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Sibling composition, executive function, and children's thinking about mental diversity



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ABSTRACT

Prior investigations of relations between sibling composition and theory of mind have focused almost exclusively on false belief understanding in children 6 years of age and younger. The current work expands previous research by examining whether sibling composition predicts 4- to 11-year-olds' ($N = 192$) more advanced mental state reasoning on interpretive theory of mind tasks. Even when controlling for age and executive function, children with a greater number of older siblings or with more same-sex siblings demonstrated stronger knowledge in both their predictions and explanations that people with different past experiences can have diverse interpretations of ambiguous stimuli. These data provide some of the first documentation of sibling constellations that predict individual differences in theory of mind during middle childhood.

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Introduction

Over the past 20 years, there has been growing empirical interest in sources of individual differences in the development of *theory of mind* (ToM); that is, understanding of people in relation to their internal mental lives such as desires, emotions, beliefs, and thoughts (Carpendale & Lewis, 2004; Dunn, 2002; Wellman, 2011a). Researchers have identified several cognitive, social, and family factors that explain variability in children's ToM performance: executive function (Carlson & Moses, 2001;

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Sabbagh, Xu, Carlson, Moses, & Lee, 2006), language (Astington & Jenkins, 1999), cultural background (Shahaeian, Peterson, Slaughter, & Wellman, 2011), maternal education level (Pears & Moses, 2003), family socioeconomic status (Shatz, Diesendruck, Martinez-Beck, & Akar, 2003), parent–child discourse (Hughes, White, & Ensor, 2014; Ontai & Thompson, 2008), parenting behaviors (Hughes & Ensor, 2006), attachment security (Symons & Clark, 2000), and sibling composition (Perner, Ruffman, & Leekam, 1994). Because this research has focused on children 6 years of age and younger, however, it is unclear whether these relations are specific to early childhood. Developmental changes and individual differences in ToM during middle childhood remain greatly understudied (see Lagattuta et al., 2015; Miller, 2012; Pillow, 2012).

The current research expands inquiries of individual differences in social–cognitive development to middle childhood by investigating relations between sibling composition and advanced ToM in 4- to 11-year-olds. Sibling composition provides an interesting test case because several studies have shown that 3- to 6-year-olds with more siblings, especially older siblings, demonstrate superior ToM performance compared with children with fewer or no siblings (e.g., Farhadian, Gazanizad, & Shakerian, 2011; Lewis, Freeman, Kyriakidou, Maridaki-Kassotaki, & Berridge, 1996; McCalister & Peterson, 2006, 2007, 2013; Perner et al., 1994; Ruffman, Perner, Naito, Parkin, & Clements, 1998; Wolfe, Want, & Siegal, 2003; but see Carlson & Moses, 2001; Cole & Mitchell, 2000; Cutting & Dunn, 1999, and Hughes & Ensor, 2005, for examples of null effects). Researchers have interpreted these data to indicate that siblings provide social opportunities that improve young children's knowledge about mental states, with older siblings being particularly advantageous because they serve as social mentors to the younger “apprentices” (Hughes et al., 2014; Perner et al., 1994; Ruffman et al., 1998). Potentially, however, sibling benefits may appear only during early childhood when mental state concepts are first emerging and children spend most of their waking hours just with family. That is, this well-accepted *apprenticeship model* may only characterize early development. Moreover, across age, older versus younger status might not matter as much as having siblings above a certain chronological age (*age threshold model*). By targeting a sample of children across a wide age range, we can test these different accounts as well as determine more generally whether sibling–ToM relations even exist during middle childhood.

There are several reasons to suspect that associations between siblings and ToM may differ in older children as opposed to younger children (Miller, 2012; Recchia & Howe, 2009). First, when children learn new concepts, there can be higher variability in performance both within the same child and within groups of children of the same age group compared with when children have mastered those concepts (Siegler, 2007). Given that most children pass the benchmark false belief task (understand that people can believe things that are not true) by 4 or 5 years of age (Wellman, Cross, & Watson, 2001), it is possible that variables that contributed to individual differences during the initial emergence of ToM no longer hold. Second, when children enter school at 5 or 6 years of age, socialization practices shift such that children begin to spend significantly more time outside of the home with non-familial peers, with the number of peer contact hours increasing over childhood into adolescence (Larson & Verma, 1999). The frequency of mental state talk with peers—talk about emotions, desires, beliefs, thoughts, and intentions—predicts individual differences in ToM (see Symons, 2004), with studies indicating that school-age children engage in more mental state talk with friends than with siblings (e.g., Brown, Donelan-McCall, & Dunn, 1996).

This constellation of changes during middle childhood—improved ToM, reduced time with siblings and family, and growing prominence of peers—may reduce or extinguish family-based factors that predicted ToM earlier in development. Specific to our focus on sibling composition, Miller (2013) recently examined whether number of siblings predicted 5- to 8-year-olds' reasoning about second-order false belief tasks (children's ability to reason about a person's belief about another person's belief or emotion). Results showed no relation between sibling composition and ToM, although this null finding may have been due to near-ceiling performance and limited sibling variability (see also Calero, Salles, Semelman, & Sigman, 2013). Studies with older children from atypical populations provide contrasting results. For example, 4- to 12-year-olds with autism spectrum disorder (ASD) who have older siblings exhibit lower ToM compared with those with no older siblings, potentially caused by being routinely “overhelped” by older siblings in social situations (O'Brien, Slaughter, & Peterson,

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