

Knowing what others know: Linking deception detection, emotion knowledge, and Theory of Mind in preschool

Alexandra F. Nancarrow¹  | Ansley T. Gilpin¹ | Rachel B. Thibodeau² | Carmen B. Farrell¹

¹Department of Psychology, University of Alabama, Tuscaloosa, Alabama, USA

²Department of Human Development and Family Science, University of Missouri, Columbia, Missouri, USA

Correspondence

Alexandra F. Nancarrow, Department of Psychology, The University of Alabama, Tuscaloosa, AL 35487, USA.

Email: afnancarrow@crimson.ua.edu

Abstract

Children's ability to understand and infer the thoughts and feelings of others influences how they develop a unique view of the world. Examining developmental factors that impact young children's success in both social and cognitive domains has important implications for advancing our current knowledge of social cognition. The purpose of this study was to examine relations among emotion knowledge, deception detection, and Theory of Mind to shed light on the development of social cognition. Specifically, preschoolers' deception detection skills were found to moderate the relationship between emotion knowledge and Theory of Mind. Thus, children's ability to use their emotion knowledge to understand the points of view of others varies as a function of their ability to detect deception. Implications for child development are discussed.

Highlights

- The purpose of this study was to examine relations among emotion knowledge, deception detection, and Theory of Mind.
- Preschoolers' deception detection skills were found to moderate the relationship between emotion knowledge and Theory of Mind.
- Children's ability to use emotion knowledge to understand the points of view of others varies as a function of deception detection.

KEYWORDS

deception, emotion knowledge, preschool, Theory of Mind

1 | INTRODUCTION

Experience drives learning, at least in the sense that children gather information about the world through observing and interacting with their surroundings. In fact, a central tenet of theory suggests that children create intuitive theories about how the world works and edit those theories to reflect new evidence provided by novel experiences (Wellman, 2014). Following foundational constructivist work by Piaget (1929), which noted that children formulate abstract representations of the world on the basis of their own experiences, contemporary researchers have construed that children's cognitive development more closely mirrors how scientists develop and revise theories. In other words, children revise their own theories of how the world works as they gather new evidence via observation or interaction (e.g., Gopnik & Meltzoff, 1997; Gopnik & Wellman, 2012; Wellman, 1990; Wellman & Gopnik, 1992). At the same time that children are refining their theories about the world, their understanding and predictions of others' behaviour are also becoming more accurate. The development of perspective-taking skills derives from social experience, resulting in different sequences of perspective-taking development cross-culturally, such as the difference Gopnik and Wellman (2012) report in Chinese and American children. For example, in the United States, children learn that white lies are appropriate to maintain positivity in certain social situations. This world knowledge about social rules ultimately affects how children perceive and interpret the emotions and thoughts of others (i.e., perspective taking).

To accurately revise theories about the world, children must learn to distinguish between whom they can trust to provide reliable information and those who may be deceiving them. A central aspect of deception detection is the ability to understand that others' intentions may differ from one's own (Maas, 2008), because others who engage in deception tend to have different states of mind than one's own. The ability to recognize that others' mental states are not always the same as our own mental states is a central component of Theory of Mind (ToM; Hughes & Ensor, 2007; Wellman, Cross, & Watson, 2001). During the preschool years, children progress from a fragile understanding of others' perspectives to a more robust understanding that their own knowledge and emotions can differ from those of others (Wellman & Liu, 2004).

Emotion knowledge also develops substantially from ages three to five, with preschoolers gaining a grasp on the ability to distinguish basic emotions such as happy, sad, mad, and scared (Izard et al., 2011; Odom & Lemond, 1972). Children exhibit emotion knowledge when they accurately interpret a social situation to understand another individual's emotions (Denham et al., 2012; Garner, 1999). Furthermore, children who are more successful at labelling emotions typically demonstrate more success in interactions with peers and siblings (e.g., Denham, McKinley, Couchoud, & Holt, 1990; Garner, Jones, & Miner, 1994; Sette, Spinrad, & Baumgartner, 2016), which arguably facilitates ToM development (Eggum et al., 2011). Before children can regulate their emotions or infer what others are feeling, they must first be able to recognize their own emotions; in this manner, emotion knowledge serves as a precursor to emotion regulation and is important for determining which emotions are better suited for different situations (Denham & Couchoud, 1990; O'Brien et al., 2011). The ability to recognize emotions thus aids in ToM development by granting children the skills needed to know when someone's emotion does not match the situation at hand. In essence, when a child accurately detects deception, the observed inconsistency between the deceiver's emotions and mental state might highlight the relationship between emotions and mental states thereby further accommodating their developing theory.

