker is merely taken to be opinionated.

I believe it is not unlikely that, within a certain range of circumstances, the competence assumption holds by default, or at the very least, that hearers will tend to assume that it holds. This is not to say that, by default, speakers are trusted to be competent *tout court*. The cases we are concerned with are quite special. Consider again how the statement in (1) prompts the hearer to infer that (1') must be false. (1) and (1') are on the same topic: both answer the question how many pears Jill had; and it is *because* it answers the same question that (1') is an alternative to (1). Now it seems reasonable for the hearer to expect that, all things being equal, if a speaker addresses an issue, the information he has at his disposal is good enough to settle it. Hence, the hearer will tend to assume that the speaker is competent in our favoured sense of the word.

Let us say that $\neg K(1')$ is the “weak scalar implicature” associated with (1), and that $K\neg(1')$ is the sentence’s “strong scalar implicature”. Now my main point is this: generally speaking, disjunctive sentences cannot give rise to strong scalar implicatures: if an utterance of a disjunctive sentence “ φ or ψ ” licenses the inference that φ and ψ can’t be true together, then in general this inference cannot be accounted for by the kind of analysis used for the *some*-sentence in (1).

In order to show that the case of *or* is special, let us try transposing our analysis of (1) to the disjunctive sentence in (2):

- (i) Rather than saying (2), the speaker could have said:
 (2') Jill had an apple and a pear.
 Why didn't he do so?
- (ii) The most likely explanation is that the speaker doesn't know if (2') is true: $\neg K(2')$.
- (iii) The speaker is knowledgeable about (2'), i.e. $K(2') \vee K\neg(2')$.
- (iv) Between them, (ii) and (iii) entail $K\neg(2')$: the speaker knows that Jill didn't have an apple and a pear.

The trouble is that, in this case, the competence assumption is not plausible at all. On the contrary, it may be argued that, *ceteris paribus*, it is more likely to be false. An utterance of (2) will typically license the inferences that the speaker doesn't know if Jill had a pear and that he doesn't know if she had an apple, either; needless to say, these are implicatures, too. And if a speaker doesn't know if φ is true and doesn't know if ψ is true, then it is *a priori* unlikely that he knows whether the conjunction of φ and ψ is true. Therefore, if (2) gives rise to the inference that, according to the speaker, Jill didn't eat an apple as well as a pear, then this inference is not a strong scalar implicature. An utterance of (2) may still give rise to a weak scalar

implicature, of course, but the strong one can only be derived in special circumstances.

There are many instances of disjunction in which the competence assumption is satisfied trivially by virtue of the fact that it is common knowledge that the two disjuncts cannot be true together. It will usually be common knowledge, for example, that people cannot be in two places at once, so if Jack says that Jill is in Amsterdam (φ) or Berlin (ψ), his audience may plausibly assume that Jack knows whether “ φ and ψ ” is true, and thus arrive at the conclusion that, according to Jack, Jill isn’t bi-locating between Amsterdam and Berlin. But clearly this is a spurious argument: if it is common knowledge that the conjunction cannot be true, it follows directly that the speaker knows this. It is pointless to derive an implicature to “confirm” this conclusion, especially since the implicature would require the same premiss.

There are special instances of disjunction in which the competence assumption is satisfied in a way that does not preempt the derivation of a strong scalar implicature. For example, suppose Jill tells Jack:

(3) You may have an apple or a pear.

In this case, the competence assumption is that Jill knows whether or not she would grant Jack permission to have an apple and a pear, and it is more than likely that she knows this; while at the same time there is no reason to assume a priori that Jack doesn’t have Jill’s permission to have an apple and a pear. Hence, in this very particular case, the inference that Jack isn’t allowed to have both *does* count as a bona fide scalar implicature. Note, however, that this only holds for the permission-giving interpretation of (3). The same sentence may also be used to report on what the addressee may do according to some third party, in which case the competence assumption is as problematic as before (for further discussion of the various readings of *may*-sentences, see Geurts 2005).

Summing up: whereas for *some*-sentences there may be a default presumption to the effect that the competence assumption is satisfied, with *or* there can be no such thing; for in the case of disjunction, the competence assumption is either special or spurious. Hence, contrary to what the textbooks say, the Gricean account predicts that, in the vast majority cases, the exclusive interpretation of *or* is not due to a scalar implicature. Is this a problem? I don’t think it is. In fact, I believe that this prediction is correct.

