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Cooperation, but not competition, improves 4-year-old children's reasoning about others' diverse desires

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ABSTRACT

Three experiments examined whether cooperation or competition affects 4-year-old children's reasoning about other people's desires—which differed from their own—in a gift selection task. Experiment 1 ($N = 72$) found that children's performance in selecting an adult-preferred gift for an adult experimenter was enhanced by a short period of preceding cooperative, but not competitive or individualistic, play with the experimenter. Experiment 2 ($N = 24$) ruled out the alternative explanation that children resisted satisfying their opponent after competition. Experiment 3 ($N = 48$) replicated the cooperation advantage in selecting a gift for someone else, indicating that children's understanding of diverse desires was generally improved by cooperation but not competition. These findings support the constructivist view of social development and highlight the advantage of cooperation.

Introduction

The development of desire understanding is a topic of much interest in the research field of cognitive development. Although there are extensive results about the relationship between age and performance (Moore et al., 1995; Moses, Coon, & Wusinich, 2000; Wellman, Phillips, & Rodriguez, 2000; Wellman & Woolley, 1990), the effects of social experiential issues are seldom

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studied. A constructivist view of social development (e.g., Carpendale & Lewis, 2004) proposed that the structure of the social interaction in which children participated affects how their mental functions develop and that the joint representation of cooperation makes it more suitable than other types of social interaction, such as competition, to augment children's understanding of others' mind states such as desires (Moll & Tomasello, 2007; Tomasello, Carpenter, Call, Behne, & Moll, 2005). Although there is increasing evidence suggesting a closer relationship between cooperation and the development of desire understanding (e.g., Brownell, Ramani, & Zerwas, 2006; Priewasser, Roessler, & Perner, 2013), there is still a lack of direct experimental studies on the constructive role of cooperation in children's enhancement in desire reasoning. In the current study, we aimed to determine whether cooperation, compared with competition, improves 4-year-old children's ability of diverse desires, a high-level desire reasoning that is usually not fully matured at this age.

The ability to understand others' desires is critical because it equips us with essential information to interpret and anticipate others' activities. An increasing number of theories have been raised to describe and explain the development of desire understanding (Moore et al., 1995; Moses et al., 2000; Wellman & Woolley, 1990; Wellman et al., 2000), and there are heated debates regarding when children achieve a certain level of understanding (e.g., Cassidy et al., 2005; Moore et al., 1995; Rakoczy, Warneken, & Tomasello, 2007; Repacholi & Gopnik, 1997). However, the majority of the studies neglect the possible effect of social experiential issues, such as participating in social interaction, which could increase with age.

Social interaction is considered capable of significantly affecting the developmental process of desire understanding. Both Piaget (1977/1995) and Vygotsky (1978) had mentioned the importance of social interaction in shaping mental function. Based on their opinions, a constructivist account of social development is raised (Carpendale & Lewis, 2004; De Jaegher, Di Paolo, & Gallagher, 2010). It proposed that children form and adapt their understanding of others' minds by interacting with people around them; as children repeatedly attend to the mutual relationships among the self, other, and object (the "epistemic triangle"; see Carpendale & Lewis, 2004) involved in the social interaction, they gradually gain deeper insight into the nature of mind states from the experienced regularities of them (Carpendale & Lewis, 2004; Moll, Meltzoff, Merzsch, & Tomasello, 2013; Moll & Tomasello, 2007). The cognitive structure of social interaction determines to what extent children attend to these relationships, which significantly affect their construction of higher-level social understanding (Carpendale & Lewis, 2004).

Cooperation is structurally advanced in helping children attending to the epistemic triangle (Carpendale & Lewis, 2004). Cooperative actions are represented in a joint form involving both oneself and the partners, as is reflected by the joint Simon effect—that one's own action performance is correlated to the correspondence between others' action plan and cue type (Iani, Anelli, Nicoletti, & Rubichi, 2014; Ruys & Aarts, 2010). Specifically, this joint action representation includes a joint goal, which everyone in the cooperation must pursue together, and complementary roles, which each individual needs to execute (Moll & Tomasello, 2007; Tomasello et al., 2005). The need to jointly represent the self and others creates a predisposition of a high mental engagement with other individuals (Tomasello & Carpenter, 2007; Tomasello et al., 2005) and elicits an analogy and comparison between others' and own minds (Barresi & Moore, 1996; Meltzoff, 2007), providing children with a "jump-start" to reason about others' mind states in cooperation (Carpendale & Lewis, 2004, 2015, chap. 10). In contrast, competitive goals and action plans are represented in an individualistic form (Tomasello et al., 2005) and are not expected to push children to engage in the relationship between others' and own minds. Evidence coming from chimpanzee studies supported this idea, proposing that although theory of mind may be helpful in some cases, competition could be carried out without any inference of others' minds (see Call & Tomasello, 2008). An explanation for such results is that in these cases, for the animals as well as children who are inefficient to reason about others' minds, they may have an alternative to simply pay attention to others' movements without representing others' mind states in competition (Tomasello et al., 2005); thus, the jump-start effect should be weaker or missing.

In accordance with our expectation, cooperation has been widely found to be positively related to theory of mind, the ability to understand others' mental states. Children's theory of mind develops in tandem with their cooperative tendency (Brownell et al., 2006; Priewasser et al., 2013). Children's relationships that involve more cooperative interaction, such as having siblings (Jenkins &