Indeed, one way in which we can see evidence of ToM development is through children's ability to detect whether someone is lying. Understanding lies and deception increases from ages three to five, a time when children also become more successful on measures of ToM, demonstrating an ability to recognize that other people may hold knowledge that does not match one's own view of reality (Carlson, Moses, & Hix, 1998). When children begin to develop an ability to accurately detect deception, their world knowledge helps them spot errors in others' lies (Lee, Cameron, Doucette, & Talwar, 2002). For example, as adults, our knowledge of Western culture would lead us to find a child's claim of a dragon

coming to life and breaking a household object to be false (Lee et al., 2002). Furthermore, the ability to detect deception enhances our perspective-taking skills when a deceiver's emotions are not in line with their claims (Ekman & O'Sullivan, 1991; Maas, 2008). For example, one might detect a difference in the display of affect between a student who truly lost a grandparent on exam day and a deceptive student who flippantly reports the death of their grandmother. Thus, the ability to detect deception enhances the relation between emotion knowledge and ToM skill development.

Investigating the precursory skills that scaffold the development of accurate ToM is critical for expanding our knowledge of social cognition in general, as well as for the application of early interventions for children who have difficulty acquiring effective social cognition skills. However, there is a dearth of research on how one of the precursory social cognition skills, deception detection (Eskritt & Lee, 2017), interacts with other related skills, such as emotion knowledge, to contribute to ToM development. The present study adds to the literature by investigating how children's deception detection skills and emotion knowledge relate to ToM. We hypothesized that the relationship between emotion knowledge and ToM skills is stronger for children with good deception detection skills than for children with fragile deception detection skills.

2 | METHOD

2.1 | Participants

A total of 108 typically developing children (ages 3 to 5 years, $M = 51.38$ months, $SD = 8.04$, 50 females) were recruited from preschools in the southeastern region of the United States. Eighty-five percent of the children were Caucasian. Forty-six percent of participants were from families with annual incomes of \$100,000 or more.

2.2 | Child direct measures

2.2.1 | Deception detection

The implausible lie task, adapted from Lee et al. (2002), assessed children's ability to detect deception demonstrated by another individual. Specifically, the implausible lie task investigated whether children believed a lie told to them when the statement violated their developing world knowledge of reality versus fantasy distinctions. While the experimenter read a book with the participant, a confederate sat quietly and read a different book that had a dragon on the cover. After reading, the experimenter placed a cup on a table and suggested that the participant join her in getting a drink from another room. While the experimenter and participant were gone, the confederate switched the cup with a matching broken cup. Participants were tested on memory of the task as well as their ability to detect deception (memory control question: "How did [confederate's name] say the cup got broken?"; critical deception detection question: "Who do you think really broke it?"). Coding was dichotomous; children who passed the task answered both questions correctly.

2.2.2 | Emotion knowledge

The Assessment of Children's Emotional Skills (Schultz, Izard, & Bear, 2004) measured children's emotion knowledge. One set of 15 vignettes contained one- to three-sentence items describing a situation evoking an emotion, such as (a) dropping your ice cream cone (sad), or (b) a friend sent you a card (happy). Children responded to each item by labelling each protagonist's feeling as happy, sad, scared, mad, or no feeling. Three of these items were composed of ambiguous vignettes designed to describe nonprototypical emotional behaviours or situations. Children's emotion knowledge score was determined by the total number of correct responses on the 12 nonambiguous trials, with higher scores indicating better emotion knowledge (possible range: 0–12).