Before I start arguing that this is so, I should like to note that, as far as we can tell from his writings, this prediction is in accord with Grice’s own views. Although on several occasions Grice discusses *or* at length, explaining in great detail how his theory accounts for the fact that a disjunctive statement may give rise to inference that the speaker has “non-truth-functional

reasons” for making his claim (i.e., he is concerned with what I call the weak scalar implicature associated with *or*), he never even considers the possibility that the exclusive construal of *or* might be due to an implicature, as well. Assuming that Grice is a cooperative author, this implicates that, in Grice’s own opinion, this construal cannot be explained in terms of implicature. Hence, we are entitled to conclude that this is the True Gricean Position on exclusive disjunction.

It will be clear that the empirical issue raised by the TGP cannot be decided by introspective evidence, and calls for experimental data of a somewhat special kind. What we need is an experimental setup which factors out as much as possible the role of world knowledge. This was done in an acquisition study by Paris (1973), who presented his subjects with (inter alia) disjunctive sentences whose content was concrete but arbitrary, e.g. “The bird is in the nest or the shoe is on the foot.” Subjects had to decide whether or not such sentences were true of a pair of pictures. The materials contained sentences with *or* as well as *either...or*. Paris’s main result was that, overall, inclusive interpretations were preferred: 82% for *or*-sentences and 76.5% for *either...or*. For adults, the rates were 75% and 68.5%, respectively. (So, even if the difference between *or* and *either...or* was statistically reliable, these data are at odds with the widely held belief that *either...or* forces an exclusive interpretation.)

While Paris’s results indicate that the “neutral” interpretation of *or* (and *either...or*) is inclusive, Noveck et al. (2002) maintain that the experimental evidence at large is “not entirely consistent”, and in support of this assessment they pit Paris’s data against Braine and Romain’s (1981). In an acquisition study with children in three age groups and adult controls, Braine and Romain had a puppet make disjunctive statements about the content of a box, e.g. “Either there is a horse or a duck in the box.” The box always contained four different toy animals, and each box corresponded to a row in a classical truth table; i.e., for the given sentence, there would be one condition in which the box contained a horse as well as a duck, one condition with a horse and no duck, etc. Braine and Romain’s main result was that, whereas children preferred inclusive interpretations in at least 73% of the cases, only half of the adults judged a sentence true if both of its disjuncts was true. So, according to this study, adults don’t show a distinct preference for either interpretation.

However, Braine and Romain’s experimental setup is flawed in at least two respects. First, as the authors themselves acknowledge, the fact that the boxes always contained two or three “irrelevant” animals proved to be confusing, and led a considerable number of subjects to conclude that a statement was only partly right. Secondly, and more seriously, both the

puppet and the subject could see what was in the box, a scenario which guarantees that the use of a disjunctive statement is downright perverse; for, as observed before, an utterance “ φ or ψ ” normally implies that the speaker doesn’t know if φ is true and doesn’t know if ψ is true. A clear indicator of these design flaws is that, in those cases in which only one of the disjuncts was true, adult subjects rejected the puppet’s statement no less than 27% of the time; the corresponding percentages for children ranged from 42% to 83%. In short, the significance of Braine and Romain’s results is up for grabs.

The upshot of the foregoing discussion is that there is no experimental evidence for the claim that *or* is interpreted as exclusive disjunction by default. On the contrary, Paris’s data show that, if the influence of world knowledge is curbed, the preferred construal of *or* is inclusive. However, this does nothing to prove that the True Gricean account of disjunction is correct. In order to obtain positive evidence for this view, *or* should be compared with other scalar terms in one experimental design. This is what I did in a study with Nausicaa Pouscoulous (Geurts and Pouscoulous, in preparation), whose objective was twofold: we wanted to compare scalar expressions that we expected to behave differently, viz. *or* and *some*; and we wanted to compare different paradigms for eliciting implicatures. The critical sentences in our experiment were the following:

- (4) a. Some of the B’s are in the box on the left.
 b. There are A’s or C’s in the box on the right.

These sentences were presented in two different conditions. First, there was an inference task, in which subjects had to decide whether the statements in (4) implied, respectively, that not all of the B’s were in the box on the left, and that the box on the right didn’t contain A’s as well as C’s. Secondly, there was a verification task, in which subjects had to say whether these sentences correctly described the following situations:

for (4a):

B B B C C C

A A A

 for (4b):

D D D

A A A B B C C C

The results were as follows. In the inference task, 92% of our subjects concluded from (4a) that not all of the B’s are in the box on the left, while only 43% took (4b) to imply that the box on the right doesn’t contain both A’s and B’s. The corresponding rates in the verification task were much lower: in the critical conditions, (4a) was rejected 54% of the time, and (4b) was rejected in a mere 12% of the cases.

