



Talking while thinking about another's mind in preschoolers: Evidence of getting Vygotskian about social cognition



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ABSTRACT

The study was the first to investigate language use during social cognitive processing in preschoolers. The private speech of 42 Cantonese-speaking 3- to 5-year-olds in a social cognitive context that required preschoolers to encode, understand, and use the psychological properties of others in order to cooperate and compete with them was observed. Task performance was indexed by preschoolers' ability in manipulating and understanding another's mind, including belief understanding. Results showed that private speech was correlated with belief understanding in younger preschoolers and with manipulating minds in older preschoolers, even after controlling for age and verbal ability. This finding suggests that language, in the form of private speech, could regulate social cognitive processing.

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Language is a tool not only for communication, but also for a variety of cognitive processes such as thinking (Carruthers, 2002; Vygotsky, 1934/1987). Children tend to talk to themselves when they encounter a challenging task. This private use of language while solving a task provides a means for investigating how language serves a role in cognitive development. Since the 1960s, this line of research has extensively focused on cognitive tasks (e.g., the Tower of London task) and a positive association has been found between language use and cognitive performance (Al-Namlah, Meins, & Fernyhough, 2012; Duncan & Pratt, 1997; Fernyhough & Fradley, 2005; Kohlberg, Yaeger, & Hjertholm, 1968). Although language is also closely related to social cognition (Clark, 1987; Semin, 2001) or 'theory of mind' (Astington & Baird, 2005; de Villiers, 2000), we know very little about language use in social cognitive processing that allows one to encode, understand, and use information and psychological properties of another person, including desires, intentions, beliefs, as well as more stable person-specific characteristics. The current study sought to investigate children's private use of language while they were engaging in social cognitive

processing. This is crucial because it contributes to our understanding of the roles that language plays in social cognition.

Piaget (1923/1962) was the first who described the phenomenon that children talk to themselves. Vygotsky (1934/1987) then carried out a series of experiments and developed his theory on children's self-talk. Later on, speech that is not addressed to another person and serves no interpersonal communicative function was termed "private speech" (Flavell, Beach, & Chinsky, 1966). During the preschool and school years, private speech has been observed universally, taking up 20–60% of children's spontaneous utterances (Berk, 1986, 2014; Berk & Landau, 1993). Further empirical research findings have largely supported Vygotsky's theory on private speech. For example, Winsler, Diaz, and Montero's (1997) finding that children are more likely to use private speech after an adult's scaffolding supports Vygotsky's idea that private speech is originated from dialogic exchanges between adult and child. Winsler and Naglieri's (2003) finding that children's private speech gradually decreases in the school years is consistent with Vygotsky's idea that internalization is taking place.

According to Berk (1986), private speech can be categorized into 3 levels: task-irrelevant private speech (e.g., word play; Level 1), task-relevant private speech (e.g., self-guiding comments; Level 2), and task-relevant partially internalized private speech (e.g., muttering; Level 3). These levels correspond to the developmental trend of private speech internalization. Children's private speech

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has been found to become more task-relevant and partially internalized between ages 3.5 and 4.5 years (Winsler, de León, Wallace, Carlton, & Willson-Quayle, 2003) and this task-relevant private speech has been shown to be related to cognitive performance (Fernyhough & Fradley, 2005). This developmental pattern of private speech has been further found to be consistent in different cognitive tasks (e.g., the Tower of London and memory task), supporting Vygotsky's original idea that there is a general transition toward semiotic mediation across various domains of cognition (Al-Namlah, Fernyhough, & Meins, 2006; Lidstone, Meins, & Fernyhough, 2011). If a general shift to semiotic mediation is the case, we would expect semiotic mediation to be involved in social cognitive processing as well. The current study extends previous research and Vygotsky's ideas by empirically examining semiotic mediation during a social cognition task.

There are two basic modes of social cognition: cooperation and competition. Children have to acquire both cooperative and competitive capacities and to distinguish which forms of interaction are appropriate for various social situations. Both cooperative and competitive interactions involve predicting and manipulating the behavior of others, which heavily rely on the attribution of mental states to others. The ability to attribute and understand mental states has been suggested to develop as children interact with others (Carpendale & Lewis, 2004). Furthermore, language in conversation provides opportunities for children to learn about mental state terms such as "think" (Peterson & Siegal, 2000; Ruffman, Slade, & Crowe, 2002), complementation syntax (e.g., *Sally thinks that Santa Claus is real*; de Villiers & de Villiers, 2000), and conversational pragmatics (Harris, 1996, 1999) which are necessary for understanding the different perspectives held by others. As empirical research has showed that language input of these kinds enhances children's understanding of the mind, some researchers suggest that language provides children with important information about the psychological world (Carpendale & Lewis, 2004; Lohmann, Tomasello, & Meyer, 2005).

