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Journal of Pragmatics 99 (2016) 78–95

journal of PRAGMATICS

www.elsevier.com/locate/pragma

Why only some adults reject under-informative utterances

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Received 15 July 2015; received in revised form 29 April 2016; accepted 2 May 2016
Available online 31 May 2016

Abstract

Several studies have investigated how listeners generate scalar implicatures using the under-informative statement paradigm, where participants evaluate statements such as ''Some of the cards have a star'' as descriptions of situations in which all of the cards have a star. Rejection of the under-informative utterances is taken as evidence that participants have interpreted these sentences with a scalar implicature, to the effect that ''Some but not all of the cards have a star''. However, acceptance rates of under-informative utterances exceed 35% in many studies (Bott and Noveck, 2004; Guasti et al., 2005; Pouscoulous et al., 2007; i.a.). The aim of our experimental investigation is to examine the cognitive or personality profile of participants who reject under-informative utterances. We provide empirical evidence that age and working memory capacity significantly predict the rate at which under-informative utterances are rejected, but find little support for influence from a broad range of personality factors.

Keywords: Scalar implicature; Pragmatics; Executive functions; Working memory; Personality factors

1. Introduction

In the Gricean account of implicature (Grice, 1989) a broad category of implied meanings arises from violations of the first maxim of quantity, which enjoins interlocutors to make their contributions ''as informative as is required (for the current purposes of the exchange)'' (Grice, 1989:26). These include the much-discussed case of scalar implicatures (SIs). According to an influential account proposed by Horn (1972), SIs are computed on the basis of pre-existing linguistic scales which order lexical terms (such as ''some'', ''all'') with respect to the strength of the information that they convey. The use of a proposition with a less informative term (e.g. ''some'') implicates that the proposition with the more informative term (e.g. ''all'') does not hold, as in (1)–(2) below.

(1) A: Did all of his students fail the exam?
B: Some of his students failed the exam

(2) Not all of his students failed the exam.

The precise mechanism by which SIs are generated has been the subject of much linguistic debate (Carston, 1998; Chierchia, 2004; Chierchia et al., 2011; Hirschberg, 1991; Geurts, 2010; Levinson, 2000; Sperber and Wilson, 1986/1995;

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http://dx.doi.org/10.1016/j.pragma.2016.05.001
0378-2166/

among others). On the Gricean view, computing a SI is a reasoning process about the speaker's intentions that involves taking into consideration a rich array of linguistic and extra-linguistic information. This includes (a) the literal meaning of the utterance; (b) the purpose of the utterance and assumptions about the speaker's cooperativity; (c) sensitivity to the first maxim of quantity, i.e. awareness that there is a more informative proposition that could have been used but was not; and (d) the interlocutor's epistemic state, i.e. the assumption that the speaker is knowledgeable about the situation. Similar accounts have been proposed by Hirschberg (1991), Geurts (2010), and Relevance theorists (Carston, 1998; Sperber and Wilson, 1986/1995). We call these accounts collectively the ''contextual accounts'' because, even though they may differ in the details of the implicature derivation, they all assume that SIs (a) are always generated through a nonce inferential process of the type proposed by Grice and (b) are context dependent and arise only when certain contextual information is available to the interlocutor (such as the information in b-d in the Gricean derivation above). Horn's (2004, 2005) account of SI might also be classified as a contextual one, at least in terms of the processes that lead to the generation of the SI. In his view, scalar terms normally and most commonly appear in contexts that licence a SI (''default'' contexts), but SI computation is still considered to be a context-driven process.

An alternative proposal is that SIs are generated by default (Chierchia, 2004; Levinson, 2000). According to this view, the scalar inference is always retrieved upon encountering a scalar trigger without reference to the communicative context and without the elaborate reasoning proposed by Grice. Subsequently, the SI may be cancelled if the appropriate contextual assumptions are not met (such as the assumptions in b-d above).

Finally, the grammatical account (e.g. Chierchia et al., 2011; see also Fox, 2007) posits that SI computation is achieved through a covert focus operator **O** which is assigned by the grammar, can take scope over any constituent with a propositional meaning, and has similar properties to the word ''only''. In (1), for instance, this proposal suggests that the silent grammatical operator **O** takes scope over the sentence with the scalar term ''some'' which leads to the negation of the alternative proposition with ''all'' and, hence, to the computation of the SI.

A prolific strand of research has tried to adjudicate between theoretical accounts of SI (particularly, the contextual theory and Levinson's (2000) default theory) using the ''under-informative statement task'' (Bott et al., 2012; Bott and Noveck, 2004; De Neys and Schaeken, 2007; Noveck and Posada, 2003; i.a.). Typically, in this paradigm participants are asked to perform a timed binary truth-value judgement task on sentences such as (3).

(3) Some elephants have trunks.

Rejection of (3) is assumed to indicate the generation of the SI ''some but not all'', whereas acceptance of (3) an interpretation without the SI. Consequently, by comparing rejection and acceptance times, it is possible to compare interpretations with and without the SI, respectively.

Most of these investigations have largely focused on the time-course with which under-informative sentences are rejected as compared to their acceptance. Processing models inspired by the contextual view often assume that SIs incur an additional processing cost compared to semantic meaning (e.g. Bott et al., 2012; Bott and Noveck, 2004; Breheny et al., 2006). This is because computing a SI depends upon contextual information, which is not required for accessing the plain meaning of scalar terms. A processing instantiation of Levinson's (2000) default theory (henceforth, the ''default model''), on the other hand, predicts no processing cost for SIs, since the inference is automatically generated at the lexical level and is relatively context independent.[1] However, the default model further assumes additional costs whenever the SI is not generated. In these cases, the inference, which had been generated by default, is cancelled, leading to processing costs associated with backtracking and re-analysis (e.g. Bezuidenhout and Cutting, 2002). All in all, the majority of studies that employed the under-informative statement paradigm have reported longer response times in the rejection case, which has been taken as evidence in favour of the contextual over the default model, in that SI interpretations appear to be associated with a processing cost (e.g. Bott et al., 2012; Bott and Noveck, 2004; Noveck and Posada, 2003).

However, one finding that has not received much attention within this body of research is that there is always a group of adults who systematically fail to reject under-informative utterances (Bott and Noveck, 2004; Guasti et al., 2005; Pouscoulous et al., 2007; i.a.). This seems to suggest that some (otherwise cognitively and linguistically normal) adults do not derive SIs in response to these stimuli. In this paper we follow up on studies that used the under-informative statement paradigm (Bott et al., 2012; Bott and Noveck, 2004; De Neys and Schaeken, 2007; Noveck and Posada, 2003) in order to examine which personality traits or cognitive factors influence whether adults will reject an under-informative utterance or not.

[1] See Levinson (2000:5 and 104) where he suggests that SIs are derived at the lexical level, without being affected by contextual information or background assumptions; and Levinson (2000:27–29) where he argues that one of the reasons for the existence of default generalised conversational implicatures (like SIs) is that they are ''cheap'' inferences, which maximise the efficiency and speed of communication (see also p. 382, where he explains ''cheap'' in terms of processing time).