It is fairly clear why the two tasks should produce different results. In the inference task, subjects are presented with a stronger statement, and have

to decide whether it follows from the given premiss. This procedure not only makes the stronger proposition *relevant* to the experimental discourse, but also suggests that it might be true. The verification task neither raises the salience of the stronger statement nor suggests that it might be true, and is therefore a better instrument for measuring spontaneous scalar inferences. Note, incidentally, that the standard introspective method of collecting evidence on implicatures is simply a self-administered inference task. Hence, it is not unlikely that the data on which the implicature industry is largely dependent are, at the very least, distorted.

In both tasks, we find marked differences between disjunctive and existential sentences. The rates at which implicatures are derived in the inference task are 92% for *some* vs. 43% for *or*; the corresponding rates in the verification task are 54% vs. 12%. There are two factors that, between them, explain this pattern. First, the use of the partitive indefinite, *some of the B's*, in (4a) will tend to raise the salience of the stronger proposition, especially as the indefinite occurs in subject position. By contrast, the use of *or* as in (4b) does not, in itself, raise the salience of the conjunctive alternative. Secondly, as I argued above, in the case of *some* there will be a stronger tendency to accept the competence assumption than in the case of *or*. Thus, the True Gricean Account explains our findings.

In this note, I have defended the quite modest claim that *or* is different from other scalar expressions. But some of the issues I raised are of broader interest. First, if I am right, all scalar expressions are not alike. This is an important point, because so far this diversity has not been recognised, and all theories of scalar implicature presuppose that they are dealing with a homogeneous set of data. I have argued that, contrary to the received opinion, the True Gricean Theory is compelled to make distinctions, which are confirmed by experimental data, and it remains to be seen whether alternative theories can make similar distinctions.

Secondly, some of the discussion in this note bears on the vexed distinction between generalised and particularised implicatures. Neo-Griceans like Horn maintain that the inferences associated with *some*, *or*, etc. are generalised conversational implicatures, but many authors have either ignored the distinction or have tried to reason it out of existence (e.g., Sperber and Wilson 1995, Geurts 1998). I continue to believe that we should be wary of the generalised/particularised distinction, and that, in principle, scalar implicatures are as context dependent as the next pragmatic inference. However, the data presented above cause a problem for strong versions of this position. For, it turns out that, even in a scenario that is perfectly neutral, there will still be a substantial number of people that construe *some* as implying *not all*; other data confirm this finding (e.g., Noveck 2001). To be sure, since the

crucial rate was only just above chance level, this should not be interpreted as evidence for the neo-Gricean position that scalar implicatures arise “normally speaking” or “by default”. But, in the case of *some*, there *is* a certain tendency to derive a scalar implicature which does not seem to be dependent on specific features of the context. I suggested an explanation of this fact, which admittedly is still somewhat tentative. It also remains to be seen how other scalar expressions behave in this regard.

References

- Braine, M. D. and B. Rumain (1981). Development of comprehension of “or”: evidence for a sequence of competencies. *Journal of experimental child psychology* 31: 46–70.
- Geurts, B. (1998). Scalars. In P. Ludewig and B. Geurts (Eds.), *Lexikalische Semantik aus kognitiver Sicht*, pp. 85–117. Tübingen: Gunter Narr.
- Geurts, B. (2005). Entertaining alternatives: disjunctions as modals. *Natural language semantics* 13: 383–410.
- Geurts, B. and N. Pouscoulous (in preparation). Local implicatures?
- Grice, H. P. (1989). *Studies in the way of words*. Cambridge, Massachusetts: Harvard University Press.
- Horn, L. R. (1989). *A natural history of negation*. Chicago University Press.
- Noveck, I. (2001). When children are more logical than adults: experimental investigations of scalar implicature. *Cognition* 78: 165–188.
- Noveck, I. A., G. Chierchia, F. Chevaux, R. Guelminger, and E. Sylvestre (2002). Linguistic-pragmatic factors in interpreting disjunctions. *Thinking and reasoning* 8: 297–326.
- Paris, S. G. (1973). Comprehension of language connectives and propositional logical relationships. *Journal of experimental child psychology* 16: 278–291.
- Sauerland, U. (2004). Scalar implicatures in complex sentences. *Linguistics and philosophy* 27: 367–391.
- Spector, B. (2006). *Aspects de la pragmatique des opérateurs logiques*. Doctoral dissertation, University of Paris VII.
- Sperber, D. and D. Wilson (1995). *Relevance* (2nd edition). Oxford: Blackwell.
- van Rooij, R. and K. Schulz (2004). Exhaustive interpretation of complex sentences. *Journal of logic, language and information* 13: 491–519.