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BRIEF REPORT

Young Children's Emerging Ability to Make False Statements

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This study examined the origins of children's ability to make consciously false statements, a necessary component of lying. Children 2 to 5 years of age were rewarded for claiming that they saw a picture of a bird when viewing pictures of fish. They were asked outcome questions ("Do you win/lose?"), recognition questions ("Do you have a bird/fish?"), and recall questions ("What do you have?"), which were hypothesized to vary in difficulty depending on the need for consciousness of falsity (less for outcome questions) and self-generation of an appropriate response (more for recall questions). The youngest children (2½ to 3½ years old) were above chance on outcome questions, but it was not until age 3½ that children performed above chance on recognition questions or were capable of maintaining false claims across question types. Findings have implications for understanding the emergence of deception in young children.

Keywords: deception, children, response inhibition, executive function

Although children's honesty has long been a subject of scientific interest, little research has examined the emergence of children's lie-telling ability. A lie is a consciously false statement intended to deceive (Stern & Stern, 1909). Most research has focused on the extent to which children are capable of intentional deception (Carlson, Moses, & Hix, 1998; Chandler, Fritz, & Hala, 1989; Hala, Chandler, & Fritz, 1991; Lewis, Stanger, & Sullivan, 1989; Newton, Reddy, & Bull, 2000; Peskin, 1992; Ruffman, Olson, Ash, & Keenan, 1993; Sodian, 1991; Talwar & Lee, 2002a). Very little attention has been devoted to identifying the age at which young children can make consciously false statements without any intent to deceive, which is a necessary precursor to lying.

There are hints in the literature on children's lies that significant developmental progress is made between 3 and 4 years of age. Parents and teachers, for example, have reported noticing the first "lies" in children at about this age (Newton, 1994, cited in Newton, Reddy, & Bull, 2000; Stouthamer-Loeber, 1986). Also, in laboratory research utilizing a temptation resistance paradigm (in which a child is asked not to peek at or play with a toy, inevitably does so, and then is asked if he or she peeked when the researcher returns), substantial increases in false statements emerge between the ages of 3 and 4 years (Lewis et al., 1989; Polak & Harris, 1999; Talwar & Lee, 2002a; Talwar, Lee, Bala, & Lindsay, 2002). At the same time, naturalistic studies have claimed lying is common among 2-year-olds (Newton et al., 2000; Wilson, Smith, & Ross, 2003), and some work has found near-universal false denials of wrongdoing among 3-year-old children (Talwar & Lee, 2002b).

Stern and Stern's (1909) classic observational work led them to postulate that many examples of early "lying" are in fact "pseudo-lies," which are "mistaken claims" or "momentary impulsive utterances" (pp. 111–112). Although Stern and Stern did not elaborate on the meaning of *mistaken* and *impulsive* claims, these sorts of statements can be said to fall on a continuum of falsity awareness. When a false statement is a mistake, the speaker believes the statement to be true and is ignorant of its falsity. When a false statement is impulsive, the speaker may be inattentive to the statement's falsity.

Elaborating on Stern and Stern, we postulate that many false statements made by young children labeled as lies are best understood as impulsive false statements in which their attention while speaking is focused on desires rather than on beliefs. In other words, it is important to distinguish between *desire*-based and *belief*-based responses. Desire-based responses are made in accord with the child's desires. False desire-based responses need not be "mistakes" or "lies" because the child may be inattentive to, rather than ignorant of, the truth of his or her response. In contrast, belief-based responses are made in accord with the child's beliefs. A false belief-based response is either mistakenly or consciously false.

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We posit that the likelihood of a child providing desire-based rather than belief-based responses depends on the nature of the question asked. First, if questions refer to desirability rather than factuality, desire-based responses are more likely. Second, if questions permit the child to accept or reject stated information rather than require the child to independently generate responses, desire-based responses are more likely. Third, if questions refer to something not immediately perceived, this facilitates desire-based responding. In each case, the underlying principle is that desire-based responses are facilitated when the child is not directly confronted with the truth.

