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## Learning to deceive has cognitive benefits

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### ABSTRACT

Recent evolutionary, cultural, and economic theories have postulated strong connections between human sociality and complex cognition. One prediction derived from this work is that deception should confer cognitive benefits on children. The current research tests this possibility by examining whether learning to deceive during early childhood promotes more advanced theory of mind and executive function skills during a time when these skills are undergoing rapid development. A total of 42 children ( $M_{\text{age}} = 40.4$  5 months; 22 boys and 20 girls) who showed no initial ability to deceive were randomly assigned to an experimental condition or a control condition. In both conditions, they played a hide-and-seek game against an adult opponent on 4 consecutive days, but only the children in the experimental condition were taught how to deceive the opponent in order to win the game. Unlike children in the control condition, children in the experimental condition significantly improved their executive function and theory of mind skills, providing the first evidence that learning to deceive causally enhances cognitive skills in young children.

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## Introduction

Deception is a ubiquitous human behavior (Barnes, 1994; Bok, 1989; DePaulo, Kashy, Kirkendol, Wyer, & Epstein, 1996; Iñiguez et al., 2014). It often serves adaptive purposes such as when people tell white lies to be polite or engage in misrepresentation in negotiations with malicious actors. Nevertheless, children are often discouraged from engaging in deception due to concerns that deception will have negative developmental consequences (Stouthamer-Loeber, 1986). For example, high rates of lying are associated with peer rejection (Pedersen, Vitaro, Barker, & Borge, 2007), conduct problems (Lavoie, Leduc, Crossman, & Talwar, 2016; Stouthamer-Loeber, 1986), aggressive behavior (Ostrov, 2006; Ostrov, Ries, Stauffacher, Godleski, & Mullins, 2008), and delinquent behavior (Warr, 2007). Here, we tested a contrarian hypothesis that learning to deceive may in fact confer cognitive benefits by promoting executive function and theory of mind skills in young children.

The possibility that learning to deceive might promote cognitive skills comes from evolutionary, cultural, and economic theories linking human sociality and complex cognition (Baumeister, 2005; Bjorklund & Kipp, 2002; Cosmides & Tooby, 1992; Crawford, 2003; Dunbar, 1998; Whiten & Byrne, 1997). There is a growing evidence to support this sociality–cognition hypothesis (Byrne & Bates, 2007; Herrmann, Woidich, Schreppel, Pauli, & Fallgatter, 2008; Holekamp, 2007). However, most studies have focused on how the positive aspects, or the “sunny” side, of human sociality such as altruism, cooperation, helping, and rule policing (third-party punishment) are linked to cognition (Brownell, Iesue, Nichols, & Svetlova, 2013; Buttelmann, Carpenter, & Tomasello, 2009; Jordan, McAuliffe, & Warneken, 2014; Olson & Spelke, 2008; Paulus et al., 2015; Wu & Su, 2014). Although social cognitive skills are thought to underlie some forms of bullying (Sutton, Smith, & Swettenham, 1999), there has been relatively little research on the linkage between cognition and the “darker” side of human sociality such as deception.

Based on the theories about linkages between human sociality and cognition, Ybarra and Winkelman (2012) argued that many forms of social interaction require complex cognitive coordination. Such coordination requires tracking others’ dynamically changing mental states in a distraction-rich environment while simultaneously pursuing goals, problem solving, and engaging in turn taking. The authors proposed that engaging in such coordination might promote cognitive skills, especially skills related to executive function and theory of mind reasoning, and that deception in particular may bring such benefits (Apperly, Samson, & Humphreys, 2005; Camerer, 2003; Cosmides & Tooby, 1992; Gneezy, 2005; Ybarra & Park, 2002).

To test this possibility, Ybarra, Winkelman, Yeh, Burnstein, and Kavanagh (2011) randomly assigned young adults to either an experimental condition, where they participated in a competitive interactive game that involved both lie production and lie detection, or a control condition without any deceptive components. Adults in the experimental condition significantly outperformed those in the control condition on an executive function task after the game. These results suggest that playing deceptive games boosts cognitive skills in adults.

It is important to understand the developmental origins of the deception–cognition linkage. From the theoretical perspective, it is possible that the causal relation seen with adults reflects the reactivation of an existing link established through more than a decade of practice. Whether such a linkage exists during early childhood when deception, theory of mind, and executive function skills are still developing is an open question. From a practical perspective, knowledge about the deception–cognition linkage during early childhood will inform educators and parents about whether children should be encouraged to play games that involve deception such as hide-and-seek and card games that require bluffing.

There is some evidence that deception and cognitive skills may be linked during childhood. A number of correlational studies have shown that young children who have relatively strong executive function and theory of mind skills are more likely to tell lies and are better at maintaining the lies they have told (Alloway, McCallum, Alloway, & Hoicka, 2015; Carlson, Moses, & Hix, 1998; Evans & Lee, 2013; Evans, Xu, & Lee, 2011; Hala & Russell, 2001; Talwar & Lee, 2008; Williams, Moore, Crossman, & Talwar, 2016; for a review, see Lee, 2013). Recent evidence suggests that the connections between these skills emerge at the time when children are first learning to deceive. This includes

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