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Mental verb input for promoting children's theory of mind: A training study

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ABSTRACT

An experimental study investigated the effect of the type of mental verb input (i.e., input with *think*, *know*, and *remember*) on preschoolers' theory of mind development. Preschoolers ($n = 72$) heard 128 mental verb utterances presented in video format across four sessions over two weeks. The training conditions differed only in the way the mental verbs were presented: the form (statement or question), the referent (first person or other person), and the interaction style (overheard or interactive). Children who overheard the characters discussing the mental states of someone else, either in statement or question form, significantly improved in their false belief understanding. These experimental findings demonstrate mental verb utterances about other people, even when not directed to the child, scaffold children's attention to differing perspectives, thus more efficiently promoting some aspects of their ToM development.

The understanding that people are mental beings with beliefs, desires and emotions, and whose actions can be interpreted by evaluating their mental states is defined as a *theory of mind* (ToM). Language, particularly mental state language (i.e., talk about feelings, cognitive states, and emotions), is argued to play a pivotal role in children's ToM development (Jenkins & Astington, 1996; Meins et al., 2002; Ruffman, Slade, & Crowe, 2002). Most studies examining the role of mental state input in children's ToM development are correlational and focus on conversations between parents and children (Adrian, Clemente, & Villanueva, 2007; Slaughter, Peterson, & Mackintosh, 2007). However, children learn language and other social-cognitive skills through observing the conversations of

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others (Akhtar, Jipson, & Callanan, 2001; Akhtar, 2005; O'Doherty et al., 2011; Rogoff, Paradise, Arauz, Correa-Chavez, & Angelillo, 2003). Furthermore, it is difficult, using a correlational design, to disentangle whether mental state input promotes children's ToM or whether mothers adjust their mental state talk to support a child's already existing ToM. The present experimental study examines the type of mental verb input that promotes ToM when children either overhear a conversation or when the conversation is directed at them.

Conversations about emotions and mind are an important source of information about inner states of self and other (Dunn & Brophy, 2005). Mothers increase their use of mental state language at the age children are beginning to develop a ToM (Beeghly, Bretherton, & Mervis, 1986; Brown & Dunn, 1991; Moore, Furrow, Chiasson, & Patriquin, 1994; Jenkins, Turrell, Kogushi, Lollis, & Ross, 2003; Taumoepeau & Ruffman, 2008). Moreover, mothers' mental state utterances and talk about feelings are positively correlated with children's performance on various tasks assessing ToM (Dunn, Brown, Slomkowski, Tesla, & Youngblade, 1991; Meins et al., 2002; Ruffman et al., 2002). ToM is commonly assessed by false belief tasks, which assess the understanding that beliefs influence how one behaves. Although children can be trained to pass false belief tasks (Appelton & Reddy, 1996; Clements, Rustin, & McCallum, 2000; Slaughter & Gopnik, 1996; Swettenham, 1996; Hale & Tager-Flusberg, 2003), they perform better at posttest if the training includes mental state language (Lohmann & Tomasello, 2003), suggesting that there is something uniquely beneficial about mental state language for ToM development.

In addition to frequency, specific uses of mental state language play an important role in ToM development. For example, maternal questions containing mental verbs (e.g., "Do you remember where your boots are?") were positively correlated to 3–5-year-olds' understanding of mental states (Adrian et al., 2007; Howard, Mayeux, & Naigles, 2008). Moreover, Harris (2005) contends that exposure to conversations containing different points of view is essential to children's developing understanding of the mental world. Indeed, maternal utterances about others are positively related to children's false belief understanding (Adrian et al., 2007; Slaughter et al., 2007). Similarly, mothers' talk of their children's mental states, instead of their own, is positively related to children's understanding and use of mental state language (Howard et al., 2008; Taumoepeau & Ruffman, 2008). In contrast, utterances in which the mother refers to her own mental state (e.g., *I* remember where it is) are negatively related to children's mental state understanding (Howard et al., 2008).

While informative, correlational research does not address *why* certain utterances are correlated with children's ToM. For example, questions with mental verbs may predict children's ToM because these utterances require children to reflect on their own mental state in order to provide a response (e.g., Do you remember where it is?). The more children reflect on their own mental states, the better they may become at reflecting on others' mental states in relation to their own. Alternatively, as noted, exposure to questions might aid in ToM development because they are often, if not always, about someone other than the speaker (e.g., "Do *you* remember where your boots are?"). Mental verb input was carefully controlled in the present study, making it possible to separate the effect of the form (question or statement) and the referent (first person or other person) of the mental verb utterance. Because success on a ToM task requires children to answer from the perspective of someone else (e.g., "What will Bobby think is inside of this box?"), it was hypothesized that taking the perspective of someone else (other-person utterances) is the key factor in mental state language promoting children's ToM development. Whether these utterances were questions or statements, they were expected to help children develop a ToM more effectively.

The present study also addressed the interaction style of the mental verb input—overheard (directed to someone other than the child) versus interactive (directed to the child). The majority of research investigating the relation between mental state language and children's ToM development has examined parent–child conversations. That is, the conversations were always directed to the child. Children are keen observers and very capable of learning through observation (Bandura, 1986; Piaget, 1962). Therefore, it is possible that children can learn about differing beliefs by observing conversations of others. Akhtar et al. (2001) demonstrated that young children learned a novel word by observing a conversation between two adults (e.g., "I'm going to show you the toma.") as well as they did when the adult only addressed the child. O'Doherty et al. (2011) examined the overheard versus direct learning distinction via a television screen. They found that 30-month-olds learned a novel word *better* by observing an onscreen conversation between two adults (e.g., one adult labeled