The way in which a child's false statements might be desire-based is particularly easy to imagine when considering simple denials of prior wrongdoing. When a child responds "no" to a question such as "Did you peek at the toy?" the child may be responding on the basis of desirability rather than on his memory of his interaction with the toy. Research on children's early use of the word *no* has found that it first emerges as a reflection of the child's desires rather than as a negation of a factual assertion (Hummer, Wimmer, & Antes, 1993; Pea, 1980). Hence, a "no" response could be interpreted as "I wish I hadn't peeked" rather than "I didn't peek."

One laboratory study examining young children's lies considered the possibility that children's false statements were mistakes but not the possibility that their false statements were desire-based. Polak and Harris (1999) recognized that prior research on children's lying failed to acknowledge that children who falsely denied having peeked may not have recalled whether they had peeked. The researchers thus compared children's willingness to state that they had touched a guitar in the experimenter's absence when either encouraged or forbidden to touch. Children encouraged to touch universally admitted having done so, whereas a substantial percentage of children who were told not to touch denied touching. However, because the instructions differed in the two groups, touching was less desirable for children who had been forbidden to touch than for children who were encouraged to touch. Children who were responding with reference to the experimenter's description of the desirability of action ("It's okay to touch" vs. "Do not touch") rather than according to their memory of their interaction with the target object would tell the truth when encouraged to touch and would make false statements when forbidden to touch.

In the temptation resistance studies, children's lie-telling capabilities may be overestimated in part due to the fact that children were asked to recall their actions (whether they had seen the toy) rather than directly confronted with a perceptible truth. Research on children's pretense abilities and inhibition supports the assertion that children's immediate perceptions influence their use of false statements. For example, young children find it easier to employ pretense language when referencing an object that has an ambiguous function or identity (e.g., block = cake) than when referencing an object that is notably different from its pretended identity (e.g., cup = cake; Bretherton, O'Connell, Shore, & Bates, 1984; McLoyd, 1983; Ungerer, Zelazo, Kearsley, & O'Leary, 1981). Similarly, research on children's inhibitory abilities has shown that young children are quite good at learning to say "sun" to an abstract stimulus (Gerstadt, Hong, & Diamond, 1994) but have considerable difficulty in learning to say "sun" to a picture of a moon (Diamond, Kirkham, & Amso, 2002). We are aware of only one study in which young children appeared to successfully lie in the face of a conflicting perception. Examining the development of white lies, Talwar and Lee (2002b) devised a clever procedure in which the experimenter, who had an unsightly spot on her nose, asked the child if she looked "okay" for her picture. Eighty-five percent of the 3-year-olds falsely said "yes." However, the target question did not directly address the child's perceptions. That is, the experimenter did not ask the child, "Do I have a spot on my nose?"

Surprisingly, research on lying has largely ignored the effect of different question types on children's performance. As we have emphasized, questions vary in the extent to which they focus on desirability or truth. Moreover, Newton et al. (2000) recognized the importance of considering if "linguistically simple forms or specific phrases" were "repeated in a routine manner rather than varied" in order to determine whether children's false statements were indeed lies (p. 309). Research on children's early lies has tended to ask yes/no questions in which a successful lie is a simple "yes" or "no" (Lewis et al., 1989; Polak & Harris, 1999; Talwar & Lee, 2002a). These questions are more subject to yes- or no-biases and random responding than are recall questions (Fritzley & Lee, 2003; Peterson, Dowden, & Tobin, 1999) and do not require the child to generate details in order to produce a false response.

Present Study

Our goal in this research was to examine children's early ability to make consciously false statements. We were especially interested in the types of false statements children can first provide and the extent to which they can modify their responses to different questions in order to maintain a falsehood. We taught 2- to 5-year-olds a game in which they earned prizes for claiming that they "had a bird" when viewing pictures of fish. They were asked outcome questions ("Do you win/lose?"), recognition questions ("Do you have a bird/fish?"), and recall questions ("What do you have?"). Finally, we included control recognition questions ("Do you have a cow?") and trials in which children were actually viewing a bird to identify task incomprehension and potential yes-biases.

We first hypothesized that the earliest signs of above-chance performance would emerge in response to the outcome questions because children could succeed by referencing the desirability of "winning" rather than the actual stimulus. Second, we expected children to perform better on recognition questions than on recall questions because "yes/no" responses are simpler to generate than are false statements. Third, on the basis of evidence that children's lie-telling abilities improve substantially between 3 and 4 years of age, we tentatively predicted that age-related improvements in performance would be largest during this period.