2.2.3 | ToM

Children completed the ToM scale developed by Wellman and Liu (2004), a measure that has substantially contributed to the study of ToM in preschool (Carlson, Koenig, & Harms, 2013). The seven-item scale was designed

for the experimenter to administer tasks in order of relative conceptual difficulty, with the Diverse Desires task being the easiest task and the Real-Apparent Emotion task being the most difficult. According to Wellman and Liu (2004), older children tend to pass more ToM scale tasks than younger children, but there is not an effect of task order. As previous research has demonstrated (e.g., Hasni, Adamson, Williamson, & Robins, 2017; Vanderbilt, Liu, & Heyman, 2011; Wellman, Lopez-Duran, LaBounty, & Hamilton, 2008), ToM scale scores were generated by participants completing all seven tasks and receiving one point for each task they passed (possible range: 0–7).

2.2.4 | Receptive vocabulary

The Peabody Picture Vocabulary Test, Fourth Edition Form B (PPVT-4; Dunn & Dunn, 2007) assessed children's receptive vocabulary. The PPVT has a 90% reliability rate (Dunn & Dunn, 2007). Standard scores were used to assess children's receptive vocabulary ($N = 108$; $M = 110.69$, and $SD = 14.65$). The PPVT-4 was used to determine whether children's receptive vocabulary skills were good enough to understand the instructions of the battery of direct child measures. Data from children who scored less than the 20th percentile on the PPVT-4 were excluded from analyses ($n = 8$). The total sample size is 100 after excluding these participants.

2.3 | Procedure

Participants were individually interviewed during one 30-min session. The administration of all measures occurred in a fixed random order as past research has demonstrated that research involving individual differences should employ fixed rather than counterbalanced designs (Carlson & Moses, 2001). Tasks were administered in the following order: ToM scale, deception detection measure, emotion knowledge measure, and finally PPVT. Each participant was interviewed in a private room that was appointed for experimental testing. Before testing, each participant provided verbal assent, and parents provided written consent. Experimenters and participants sat next to each other at a small table. Participants received a small prize for their participation.

3 | RESULTS

3.1 | Preliminary analyses

Table 1 provides the descriptive statistics for the variables used in analyses. Children's emotion knowledge, deception detection, and ToM demonstrated development from age three to five as described in previous literature (e.g., DePaulo, Jordan, Irvine, & Laser, 1982; Wellman & Liu, 2004; see Table 2). Analysis of variance was used to examine gender differences in ToM, emotion knowledge, and deception detection; these analyses revealed no significant

TABLE 1 Descriptive statistics

Variable	Age	M	SD	Possible range	Actual range
Theory of Mind scale	3-year-olds	2.76	1.20	0–7	0–7
	4-year-olds	3.00	1.34		
	5-year-olds	4.16	1.57		
	Overall	3.15	1.43		
Emotion knowledge (ACES social situations)	3-year-olds	4.97	2.22	0–12	0–11
	4-year-olds	6.02	2.57		
	5-year-olds	7.22	2.13		
	Overall	5.89	2.48		
Deception detection (implausible lie task)	3-year-olds	1.03	.54	0–2	0–2
	4-year-olds	1.34	.62		
	5-year-olds	1.67	.69		
	Overall	1.30	.64		

TABLE 2 Correlations between variables of interest

Variable	2	3	4
1. Age	.47**	.43**	.35**
2. Emotion knowledge (ACES social situations)		.32**	.36**
3. Deception detection (implausible lie task)			.23*
4. Theory of Mind scale			

