The roles of feedback and working memory in children's reference production

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ABSTRACT

Children's communicative perspective-taking ability was investigated in a sample of 62 5- and 6-year-olds using a spoken production referential communication task in which speakers identify target objects for listeners. We assessed whether children would make use of non-verbal negative feedback to improve their future production of referring expressions, which involve words or phrases that function in discourse to identify individual objects. We also examined whether the use of such feedback is related to cognitive resources. Results indicated that children who were given feedback from addressees produced more informative referring expressions than those who received no feedback. Furthermore, this tendency to effectively make use of feedback was greatest among children with higher working memory. These findings demonstrate that feedback can facilitate learning about referential communication and suggest that one limitation in using such feedback is the ability to hold it in mind so that it can be used to guide the production of referring expressions.

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Introduction

To communicate effectively, children must learn the structure and content of their language as well as how to use it in a social context. A fundamental aspect of this ability involves coordinating what one says with one's mental representation of the beliefs and perspectives of others. For example,

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successful communication requires identifying the knowledge that is shared (or not shared) between speaker and addressee (e.g., Clark, 1992; Clark & Marshall, 1981). The current research focuses on this skill within the context of referential communication, where a speaker provides information about a specific object so that a listener can identify it from an array of choices.

A key challenge of referential communication is that speakers must make sure that listeners know what they are referring to. Miscommunication can arise when speakers and listeners have different physical perspectives such as when two people are traveling in a car and each is looking out a different side window. If the speaker says, "I want a car like that one," the listener might not know which car the speaker is referring to if there are many cars in the listener's visual field. In these types of situations, speakers must determine the appropriate information to uniquely convey the particular referent. In many situations, this requires that speakers take into account the differences between their own knowledge and perspectives and those of their listeners (cf. Clark, 1992).

Although knowledge differences can be vast and complex, one simple tactic is to divide things up into two categories: common ground and privileged ground. Common ground is made up of information and knowledge that are mutually known to both speaker and listener (e.g., all of the cars that both people can see) (Stalnaker, 2002). In contrast, privileged ground is made up of the information and knowledge that only one person knows (e.g., the cars that only the speakers can see or that only the addressee can see). For speakers to produce appropriate referring expressions, they must attend to and encode contextual information such as whether information is common or privileged ground. They must then hold that information in memory, inhibit conflicting privileged information, and formulate and produce a referring expression (cf. Nilsen & Fecica, 2011; Nilsen & Graham, 2009). Although complicated, studies have shown that young children, younger adults, older adults, and some older impaired adults are capable of this behavior and exhibit it on a regular basis (Nadig & Sedivy, 2002; Wardlow, 2013; Wardlow, Ivanova, & Gollan, 2014). However, studies have also highlighted situations where each of these populations regularly fails to adequately produce appropriate referring expressions (Deutsch & Pechmann, 1982; Horton & Keysar, 1996; Wardlow et al., 2014).

Perspective taking

Numerous studies have assessed children's perspective-taking performance in referential communication tasks. For example, 2-year-olds' referring expressions are more verbally explicit when speaking to an addressee who cannot see the referent than when speaking to one who can (Maratsos, 1973), and they gesture more when indicating the location of an object to an addressee who lacks prior knowledge of its location than to an addressee who already knows its location (O'Neill, 1996). These findings establish that young children can and do adjust their referring expressions according to addressee knowledge.

Studies of children between the 4 and 6 years of age show that they also can, but often do not, accommodate perspective differences when producing referring expressions (Glucksberg, Krauss, & Weisberg, 1966; Nadig & Sedivy, 2002; Nilsen & Graham, 2009; Pechmann & Deutsch, 1982). For example, Nadig and Sedivy (2002) assessed the rate at which children between 4 and 6 years of age produce perspective-adjusted referring expressions for addressees in a referential communication task. Children viewed a display of four objects, three of which were in common ground. On common ground trials, speakers were required to refer to a common ground object (e.g., a duck) that had a foil of the same type but different size (a bigger or smaller duck) that was also in common ground. In this context, speakers correctly used a modifier (said "*big* duck") on the majority of trials (75%). When a modifier was not used, speakers simply said the name of the object ("duck") and, thus, did not differentiate the target from the foil for the addressee. On privileged ground trials, speakers were asked to name an object in common ground that had a foil of the same type but different size in privileged ground. Here, speakers do not need to use the modifier to distinguish the target from the foil because the addressee cannot see the foil. In fact, the use of a modifier in this context violates normal assumptions of cooperativeness in pragmatics (Grice, 1975) and in some cases, such as when the privileged object is a possible target, can cause the addressee to choose an unintended target (Wardlow Lane & Ferreira, 2008). Thus, the lack of a modifier may signal that a referring expression has been produced after accounting for an addressee's perspective. In the context of privileged ground