Method

Participants

Participants were 158 English-speaking children age 2 years 7 months to 5 years 7 months (M = 49 months, SD = 8.5) from preschools in middle-class neighborhoods in two counties in southern California (57% male). The ethnic breakdown of the sample was 56% Caucasian, 13% Asian, 10% Latino, 3% African

American, and 18% biracial, other, or unknown. We did not collect information regarding participants' native language and parental education. We obtained written consent from parents through in-person recruitment.

Materials and Procedure

The experimenter individually brought children to a quiet area of their preschool and obtained their assent to participate. Children completed the task described herein either before or after the day–night Stroop-like task (Gerstadt, Hong, & Diamond, 1994) and a truth–lie identification task (Lyon, Carrick, & Quas, 2010). Task order did not affect the results, and those tasks are not discussed further.

Training phase. The experimenter introduced the task by stating, "In this game, always say you have a bird. Because if you say you have a bird, you win and you get a prize!" The experimenter then placed a coin into a box that was in front of the child. "But if you don't say you have a bird, you lose, and I take away your prize!" The experimenter then removed the coin from the child's box. Each child was first trained to provide the appropriate response to the recall ("What do you have?") and recognition questions ("Do you have a bird/fish?") without bird or fish stimuli present. The child was asked each question up to three times with rule reinstatement; if the child failed three times to provide the appropriate response, the experimenter told the child the appropriate answer and rehearsed the answer with the child. Each child was then given four trials with fish stimuli and two trials with the bird stimuli present and asked the recognition questions. If the child responded to a yes/no question without a yes/no answer (e.g., the child responded, "bird" to "Do you have a fish?"), the question was repeated, and the child was prompted to say "yes" or "no." At the end of each practice trial the experimenter repeated, "Always say you have a bird." Children at all ages made at least one false claim by the end of the two training sessions.

Testing phase. The experimenter reiterated the game's rule and reminded the child to say she had a bird "even if [she had] a fish" at the outset of the testing phase. For the test, the child was shown three blocks of six fish pictures and one block of six bird pictures, with the order of the block of bird pictures being counterbalanced across children. One question corresponded to each picture and included outcome questions ("Do you win/lose?"), recognition questions ("Do you have a bird/fish?"), recall questions ("What do you have?") and control recognition questions ("Do you have a cow?"). The experimenter either praised the child or expressed disappointment, depending on whether the child claimed to have a bird.

In total, children received six outcome (three "do you win" questions and three "do you lose" questions), six recognition (three "do you have a bird" questions and three "do you have a fish" questions), and three recall trials ("what do you have" questions) to fish stimuli during the testing phase. The questions were administered so that their order varied across the three fish blocks, providing that complementary questions (e.g., "do you win" and "do you lose") were not asked consecutively. Yes/no prompts were given for outcome questions ("Do you win/lose?") if the child answered with an animal response ("Bird"). If a child was not responsive to a particular question, the experimenter asked the child, "Tell me what you think." If the child remained unresponsive, the experimenter repeated the question once before moving to the next trial.

Coding. Children's final answers were coded to generate proportion scores, with higher proportions reflecting success in making false statements. Children were given one point for each answer that suggested that they had a bird (except for "bird" responses to the outcome questions, which were treated as incorrect), and zero for each answer that suggested they did not have a bird or that indicated they had a fish. Children received a .5 score for each "don't know" or incomprehensible response so that a failure to answer would reflect chance responding; only 2% of the responses were coded as .5. Correct answers to the control recognition questions (i.e., "no" responses to "Do you have a cow?") received a score of 1 to measure yes-bias.

Results

Children's mean performance across the three fish trials is shown in Table 1 (higher scores reflect success in making false statements). For the outcome and recognition questions, children's responses could be compared to chance responding; whereas even the youngest children were above chance on the outcome questions, children were not above chance on the recognition questions until ages 3 years 7 months to 4 years 5 months. The oldest age group was near ceiling across the three question types.

