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How do 3- and 5-year-olds respond to under- and over-informative utterances?

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Abstract

As children learn their native languages, they come to have detailed expectations about how to refer to things. These expectations and the detection of their violations are key to inference-making processes. But what do children do when their expectations are not met? Using reaction-time measures and gaze-direction monitoring in a referential communication task, we investigated whether 3- and 5-year-olds notice the infelicity of under- and over-informative utterances and then seek out further information in order to recover the speaker's intended meaning. We tested how children resolve under-informative instructions such as ''Find the orange'' when there is more than one orange in view. We also tested whether instructions such as ''Find the cat with a tail'', in a context where there is only one, normal-looking cat, would lead them to question why the speaker was over-informative and to seek out further information. Both age groups were sensitive to the ambiguous instructions. Only 5-year-olds were significantly delayed and more likely to check their interlocutor's gaze when responding to over-informative expressions. We discuss how children's spontaneous motivation to resolve violations of expectation, coupled with increased speed of linguistic processing, drives language learning.

Keywords: Language acquisition; Referential communication; Referring expressions; Informativity; Repair

1. Introduction

As children learn their native language they develop very detailed expectations about what terms might be used to talk about a given situation. Indeed, some recent accounts consider this ability to predict what will be said given the context to be central to language acquisition (Ramscar et al., 2010). In particular, with regard to the development of referential choice, children need to learn to expect speakers to produce referring expressions that provide just enough useful information for the hearer to identify the referent in question (as adults do: Ariel, 1988). Recent research has demonstrated that, at around 5 years of age, children disprefer both under- and over-informative referential expressions when compared to optimally informative equivalents (Davies and Katsos, 2010). However, there is relatively little research indicating how young children act once they detect an infelicitous referential expression. Taking action is important for two reasons. First, as language comprehenders (in the moment), children need to take steps to accurately ascertain what it is that their interlocutor is talking about (see Sperber and Wilson, 1986/95, for a general theory of this process). Second, as language learners (in the longer term), children need to be able to check why people use the language they do in a given situation in

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order to adjust their language model. In this study, we tested whether children detect pragmatic infelicities due to under- or over-informativity in a referential communication task (where the instructions were always semantically accurate). Of particular interest is whether, and by what means, they actively seek out further information in order to recover the speaker's intended meaning.

1.1. Comprehending under-informative utterances

A vast body of work has investigated children's comprehension of under-informative expressions. For example, Revelle et al. (1985) found that 4-year-olds were able to detect ambiguous messages in a referential communication task and generally requested clarification before taking action. The 3-year-olds in their study, however, lacked verbal strategies for coping with ambiguity, although they exhibited appropriate and selective monitoring responses for other kinds of problems such as unintelligible or impossible requests (Revelle et al., 1985; see also Flavell et al., 1981). It has been debated whether young children can even detect if a request is intrinsically ambiguous, or if they only discover the communicative problem if it renders them unable to act, as suggested by Markman (1977, 1981) and Robinson and Peter Robinson (1977). Singer and Flavell (1981) investigated the question of how a positive versus negative communicative outcome influenced children's judgments of ambiguity. 5-year-olds' but not 7-year-olds' responses depended on whether the listener said he could not comply with the instruction. These results suggest that, during the early school years, children develop the awareness that an ambiguous message is intrinsically unclear regardless of the listener's response to it. More recently, Nilsen et al. (2008) found that 4-year-old children show sensitivity to ambiguity from another listener's perspective, even when they possess private knowledge that allows them to resolve the ambiguity. This last result was only found when measures of *implicit* awareness (child's eye movements between possible referents) rather than *explicit* awareness (request for clarification) were taken (Nilsen and Graham, 2012; Nilsen and Fecica, 2011). This raises the question of whether even younger children are implicitly sensitive to referential ambiguity.

Evidence from the word learning literature suggests that children have the pragmatic wherewithal to detect ambiguity and seek clarifying information from an interlocutor. For example, it is established that 2- to 4-year-olds check the gaze of their interlocutor in an attempt to establish which of two possible objects she is referring to with a novel word (Nurmsoo and Bloom, 2008; see also Diesendruck, 2005; Grassmann et al., 2009). Indeed, even 13-month-old infants check the line of regard of an interlocutor more when a novel word is produced with two novel objects in view rather than one (Vaish et al., 2011). It is thus possible that young children can exploit indications of the speaker's epistemic state in order to resolve ambiguous referring expressions. However, there are several reasons to think that the application of these early pragmatic skills to reference resolution in other settings may not be straightforward (Matthews et al., 2006). First, the use of a novel word renders the presence of a communication gap that needs to be repaired obvious to the child. In contrast, when a familiar word is used ambiguously in the presence of two similar objects, resolution is more challenging because it requires the child to detect the ambiguity per se. Moreover, when utterances and the contexts they are produced in become more complex, the number of inferences a child could draw at any one moment increases exponentially. Whereas in a word learning task the child is presented with one novel word and one or two objects, in referential communication tasks (and arguably in many everyday interactions), children are presented with complex descriptions made up of familiar words and structures (drawn from a set of many possible alternative descriptions) and large arrays of objects. It is an empirical question as to how children respond to inferences about the speaker's intent under such circumstances.

1.2. Comprehending over-informative utterances

That a referring expression has to contain enough information to identify a referent is not the only expectation one might have regarding the informativity of a sentence: utterances that contain too much information are also infelicitous. Although far less research has investigated children's sensitivity to over-informativity, Davies and Katsos (2010) demonstrated that 5-year-olds tend to judge object descriptions with redundant adjectives as non-optimal. As a result of this growing expertise, 5-year-old children consider the addition of some adjectives to a canonical description to mark a contrastive function. For example, Huang and Snedeker (2008) adapted the referential paradigm used by Sedivy et al. (1999) and found that 5-year-olds match a modified expression to a target object more rapidly in trials containing a contrast set. Likewise, a recent study of 3-year-olds' adjective comprehension suggests that even at this age there is some sensitivity to over-informativity. Bannard et al. (2013) had children observe one adult use a novel adjective to request a toy from another adult (e.g., ''Give me the dilsige duck''). If the use of the adjective was justified by a contrastive motive (e.g., there were two ducks in view, one of which was marked), then children were more likely to imitate the use of the adjective than if there was no reason to produce it (i.e., because there was only one duck). Thus, children as young as 3 years of age were more reluctant to imitate an adjective if they thought its use would be over-informative. This is in line with findings that, in simplified contexts, children as young as 2 years of age tend to avoid producing redundant information in their referring expressions (Matthews et al., 2007, 2012). Therefore it seems to be the case that from 3 years of age, children are able to