



Collaborative mother–toddler communication and theory of mind development at age 4



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ABSTRACT

Focusing on social pragmatics, this longitudinal study investigated the contribution of mother–toddler collaborative communication to theory of mind (ToM) development at age 4. At age 2½, 78 toddlers (42 boys) and their mothers were observed during pretend play. At age 4, children were tested using 4 false belief understanding tasks. Both mothers and toddlers engaged in more collaborative (*inform, guide/request, and support/confirm*) than non-collaborative communication acts. Other-focused collaborative acts of *support/confirm* by mothers and toddlers predicted children's false belief understanding, even after controlling for 5 covariates. In addition, as *active* agents in their own ToM development, the contribution of toddlers' collaborative acts to false belief understanding was independent of their mother's. Finally, the way toddlers and their mothers *co-constructed* their communication mattered. Only when toddlers engaged in high levels of collaborative acts, the mothers' high levels of collaborative acts demonstrated a positive effect on children's ToM development. The applied implications of these findings are discussed.

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With age, children come to recognize that human actions are governed by mental states, and that their own and others' mental states, such as desires, intentions, emotions, and beliefs, may be different. A key indicator of such ability, known as “theory of mind” (ToM), is a child's understanding that beliefs of representations of reality can be false. In spite of individual differences, young children show normative development progressing from consistently failing to consistently passing explicit, verbal (i.e., elicited-response) false belief tasks between ages 3 and 5 (e.g., Astington & Jenkins, 1995; Bartsch & Wellman, 1995; Dunn, 2004; for recent reviews, see Apperly, 2012; San Juan & Astington, 2012). Using diverse implicit, nonverbal (i.e., spontaneous-response) tasks, impressive research in the past decade has further shown that children's ToM ability may begin to emerge in infancy as young as 7 months of age (Kovács, Téglás, & Endress, 2010; for reviews see Baillargeon, Scott, & He, 2010; Liskowski, 2013; Sodian, 2011). However, because of variations in definitions and assessment paradigms, ToM researchers disagree not only on the specific age of its emergence, but also on the nature of its development. Whereas some believe that ToM development involves a continuous process of change in the belief understanding system progressing from implicit to explicit

(e.g., Baillargeon et al., 2010; Liskowski, 2013), others believe that implicit and explicit understanding involves two distinctive, either related or disassociated, systems that develop either in sequence (Sodian, 2011) or exist in parallel (Apperly & Butterfill, 2009).

Various cognitive accounts have been formulated to explain ToM development. Nativist modular perspectives theorize ToM as an innate cognitive ability to perceive and represent others' internal mental states (e.g., Baillargeon et al., 2010). Cognitive constructivist perspectives highlight structural changes in children's mental state representations, in which the child is seen as a lone-working scientist deriving correct theories on his or her own (e.g., Leslie, 1994; Wellman, 1992). These cognitive approaches rarely address questions about individual differences or their social–interactional origins (Apperly, 2012; Liskowski, 2013; San Juan & Astington, 2012). By contrast, social constructive perspectives propose that children develop ToM through interpersonal processes. Emphasizing the functional use of ToM in predicting others' actions during social interaction, Liskowski (2013) postulates that the emergence and development of ToM system are driven by children's interactive experience. Guided by a social constructive perspective, the goal of this study was to examine the role of mother–child communication in ToM development.

Social constructive perspectives differ in how children develop ToM abilities within interpersonal contexts. For example, in Liskowski's (2013) usage-based account, ToM development results from children's repeated interactive use of language during communication with others. Through cumulative interactive experience, infants initially develop simple expectations about others' actions extracted from contingency

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and regularities in interaction, with which they form the basis for further interaction. With repeated practice, complex abstractions, interpretation, and predictions about others' actions become possible, which are further used for regulating social interactions (Astington, 2003) and inferring cultural meanings (Feldman, 2000). Although language is often theorized as a mechanism for the developmental transition between early implicit and later explicit understanding of mind (e.g., San Juan & Astington, 2012), theorists also differ in their conceptualizations about the role of language. Nelson (2005) proposes that children enter adults' "communities of minds" by participating in a discourse about social interactions and accumulating meaningful shared experiences with others. Dunn (2004) emphasizes that children learn about mind and emotion within close relationships (e.g., family and friends) through talks about inner states, engagement in pretend play, argument about conflicts, exposure to deception, and construction of collaborative narratives.

Fonagy, Gergely, and Target's (2007) "pedagogical stance" posits that caregivers act in the role of a teacher from whom children learn about the social world. Others have further theorized that secure attachment relationships and emotional connections with caregivers provide young children with stable and organized mental representations for understanding their own and exploring others' mental states (e.g., Ontai & Thompson, 2008; Repacholi & Trapolini, 2004). Caregivers' sensitive and appropriate responses enable children to be attuned to the psychological states of caregivers and to derive meaning from interactions with caregivers (Steele, Steele, & Johansson, 2002). Meins et al. (2002, 2003) further revealed that it is maternal mind-mindedness (mothers' appropriate comments on their infants' mental states), rather than maternal sensitivity or secure attachment, that contributes to ToM understanding at preschool age. Taken together, it appears that early ToM development in part is grounded in children's linguistic skills and communication experiences within close relationships. Family demographic variables, such as maternal education level (e.g., Ensor & Hughes, 2008; Ruffman, Slade, & Crowe, 2002) and number of siblings (e.g., McAlister & Peterson, 2013), are also positively correlated with ToM.