To examine age and question-type differences, a mixed model analysis of covariance (ANCOVA) was conducted on children's responses. Age (2 years 7 months to 3 years 6 months, $n = 41$; 3 years 7 months to 4 years 6 months, $n = 71$; 4 years 7 months to

Table 1
Mean Scores and Standard Deviations (in Parentheses) on Children's False Statement Performance

	Age		
Question type	2 years 7 months to 3 years 6 months ($n = 41$)	3 years 7 months to 4 years 6 months ($n = 71$)	4 years 7 months to 5 years 7 months ($n = 46$)
Outcome: "Do you win/lose?"	.67 (.27)$^{b}_{a}$*	.83 (.25)$^{b}_{a}$*	.84 (.28)$^{b}_{a}$*
Recognition: "Do you have a bird/fish?"	.53 (.23)$_{b}^{a}$	.79 (.27)$^{b}_{a}$*	.85 (.29)$^{b}_{a}$*
Recall: "What do you have?"	.35 (.39)$_{c}^{a}$	.73 (.36)$_{c}^{b}$	.87 (.29)$_{a}^{c}$

Note. Different superscripts within each question denote significant differences between age groups, and different subscripts denote significant differences across questions within each age group.
* $p = .05$.

5 years 7 months, $n = 46$) was entered as a between-subjects factor, and question type (outcome, recognition, recall) was entered as a within-subjects factor. Children's responses to the control recognition question were covaried to control for the effects of a yes-bias. There were significant main effects of age, $F(2, 154) = 8.81$, $p < .001$, $\eta_p^2 = .10$ and question type, $F(2, 308) = 26.06$, $p < .001$, $\eta_p^2 = .15$, and age interacted with question type, $F(4, 308) = 2.38$, $p = .05$, $\eta_p^2 = .03$. There was also a main effect due to the covariate, $F(1, 154) = 10.96$, $p = .001$, $\eta_p^2 = .07$ and the covariate interacted with question type, $F(2, 308) = 13.17$, $p < .001$, $\eta_p^2 = .08$. Yes-bias was most common among the youngest children (2 years 7 months to 3 years 6 months, $M = .48$, $SD = .42$; 3 years 7 months to 4 years 6 months, $M = .82$, $SD = .33$; 4 years 7 months to 5 years 7 months $M = .96$, $SD = .11$).

Examination of the means in Table 1 revealed that the Age × Question Type interaction was attributable to the fact that the younger two age groups performed better on outcome than on recognition questions and better on recognition questions than on recall questions. Moreover, age improvements were evident between the youngest and the middle age group for each question type, whereas children continued to perform more proficiently on recall questions across each age group. In other words, recall questions appeared to be most difficult, and children exhibited continued improvement with age. The covariate effect and its interaction with question type were attributable to the fact that children with lower scores on the control recognition questions (evincing a yes-bias) performed worse on the task, particularly when answering the recognition and recall questions.

To pinpoint the age at which children exhibited the largest improvement in performance, we further divided children between 3 years 1 month and 4 years into four 3-month age groups (3 years 1 month to 3 years 3 months, $n = 13$; 3 years 4 months to 3 years 6 months, $n = 17$; 3 years 7 months to 3 years 9 months, $n = 14$; 3 years 10 months to 4 years 0 months, $n = 20$) and examined the pattern of responses, depicted in Figure 1. Children's success at making false claims was compared with 50% proficiency to reflect chance performance for recognition and outcome questions and with 50% proficiency to reflect a comparable benchmark for recall questions. Children in the youngest age group (3 years 1 month to 3 years 3 months) performed significantly below 50% proficiency on recall questions $t(12) = -2.46$, $p = .03$, whereas their performance on the outcome and recognition questions did not differ from chance. By age 3 years 4 months to 3 years 6 months, however, children performed above chance in response to the outcome questions, $t(16) = 3.10$, $p = .01$. By age 3 years 7 months to 3 years 9 months, children performed above chance on both the outcome questions, $t(13) = 5.51$, $p < .001$ and recognition questions $t(13) = 4.14$, $p = .001$. Finally, among the oldest group, the 3 years 10 months to 4 years 0 months, children performed reliably above chance on the outcome questions, $t(19) = 9.0$, $p < .001$, and recognition questions, $t(19) = 7.76$, $p < .001$, and they were greater than 50% proficient on the recall questions, $t(19) = 4.18$, $p = .001$. A significant improvement in performance between these age intervals emerged between 3 years 4 months to 3 years 6 months and 3 years 7 months and 3 years 9 months of age in response to the recognition questions, $t(29) = 2.87$, $p = .01$.