* $p < .05$,

** $p < .01$.

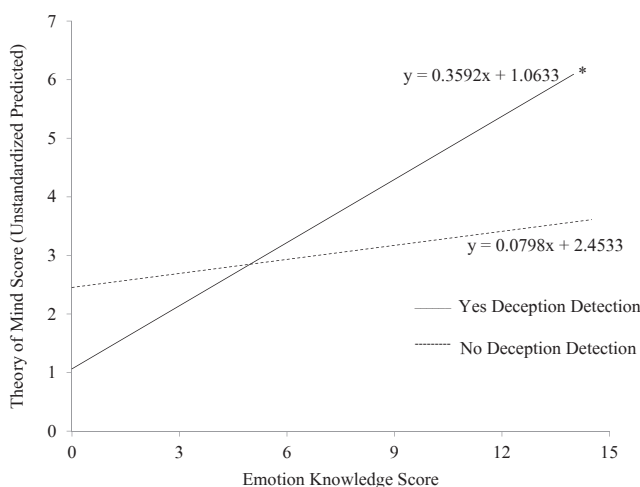
gender differences. Thus, gender was excluded from further analyses. Table 2 demonstrates correlations between variables, including age, deception detection, emotion knowledge, and ToM ability.

3.2 | Predictors of ToM performance

As depicted in Table 3, a hierarchical linear regression predicting ToM performance revealed a significant main effect of emotion knowledge, as well as a significant emotion knowledge and deception detection interaction, $\beta = .29$,

TABLE 3 Linear regression analyses for Theory of Mind using emotion knowledge and deception detection as predictors

Dependent variable: Theory of Mind scale					
Model	Predictor	β	SE β	t	p
1	Constant	1.59	.47	3.42	.00
	Age	.75	.22	3.46	.00
2	Constant	2.24	.54	4.13	.00
	Age	.44	.26	1.70	.09
	Emotion knowledge (mean centred)	.14	.06	2.24	.03
	Deception Detection (mean centred)	.18	.31	.56	.58
3	Constant	2.05	.53	3.85	.00
	Age	.47	.25	1.90	.06
	Emotion knowledge (mean centred)	.15	.06	2.36	.02
	Deception detection (mean centred)	.06	.31	.18	.86
	Emotion knowledge \times deception detection	.29	.12	2.49	.02

**FIGURE 1** The interaction of children's emotion knowledge scores and deception detection abilities significantly predicted Theory of Mind skills. $p = .02$

$t(86) = 2.49, p = .02$, controlling for age. The deception detection and emotion knowledge interaction explained 23% of the variance in ToM scores, $R^2 = .23, F(4, 86) = 6.41, p < .001$. Figure 1 displays this enhancing effect such that when deception detection and emotion knowledge scores are both high, children's ToM scores are also high. In other words, children with high deception detection and high emotion knowledge demonstrated the best ToM performance in comparison with their peers. A simple slopes analysis was conducted to determine whether emotion knowledge influences ToM for children at each level of deception detection. The simple slope for children who detected deception was significant, $p = .001$, whereas the simple slope for children who did not detect deception was not significant, $p = .28$, indicating that deception detection skills support ToM for children who have strong emotion knowledge but not for children who have fragile emotion knowledge.

4 | DISCUSSION

Research in social cognition has recently featured advances in studying associations between developing emotion knowledge and ToM (e.g., Loukusa, Mäkinen, Kuusikko-Gauffin, Ebeling, & Moilanen, 2014; O'Brien et al., 2011). This study adds to the literature by demonstrating that a foundational social cognition skill, namely, deception detection, moderates the relation between emotion knowledge and ToM. Specifically, deception detection appears to strengthen the relationship between emotion knowledge and ToM for children when children have strong emotion knowledge. However, deception detection skills do not appear to influence ToM performance for children who have fragile emotion knowledge skills. This is both useful for informing our knowledge of social cognition development and for informing treatment for populations who have challenges in social cognition, such as the deficits in social communication seen in individuals with autism spectrum disorders (ASD).

