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Promoting theory of mind during middle childhood: A training program

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ABSTRACT

Evidence that conversations about the mind foster improvements in theory of mind (ToM) is growing, but their efficacy in typically developing school-aged children has yet to be demonstrated. To address this gap, we designed a conversation-based training program for 9- and 10-year-olds and measured its effectiveness by pre- and post-test comparisons of performance on age-appropriate ToM tasks for two groups (matched at pre-test for gender, age, socioeconomic background, verbal ability, reading comprehension, executive functions, and ToM) who were assigned to either the intervention condition ($n = 45$) or an active control condition ($n = 46$). The intervention group showed significantly greater gains in ToM than the control group; this contrast was stable over 2 months, and (in a subsample) the improvement in ToM was independent of any changes in executive functions. Implications for the role of conversations about the mind in children's mental state reasoning are discussed.

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Introduction

Children's theory of mind (ToM) represents one of the liveliest areas of study in developmental psychology. After 30 years of research in this field, there is some consensus about key milestones of

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normative ToM development, particularly during the preschool years (Wellman, Cross, & Watson, 2001). Recent years have also seen mounting evidence that ToM continues to develop during and even beyond the school years (Miller, 2012), extending into adolescence and adulthood (Apperly, 2011; Devine & Hughes, 2013).

During the school years, children become increasingly sophisticated in applying their ToM skills to make sense of complex social situations. Despite being able to pass second-order false belief tasks (involving mistaken beliefs about beliefs), 9-year-olds are still only beginning to effectively use their ToM skills to explain behavior (Banerjee, Watling, & Caputi, 2011). Recent studies have shown that, with increasing age, children became better at reasoning about beliefs and perspectives and in applying these skills in a variety of contexts/scenarios. For example, they become able to accurately judge one person's beliefs about the intentions of others (Miller, 2009; Pillow, 1991) and use a higher frequency of mental state terms to describe social behavior (Meins, Fernyhough, Johnson, & Lidstone, 2006). Between 9 and 11 years of age, children become more sophisticated in interpreting ironic utterances (Filippova & Astington, 2008), and understanding faux pas (Baron-Cohen, O'Riordan, Stone, Jones, & Plaisted, 1999). Crucially, a recent study of 230 children between 8 and 13 years of age showed age-related improvement in two ToM tasks: the well-established text-based Strange Stories task (White, Hill, Happé, & Frith, 2009) and a novel paradigm involving brief clips from a classic silent film (Devine & Hughes, 2013). This result is important because it suggests that children's ability to use their understanding of mental states continues to improve beyond the preschool years.

Despite these promising studies, we still know very little about what drives development in ToM beyond early childhood. The current article addresses the hypothesis that conversations about mental states have a crucial role in the development of relatively advanced ToM skills.

Conversational approach to ToM development

Several strands of evidence, including cross-cultural studies (Hughes et al., 2014; Lecce & Hughes, 2010) and observational studies (see Hughes, 2011), indicate that variation in social experiences contributes to individual differences in ToM. Interestingly, empirical results from twin studies suggest that as children increase in age, the social environment becomes important in explaining individual differences in ToM (Hughes & Cutting, 1999; Hughes et al., 2005; Ronald, Viding, Happé, & Plomin, 2006). Notably, a large-scale study of 5-year-old twins showed common influences of shared environment on individual differences in children's understanding of false beliefs and verbal ability, indicating that variation in linguistic environments (i.e., family talk) may contribute to variation in children's ToM (Hughes et al., 2005).

Numerous authors have highlighted participation in conversations about mental states as an important influence on children's development of ToM. According to this *conversational approach*, exposure to conversations that are rich in reference to (and explanation of) mental states such as desires, emotions, and beliefs facilitates children's understanding of others' minds (Dunn & Brophy, 2005; Nelson, 2005; Turnbull & Carpendale, 1999). Indeed, some existing theoretical models present mental state conversations as the key learning context within which ToM progress can be made. For example, Nelson (2007) proposed that conversations make children enter into the "community of minds," allowing them to reflect on their social experiences and improve their awareness that people can have different mental states that relate to the same situation. From this perspective, conversations constitute a privileged context for helping children to reflect on the differences between others' and their own states of mind. In turn, the need to coordinate others' points of view with their own experience gives birth to a gradually constructed understanding of the mind (Harris, 1999).

Direct evidence for the role of mental state talk in school-aged children's ToM skills comes from three separate sources. First, extending early demonstrations of delayed ToM success among deaf children born to hearing parents (DoH) but not deaf children born to deaf parents (DoD) (e.g., Peterson & Siegal, 1995; Peterson & Slaughter, 2006), two studies showed that the richness of conversational experience at school predicts variation in ToM success within DoD children (Meristo et al., 2007; Tomasuolo, Valeri, Di Renzo, Pasqualetti, & Volterra, 2013). Second, longitudinal studies of typically developing children have shown that early variation in mothers'

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