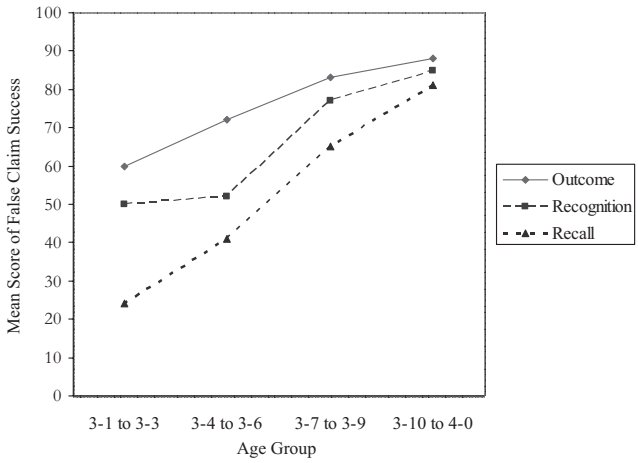

Figure 1. Mean scores of children's false claim of success in the age range of 3 years 1 month (3-1) to 4 years (4-0).

To determine if age differences in performance among the youngest children (2 years 7 months to 3 years 6 months), middle children (3 years 7 months to 4 years 6 months) and oldest children (4 years 7 months to 5 years 7 months) were merely due to task incomprehension among the younger children, we separately analyzed children who provided accurate answers to the three question types when presented with the bird stimuli (outcome $n = 117$, recognition $n = 117$, recall $n = 145$). We then conducted separate univariate ANCOVAs for each question type with age as a between subjects factor and with yes-bias as a covariate. No significant age differences emerged for outcome questions, $F(2, 113) = 0.251$, $p = .779$, but age-related improvements remained between the youngest two age groups (2 years 7 months to 3 years 6 months and 3 years 7 months to 4 years 6 months) for recognition questions, $F(2, 113) = 5.612$, $p = .005$, $\eta_p^2 = .09$, and recall questions, $F(2, 141) = 8.06$, $p < .001$, $\eta_p^2 = .10$.

Finally, individual patterns of responding were examined. Of interest was the number of children at ceiling on each question type (see Table 2). Only 1 child (2%) under 3 years 7 months answered all questions appropriately across question types, compared with 31% of children between 3 years 7 months and 4 years 6 months, and 50% of children between 4 years 7 months and 5 years 7 months.

Discussion

In the current study, we examined young children's emerging ability to make consciously false statements, a necessary precursor to lying. We taught children a game in which they won prizes for claiming that every stimuli they saw was a bird. Unlike prior research examining incipient lies, we asked children about currently perceptible stimuli to ensure that they were aware of and attentive to the truth. We further varied whether the questions directly referenced the truth in order to determine if question type affected children's performance. We tentatively predicted that good performance on the tasks would emerge between 3 and 4 years of age.

Our hypotheses were largely supported. For one, children were most adept at making false statements when questions addressed the desirability of winning (outcome questions) rather than the children's immediate perception (recognition and recall questions).

Table 2
Percentage and Number (in Parentheses) of Children at Ceiling in Making False Statements by Question Type

Question type	Age		
	2 years 7 months to 3 years 6 months	3 years 7 months to 4 years 6 months	4 years 7 months to 5 years 7 months
Outcome: "Do you win/lose?"	29 (12)	54 (38)	63 (29)
Recognition: "Do you have a bird/fish?"	2 (1)	47 (33)	63 (29)
Recall: "What do you have?"	17 (7)	55 (39)	78 (36)
All questions	2 (1)	31 (23)	50 (43)

Indeed, when we excluded children who may not have fully understood the questions (children who failed to assert winning when they really had won), there were no age differences in performance on the outcome questions. Moreover, a substantial number of children began to exhibit consistently good performance in the 3 years 6 months to 4 years 6 months age range, with the most notable improvement at 3 years 7 months to 3 years 9 months of age.