An important feature of social cognition is the ability to understand others' emotions and intention in interpersonal communication; both of which contribute to ToM understanding. Furthermore, understanding deception is important for several facets of development, including relationships with peers, determining which adults to trust, and developing general world knowledge (e.g., Cassidy, Werner, Rourke, Zuernis, & Balaraman, 2003). When an individual's words and affect are not in accord, the ability to understand emotions is particularly helpful for ToM understanding in young children. In support of this notion, one of the most difficult tasks in the ToM scale (Wellman & Liu, 2004) includes an emotional component, testing a child's understanding of real versus apparent emotions; in this task, children are told a story about a boy and asked to discern how the boy really feels versus how he appears to look given his facial expression. In the script, the experimenter mentions that the boy "might really feel one way inside but look a different way on his face. Or, he might really feel the same way inside as he looks on his face." In the story, the boy tries to hide how he feels. To pass this task, children must correctly indicate how the boy felt and how he looked on his face. Children who pass the real-apparent emotion task tend to display above-average ToM skills. However, understanding emotions is a complex process. In this study, we measured children's knowledge about emotions by assessing their ability to identify the correct emotion for a given situation. For example, being alone in the woods should make one feel scared whereas receiving a gift should make one feel happy. A more complex form of emotion understanding is the ability to identify a person's facial expressions as communicating a specific emotion. For example, raised eyebrows with an open mouth indicate that someone is surprised. Future studies should examine how knowledge of facial expressions of emotions further adds to the development of these social cognition constructs.

Relatedly, between the ages of four and 10, children begin to understand that social rules determine which emotions are appropriate for the situation at hand (i.e., emotional display rules) and that an individual's face may not match an internal emotion (Garner, 1999; Gnepp & Hess, 1986; Hayashi & Shiomi, 2015). Thus, future research should incorporate measures that assess both the cognitive and emotional aspects of emotion knowledge. In particular, designing deception detection tasks in which the experimenter acts in a more emotive manner will also enhance ecological validity of the deception detection task itself. For example, assessments of children's ability to identify emotions from a series of vignettes might be accompanied by a faceless puppet (e.g., Channell & Barth,

2013; Denham et al., 2002; O'Brien et al., 2011). Future research should address whether deception detection moderates the relationship between emotion knowledge and ToM when both the emotion knowledge task and deception detection task assess ecologically valid emotion understanding, such as the use of faceless puppets. Similarly, it would also be interesting to include a deception detection task that affects the participant personally. In the deception detection task adapted from Wellman and Liu (2004), a cup is broken. This cup does not belong to the participant; thus, the participant is not fully invested in the reasoning behind the experimenter's lie. Future tasks should seek to evoke emotion in the participant by including elements tied to them (e.g., breaking a prize previously given to the participant).

With regard to this research's application, examining developmental factors that impact young children's success in both cognitive and social domains has important implications for advancing our knowledge of social cognition. Deficits in this type of understanding are witnessed in individuals with general social cognition challenges and poor emotion knowledge, such as people with ASD. For example, children with ASD have trouble keeping information secret from others but perform just as well as typically developing children in hiding objects from others (Baron-Cohen, 1992). Additionally, Dennis, Lockyer, and Lazenby (2000) demonstrated that children with ASD exhibit difficulty in assigning emotions to characters in a story when facial expressions do not match an individual's true feelings. Therefore, more research is needed to identify mechanisms of the development of social cognition skills (e.g., deception detection) for the advancement of interventions for children with ASD.

Conversely, some research has indicated various costs of advanced ToM understanding. For example, children with advanced ToM understanding have been shown to rate their overall happiness lower than peers who demonstrate a lack of ToM understanding (e.g., Bosacki, 2015; Caputi, Lecce, Pagnin, & Banerjee, 2012). In regard to the associations between peer relations and social cognition, perhaps the idiom "ignorance is bliss" rings true; children lacking ToM understanding may concentrate more on their own well-being rather than feel concern for the thoughts and feelings of others. Thus, further examining the associations among ToM understanding, emotion knowledge, and deception detection is important for illuminating central aspects of early social cognitive development tied to children's overall cognitive and social well-being.

Overall, these results suggest that the ability to detect deception in others strengthens the relationship between emotion knowledge and ToM development for children with good emotion knowledge skills. Thus, when developing interventions for children who have difficulty with early ToM skills, both emotion knowledge and deception detection should be considered. Future studies of ToM development should expand upon these results by longitudinally investigating the relations among precursory skills of social cognition that contribute to children's ToM development throughout childhood.

CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

ORCID

Alexandra F. Nancarrow  <http://orcid.org/0000-0003-2988-9336>

REFERENCES

- Baron-Cohen, S. (1992). Out of sight or out of mind? Another look at deception in autism. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, 33(7), 1141–1155.
- Bosacki, S. L. (2015). Children's theory of mind, self-perceptions, and peer relations: A longitudinal study. *Infant and Child Development*, 24(2), 175–188.
- Caputi, M., Lecce, S., Pagnin, A., & Banerjee, R. (2012). Longitudinal effects of theory of mind on later peer relations: The role of prosocial behavior. *Developmental Psychology*, 48(1), 257–270.
- Carlson, S. M., Koenig, M. A., & Harms, M. B. (2013). Theory of mind. *WIREs Cognitive Science*, 4, 391–402.

- Carlson, S. M., & Moses, L. J. (2001). Individual differences in inhibitory control and children's theory of mind. *Child Development, 72*(4), 1032–1053.
- Carlson, S. M., Moses, L. J., & Hix, H. R. (1998). The role of inhibitory processes in young children's difficulties with deception and false belief. *Child Development, 69*(3), 672–691.
- Cassidy, K. W., Werner, R. S., Rourke, M., Zubernis, L. S., & Balaraman, G. (2003). The relationship between psychological understanding and positive social behaviors. *Social Development, 12*(2), 198–221.
- Channell, M. M., & Barth, J. M. (2013). Individual differences in preschoolers' emotion content memory: The role of emotion knowledge. *Journal of Experimental Child Psychology, 115*(3), 552–561.
- Denham, S. A., Bassett, H. H., Way, E., Mincic, M., Zinsser, K., & Graling, K. (2012). Preschoolers' emotion knowledge: Self-regulatory foundations and predictions of early school success. *Cognition & Emotion, 26*(4), 667–679.
- Denham, S. A., Caverly, S., Schmidt, M., Blair, K., DeMulder, E., Caal, S., ... Mason, T. (2002). Preschool understanding of emotions: Contributions to classroom anger and aggression. *Journal of Child Psychology and Psychiatry, 43*(7), 901–916.
- Denham, S. A., & Couchoud, E. A. (1990). Young preschoolers' understanding of emotions. *Child Study Journal, 20*(3), 171–192.
- Denham, S. A., McKinley, M., Couchoud, E. A., & Holt, R. (1990). Emotional and behavioral predictors of preschool peer ratings. *Child Development, 61*(4), 1145–1152.
- Dennis, M., Lockyer, L., & Lazenby, A. L. (2000). How high-functioning children with autism understand real and deceptive emotion. *Autism, 4*(4), 370–381.
- DePaulo, B. M., Jordan, A., Irvine, A., & Laser, P. S. (1982). Age changes in the detection of deception. *Child Development, 53*(3), 701–709.
- Dunn, L. M., & Dunn, D. M. (2007). *Peabody picture vocabulary test* (Fourth ed.). Minneapolis, MN: NCS Pearson, Inc.
- Eggum, N. D., Eisenberg, N., Kao, K., Spinrad, T. L., Bolnick, R., Hofer, C., ... Fabricius, W. V. (2011). Emotion understanding, theory of mind, and prosocial orientation: Relations over time in early childhood. *The Journal of Positive Psychology, 6*(1), 4–16.
- Ekman, P., & O'Sullivan, M. (1991). Who can catch a liar? *American Psychologist, 46*, 913–920.
- Eskritt, M., & Lee, K. (2017). The detection of prosocial lying by children. *Infant and Child Development, 26*(1), 1–17.
- Garner, P. W. (1999). Continuity in emotion knowledge from preschool to middle-childhood and relation to emotion socialization. *Motivation and Emotion, 23*(4), 247–266.
- Garner, P. W., Jones, D., & Miner, J. L. (1994). Social competence among low-income preschoolers: Emotion socialization practices and social cognitive correlates. *Child Development, 65*(2), 622–637.
- Gnepp, J., & Hess, D. L. (1986). Children's understanding of verbal and facial display rules. *Developmental Psychology, 22*(1), 103–108.
- Gopnik, A., & Meltzoff, A. N. (1997). *Words, thoughts, and theories* (Vol. 1). Cambridge, MA: MIT Press.
- Gopnik, A., & Wellman, H. M. (2012). Reconstructing constructivism: Causal models, Bayesian learning mechanisms, and the theory theory. *Psychological Bulletin, 138*(6), 1085–1108.
- Hasni, A. A., Adamson, L. B., Williamson, R. A., & Robins, D. L. (2017). Adding sound to theory of mind: Comparing children's development of mental-state understanding in the auditory and visual realms. *Journal of Experimental Child Psychology, 164*, 239–249.
- Hayashi, H., & Shiomi, Y. (2015). Do children understand that people selectively conceal or express emotion? *International Journal of Behavioral Development, 39*(1), 1–8.
- Hughes, C., & Ensor, R. (2007). Executive function and theory of mind: Predictive relations from ages 2 to 4. *Developmental Psychology, 43*(6), 1447–1459.
- Izard, C. E., Woodburn, E. M., Finlon, K. J., Krauthamer-Ewing, E. S., Grossman, S. R., & Seidenfeld, A. (2011). Emotion knowledge, emotion utilization, and emotion regulation. *Emotion Review, 3*(1), 44–52.
- Lee, K., Cameron, C. A., Doucette, J., & Talwar, V. (2002). Phantoms and fabrications: Young children's detection of implausible lies. *Child Development, 73*(6), 1688–1702.
- Loukusa, S., Mäkinen, L., Kuusikko-Gauffin, S., Ebeling, H., & Moilanen, I. (2014). Theory of mind and emotion recognition skills in children with specific language impairment, autism spectrum disorder and typical development: Group differences and connection to knowledge of grammatical morphology, word-finding abilities and verbal working memory. *Language and Communication Disorders, 49*(4), 498–507.
- Maas, F. K. (2008). Children's understanding of promising, lying, and false belief. *Journal of General Psychology, 135*(3), 301–321.
- O'Brien, M., Weaver, M. W., Nelson, J. A., Calkins, S. D., Leerkes, E. M., & Marcovitch, S. (2011). Longitudinal associations between children's understanding of emotions and theory of mind. *Cognition and Emotion, 25*(6), 1074–1086.