More recently, Fernyhough (2008) has drawn on Vygotsky's (1934/1987) ideas to account for the role of language in the development of 'theory of mind'. In addition to being a source of information about the psychological world, language may play a constitutive role in reasoning about psychological and social processes—envisaging a role for semiotic mediation (Fernyhough, 2004, 2008). Fernyhough has also taken on Bakhtin's (1984, 1986) idea that an individual's linguistic utterance in dialogue reflects his perspective on reality and the perspective of others who have used those words before. Therefore, the internalization of dialogic exchanges into private speech would involve adopting others' perspectives and reconstructing one's own perspective on reality. Following his theoretical propositions, Fernyhough and Meins (2009) have reported a positive relationship between children's private speech production and their performance on theory-of-mind tasks in 49-month-old children, but no relationship in 58-month-old children and a negative relationship in 71-month-old children where private speech gradually decreases whilst 'theory of mind' fully fledges. However, Fernyhough and Meins have not observed children's private speech during theory-of-mind tasks. Instead, children's private speech was observed during free play or solving the Tower of London task. Thus, the findings of Fernyhough and Meins's study imply that private speech produced in different contexts is related to children's theory-of-mind performance. Although cross-task and cross-context consistency in private speech production has been shown in previous studies (Lidstone et al., 2011; Winsler et al., 2003), it is still not clear whether private speech in a social cognitive context, that requires children to encode, understand, and use the psychological properties of others in order to cooperate and compete with them, would be associated with performance.

Instead of using the heterogeneous series of theory-of-mind tasks in Fernyhough and Meins (2009), the current study adapted a social cognitive task originally devised by Sodian, Taylor, Harris, & Perner (1991; Experiment 2) to empirically investigate 3- to 5-year-olds' private speech production as they were asked to cooperate with one person and compete with another person. This adapted version of Sodian et al.'s (1991) task has four advantages. First, in addition to asking children questions, as in many other theory-of-mind tasks (Fernyhough & Meins, 2009), the current task involved an extended thinking process that was crucial for private speech to be observed. Second, this thinking process would result in children performing an observable manipulation of another person's mind which was then scored if it was effective according to the cooperative or competitive mode required. For example, providing information for another person was an effective way to cooperate with that person, whereas hiding information was an effective way to compete with him/her. Third, a question was asked to test whether children understood the effect of their manipulation on another's mind. Finally, children's manipulations and their answers to the test question were evaluated in pairs to determine whether children have shown an understanding of beliefs, specifically false beliefs, given that these have been widely regarded as an index of 'theory of mind' (Wellman, Cross, & Watson, 2001). Therefore, there were three indices of social cognitive performance: manipulation, test question, and belief understanding.

Given that Sodian et al. (1991) showed that 3-year-olds did not manipulate another person's mind according to the cooperative or competitive mode required and demonstrated no clear understanding of their manipulations' effects on another person's mind, whereas 4-year-olds' manipulations were effective according to the mode required and showed an understanding of false beliefs, older children were expected to show better social cognitive performance than younger children in the current study. On the other hand, empirical studies of private speech show that private speech emerges in toddlerhood, becomes more task-relevant and partially internalized between ages 3.5 and 4.5 years, and then reaches a peak around age 5 years (Kohlberg et al., 1968; Winsler et al., 2003). Thus, a similar developmental trend of private speech internalization would be expected in the current study.

Taking these two predictions together, one would expect a positive relation between social cognitive performance and private speech given that children gradually show better social cognitive performance and more private speech between ages 3.5 and 4.5 years. This hypothesis was supported by Fernyhough and Meins's (2009) study in which a positive association between private speech and 'theory of mind' was found in this younger age group. However, by the age of 4.5 and 5 years, children acquire a fully fledged 'theory of mind' (Happé, 1995; Wellman et al., 2001) and their private speech reaches a peak (Kohlberg et al., 1968; Winsler et al., 2003), so no association would be expected. Fernyhough and Meins's findings also supported this hypothesis although they used a different 'theory of mind' task for this older age group. Therefore, a changing pattern of association, from a positive to no correlation, between private speech and belief understanding (the third index of social cognitive performance) across younger and older children would be expected in the current study. However, no prediction could be made regarding whether private speech would be related to the other two indices of social cognitive performance given that this was the first time this was examined. Despite that, there is a large amount of research highlighted that 'theory of mind' underpins social cognitive functioning. For example, children who perform better on theory-of-mind tasks tend to cooperate with others (Denham, 2006) and gain others' liking and preference (Slaughter, Dennis, & Pritchard, 2002). Meanwhile, 'theory of mind' skills may also help in persuading others (Slaughter, Peterson, & Moore, 2013) or even in outwitting and bullying others

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