There was also some support for our prediction that children would perform better on recognition questions ("Do you have a bird/fish?") than on recall questions ("What do you have?"), on the basis of the notion that yes/no responses are simpler to generate than are false labels. However, virtually none of the youngest children were capable of consistently responding appropriately to the recognition questions (2%), whereas a fair number were capable of consistently answering "bird" to the recall questions (17%; see Table 2). The recognition questions' difficulty may have been due to the need for flexibility in responding: Children had to alternate between "yes" and "no" responses. In contrast, the appropriate recall response never varied. Additionally, children were administered six recognition trials compared with only three recall trials, which may have promoted ceiling performance on the recall questions. Clearer differences between recognition and recall questions are likely to emerge when children must generate their own false response to the recall questions rather than repeat one provided by the experimenter.

The difficulty 3- and 4-year-olds had in providing false responses across question types on this task suggests that research on children's lies should consider the distinctions among outcome, recall, and recognition questions and the perceptibility of the truth in influencing children's honesty. False denials elicited from young children in temptation resistance studies may include impulsive utterances rather than conscious assertions about their prior actions. Young children may be capable of uttering a simple "no" but incapable of maintaining a lie over multiple questions or generating false information about their actions. Future work should manipulate both the perceptibility of the truth and the type of question the child is asked. For example, we would predict that children would lie less if peeking entailed opening a window that could not be closed, thus making the transgression immediately perceptible when the question was asked. Similarly, with respect to question type, we suspect that many 3-year-olds who answer "yes" when asked, "Do I look okay for my picture?" will answer honestly if asked, "Do I have a red spot on my nose?" (Talwar & Lee, 2002a). Exploration of these issues will provide a richer understanding of the emergence of children's lying abilities.

Although we emphasized ways in which prior research may have exaggerated young children's tendency to make false statements, it is also possible that children in some studies were insufficiently motivated to perform well on the tasks. We trained children to make false statements and consistently and explicitly rewarded them for doing so. Despite the large number of trials, children's performance remained stable during the task. In contrast, research on children's inhibitory abilities (in which they are instructed to say "night" in response to a sun and "day" in response to a moon) often finds decrements in performance over trials (Gerstadt et al., 1994), and children do not perform at ceiling until 6 years of age (Gerstadt et al., 1994; Passler, Isaac, & Hynd, 1985). In the temptation resistance studies, the younger children who admitted peeking may have been unwilling rather than unable to lie. Research on children's early ability to negate false statements suggests that children develop compunctions against making false statements at a very young age (Lyon et al., 2010). Hence, through explicit encouragement and reinforcement, and by providing a context in which there was no intention to deceive, our task was maximally sensitive to children's ability to make false statements.

Future work should explore the possible relation between the emergence of children's ability to make false claims and executive functioning. Prior research has found that children's lies are related to executive functioning (Talwar & Lee, 2008). Because we controlled for yes-bias (which is related to inhibitory skills; Moriguchi, Okanda, & Itakura, 2008), we believe that young children's ability to make false statements reflects something more specific than simply impulsive responding. Nevertheless, inhibitory abilities probably play some role in facilitating false statements because children's repeated experience with labeling objects leads true statements to function as prepotent responses. Younger children's superior performance on the outcome questions, in which they were asked, "Do you win/lose?" may reflect the fact that there was no prepotent response to interfere with false responding.

Children's ability to make false statements may also be related to their theory of mind abilities. Research has found a relation between theory of mind and lying (Polak & Harris, 1999; Talwar & Lee, 2008), with a possible link between children's awareness that others may have false beliefs and their attempts to create false beliefs through lying. Moreover, some research has found relations between second-order theory of mind and children's ability to lie in response to questions that probe their initial lie (Talwar, Gordon, & Lee, 2007; Talwar & Lee, 2008). However, because our task did not entail attempts to deceive, the potential link with theory of mind understanding is less clear.

In closing, this study found that children exhibit substantial improvement in their ability to make false statements from 3 to 4 years of age. Although children as young as 2½ were proficient at making false statements that did not contradict the child's immediate perception, it was not until over 3½ years of age that children appeared capable of maintaining a false claim across different types of questions. These results suggest that, despite lying appearing to emerge very early, preschool children are not necessarily proficient at producing full-fledged lies.

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