- Odom, R. D., & Lemond, C. M. (1972). Developmental differences in the perception and production of facial expressions. *Child Development, 43*(2), 359–369.
- Piaget, J. (1929). *The child's concept of the world*. London: Routledge and Kegan Paul.
- Schultz, D., Izard, C. E., & Bear, G. (2004). Children's emotion processing: Relations to emotionality and aggression. *Development and Psychopathology, 16*, 371–387.
- Sette, S., Spinrad, T. L., & Baumgartner, E. (2016). The relations of preschool children's emotion knowledge and socially appropriate behaviors to peer likability. *International Journal of Behavioral Development, 41*(4), 532–541.
- Vanderbilt, K. E., Liu, D., & Heyman, G. D. (2011). The development of distrust. *Child Development, 82*(5), 1372–1380.
- Wellman, H. M. (1990). *The child's theory of mind*. Cambridge, MA: MIT Press.
- Wellman, H. M. (2014). *Making minds: How theory of mind develops*. Oxford University Press.
- Wellman, H. M., Cross, D., & Watson, J. (2001). Meta-analysis of theory-of-mind development: The truth about false belief. *Child Development, 72*(3), 655–684.
- Wellman, H. M., & Gopnik, A. (1992). Why the child's theory of mind really is a theory. *Mind & Language, 7*(1–2), 145–171.
- Wellman, H. M., & Liu, D. (2004). Scaling of theory-of-mind tasks. *Child Development, 75*(2), 523–541.
- Wellman, H. M., Lopez-Duran, S., LaBounty, J., & Hamilton, B. (2008). Infant attention to intentional action predicts preschool theory of mind. *Developmental Psychology, 44*(2), 618–623.

How to cite this article: Nancarrow AF, Gilpin AT, Thibodeau RB, Farrell CB. Knowing what others know: Linking deception detection, emotion knowledge, and Theory of Mind in preschool. *Inf Child Dev.* 2018; e2097. <https://doi.org/10.1002/icd.2097>