Maternal input and theory of mind development

The emerging ability to use language as means for communication and representation is necessary for early social understanding and deemed to be a covariate for empirical investigation (for reviews, see Hughes, 2011; San Juan & Astington, 2012). In addition to a general link between children's linguistic skills and ToM, complex connections exist between language and ToM at the structural (i.e., semantics and syntax) and functional (e.g., pragmatics) levels.

At the structural level, researchers have placed an emphasis on the role of syntactic composition (e.g., complement syntax following mental verbs; e.g., de Villiers & de Villiers, 2000; Tager-Flusberg, 2000) and semantic content (e.g., mental-state words, such as "think" and "remember"; Adrián, Clemente, & Villanueva, 2007; Meins et al., 2002; Symons, Fossum, & Collins, 2006). Extensive research has shown that as children begin to develop ToM, mothers increase their use of inner-state language (e.g., Taumoepeau & Ruffman, 2008), including words expressing desire, intention, cognitive activity, and affect (Bartsch & Wellman, 1995; Hughes, Fujisawa, Ensor, Lecce, & Marfleet, 2006), which is related to increased false belief understanding FBU in children (Jenkins, Turrell, Kogushi, Lollis, & Ross, 2003; Meins et al., 2002).

Although researchers agree that the functional or pragmatic aspect of language extracted from conversational exchanges is critical for ToM understanding (e.g., Milligan, Astington, & Dack, 2007; San Juan & Astington, 2012), empirical evidence linking communication pragmatics to ToM development, however, remains to be lacking (Fernández, 2011). A recent study found that the connectedness in mother-child talk (i.e., the degree to which maternal speech is semantically linked to the child's prior utterance) contributes to ToM skills, even after child current verbal ability and

earlier social understanding were controlled (Ensor & Hughes, 2008). Clinical research provides further evidence that deprivation of conversational experiences, particularly, deficits in pragmatics due to deafness, blindness, and autism, lead to delayed ToM development (Meristo et al., 2007; Siegal & Peterson, 2008; Siegal, Varley, & Want, 2006). Children appear to develop their ToM system not only through the content of conversations, but also through the pragmatic use of language (Deleau, 2012). By participation in conversational exchanges, children acquire an awareness of different viewpoints, the meaning of dialogs, and representations of mental states (Deleau, 2012; Fernyhough, 2008; Montgomery, 2005). Elaborated discourse and complex conversation moves within complex social situations may augment ToM development (Liszkowski, 2013). Thus, the present study was aimed to address the research gap by examining the contribution of mother-toddler communication pragmatics to ToM development.

Social pragmatic approach to theory of mind development: communication acts analysis

A social pragmatic perspective of communication centers on the meaning of inner-state words emerging from pragmatic functions, rather than on the word-referent relations (Fernández, 2011; Montgomery, 2005). One approach to the examination of social pragmatic functions of language is to identify speech or communication acts (Garvey, 1982; McTear & Conti-Ramsden, 1992; Ninio & Snow, 1996). Communication acts are messages conveyed by the speaker to the listener. Collaborative communication acts are those that are high in directness and involvement (Leaper, 1987, 2000), whereby a speaker continuously keeps track of the listener's interest, affective state, and comprehension of the message. During pretend play, young children often use communication acts to create and share mentally constructed worlds and integrate conflicting mental representations. As such, pretense has been theorized to reflect a context that permits the child to acquire ToM (e.g., Leslie, 1994; Lillard, 2001, 2007a; Schwebel, Rosen, & Singer, 1999). The first goal of this study, therefore, was to examine the contributions of mothers' and their toddlers' collaborative communication acts during pretend play to children's later ToM development at age 4. It was expected that both maternal and toddler collaborative communication acts would make a significant contribution to children's ToM development that was above and beyond that of non-collaborative acts, even after the covariates were controlled.

Preschoolers use communicative acts of *confirm* to indicate agreement and *request* to ask for additional information when collaborating with their parents or peers during play and conversation (Leaper & Gleason, 1996). To establish mutual coordination with their preschool-aged children, parents also often employ collaborative acts, such as *inform* (e.g., give related information), *guide* (e.g., make suggestions), and *support* (e.g., show understanding; Dunn & Brophy, 2005; Nelson et al., 2003). Collaborative acts, with or without mental-state words, may not only deliver a clear message about the speaker's state of mind, but also invite the listener to reflect on his/her own mental state. For example, when a mother directly *informs* (e.g., "I think the baby's diaper is dirty.") or *guides* (e.g., "You should change the diaper.") her child, she makes her mental state openly accessible and directly aligns the child's mental state with hers. Maternal *support* statements (e.g., "I know you can do it." or "I can help with the diaper.") and *request* questions (e.g., "Do you know where the diaper is?") not only communicate the mother's mental state to the child through complex messages (e.g., "I know you don't know how, but I will help you." or "I don't remember, but I thought you might remember."), but also require the child to reflect on the mother's mental states in relation to his/her own state of mind. Some collaborative communication acts also require the listener to take a third person's perspective into consideration. A *confirm* statement by the mother, for example, "Baby likes clean diapers." goes beyond the mother's and the child's viewpoints. The second goal of this study, thus, was to reveal the specificity of different maternal and toddler collaborative acts in their

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