Taking the epistemic step: Toward a model of on-line access to conversational implicatures

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ABSTRACT

There is a growing body of evidence showing that conversational implicatures are rapidly accessed in incremental utterance interpretation. To date, studies showing incremental access have focussed on implicatures related to linguistic triggers, such as 'some' and 'or'. We discuss three kinds of on-line model that can account for this data. A model built around the notion of linguistic alternatives stored in the lexicon would only account for linguistically triggered implicatures of the kind already studied and not so-called 'particularised' implicatures that are not associated with specific linguistic items. A second model built around the idea of focus alternatives could handle both linguistically triggered implicatures and so-called particularised implicatures but would be insensitive to the role that information about the speaker's mental state plays in deriving implicatures. A third more fully 'Gricean' model takes account of the speaker's mental state in accessing these implications. In this paper we present a visual world study using a new interactive paradigm where two communicators (one confederate) describe visually-presented events to each other as their eye movements are monitored. In this way, we directly compare the suitability of these three kinds of model. We show hearers can access contextually specific particularised implicatures in on-line comprehension. Moreover, we show that in doing so, hearers are sensitive to the relevant mental states of the speaker. We conclude with a discussion of how a more 'Gricean' model may be developed and of how our findings inform a long-standing debate on the immediacy of on-line perspective taking in language comprehension.

1. Introduction

Conversational implicature is a phenomenon that has attracted much attention since the work of Grice. Grice's contribution was to argue that apparently central components of meaning in language could be explained as not deriving from the conventional or encoded meaning of sentences but as inferences about what the speaker means to convey indirectly, over and above what the sentence means in context (Grice, 1989). One of Grice's examples of indirect communication is the case of the uninformative academic reference: Imagine receiving a reference for a candidate for an academic post which states only that the person in question was always punctual for meetings. You would probably infer that the reference-writer did not say anything about the candidate's academic abilities because she had nothing good to say. You would probably also infer that the reference writer must have intended you to infer this and to see that she so intended. Thus, in an indirect way, the reference writer has communicated her estimation of the candidate without explicitly giving it. Grice's pragmatic theory provides a rational reconstruction

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of such indirect communication in terms of general expectations we have of each other as communicators. Grice proposed that his theory could account for a wide range of phenomena that had previously been seen as purely linguistic. For example, students would normally understand a teacher who says, 'Some of you got an A on the test' to mean that not all of them got an A. Although this example might not seem at first to involve indirect communication as in the uninformative reference case, Gricean theory would derive the implication in a similar way, as illustrated in Table 1a below. In particular, the implication would be derived by making an inference about the speaker's intentions in the specific situation in which the utterance is produced, relative to mutually assumed expectations of relevance.

Recently, some psycholinguistic evidence has come to light suggesting that the results of Gricean reasoning are accessed in incremental online interpretation. For instance, Sedivy (Grodner & Sedivy, 2011; Sedivy, 2003) argues that the use of pre-nominal modification (as in (1)) to trigger a contrastive inference before the on-set of the noun (see Sedivy, Tanenhaus, Chambers, & Carlson, 1999) is likely to be the effect of Gricean reasoning.

(1) Pick up the tall glass.

Other studies by Huang and Snedeker (2009, 2011) and Grodner, Klein, Carbary, and Tanenhaus (2010) reveal similar on-line effects.

Another much studied phenomenon is so-called scalar quantity implicatures, as where the teacher saying 'some' implies not all (see Geurts, 2010). Breheny, Katsos, and Williams (2006) provide evidence from reading-time studies that where (2) is understood to imply that not all of the consultants had a meeting with the director, this information is integrated while participants are reading the quantificational constituent:

(2) Some of the consultants had a meeting with the director.

Similar evidence for on-line access to scalar implicatures is reported in Panizza, Chierchia, and Clifton (2009; see also Katsos, Breheny, & Williams, 2005; Katsos, 2008).

While studies such as these reveal the effects of pragmatic reasoning in incremental interpretation, it is yet to be determined how this occurs. Psycholinguistic models tend to be set up to account for comprehension in terms of how meaning is *selected* from a range of alternatives provided by information encoded in linguistic stimuli, possibly augmented by contextual information. For example, lexical or syntactic ambiguities give rise to a decision problem generated simply by competing linguistic representations associated with given forms. As mentioned, according to Grice's account of these implicatures, content is added over and above what is encoded as conventional meaning. In Grice's theory, implicatures are not associated with any linguistic forms but are derived from the use of a given form by a speaker in a context. So, 'x is always punctual' does not encode that x is not suitable for the job. In fact, in some contexts, it can mean the opposite.

One way in which we may begin to bring implicatures into on-line models is suggested in neo-Gricean theory (Gazdar, 1979; Horn, 1984; Levinson, 2000). According to this theory, there are two classes of implicature: generalised and particularised. A generalised implicature is one which is associated with a specific form of words and, in neo-Gricean theory, is available by default and only withdrawn or 'cancelled' under certain circumstances. The much-studied implicature involving the quantificational determiner, 'some', illustrated in (2), is thought to be a generalised, so-called, 'scalar' implicature. Putting aside details of neo-Grican theory, it seems clear that, from a psycholinguistic perspective, generalised implicatures, such as scalars, could be accessed rapidly on-line in virtue of the existence of linguistic triggers.

Levinson (2000) proposes that only implicatures that have specific linguistic expressions as triggers could be accessed incrementally. Both of the types of implicature illustrated in (1) and (2) are plausibly cases that have linguistic triggers. According to Levinson's theory, quantificational

Table 1
(a) Key steps in the derivation of the *and not all* quantity implicature according to Gricean pragmatics. (b) Key steps in the derivation of the *and nothing else* quantity implicature according to Gricean pragmatics.

(a)
I. The teacher has said that some of the students did well on the test. For all that is said, it could be true that all of the students did well
II. However, given (i) that the utterance is telling us about how the students did on the test and (ii) the mutually assumed expectation that the teacher will give as much information as is relevant modulo her own knowledge and preferences...
III. It would clearly be deficient of the speaker to have said what she did if she had known that all of the students did well
IV. So we can conclude that the teacher does not know that all of the students did well
V. Given that the speaker knows all about how the students did, we can conclude that not all of the students did well
VI. The speaker intends me to reason as above

(b)
I. The speaker has said that the woman put a spoon into the box. For all that is said, the woman could have put many things in addition to a spoon into the box
II. However, given (i) that the utterance is telling me about what the woman put into the box and (ii) the mutually assumed expectation that the speaker will give as much information as is relevant modulo her own knowledge and preferences...
III. It would clearly be deficient of the speaker to have said what she did if she had known that the woman put other things into the box
IV. So I can conclude that she does not know that the woman put other things into the box
V. Given that the speaker knows all about what the woman put into the box, I can conclude that the woman did not put other things there
VI. The speaker intends me to reason as above