Journal of Experimental Child Psychology 113 (2012) 147–158

Contents lists available at SciVerse ScienceDirect

Journal of Experimental Child Psychology

journal homepage: www.elsevier.com/locate/jecp

Young children can tell strategic lies after committing a transgression

Genyue Fu [a,*], Angela D. Evans [b], Fen Xu [c], Kang Lee [d,*]

[a] Zhejiang Normal University, Jinhua, Zhejiang Province 321004, People's Republic of China
[b] Department of Psychology, Brock University, St. Catharines, ON L2S 3A1, Canada
[c] Department of Biomedical Engineering, Beijing Normal University, Beijing 100871, People's Republic of China
[d] Institute of Child Study, Human Development and Child Psychology, OISE/University of Toronto, Toronto, ON, Canada M5R 2X2

ARTICLE INFO

Article history:
Received 21 November 2011
Revised 5 April 2012
Available online 15 June 2012

Keywords:
Deception
Tactical deception
Lying
Lie telling
Strategy
Children
Development

ABSTRACT

This study investigated whether young children make strategic decisions about whether to lie to conceal a transgression based on the lie recipient's knowledge. In Experiment 1, 168 3- to 5-year-olds were asked not to peek at the toy in the experimenter's absence, and the majority of children peeked. Children were questioned about their transgression in either the presence or absence of an eyewitness of their transgression. Whereas 4- and 5-year-olds were able to adjust their decisions of whether to lie based on the presence or absence of the eyewitness, 3-year-olds did not. Experiments 2 and 3 manipulated whether the lie recipient appeared to have learned information about children's peeking from an eyewitness or was merely bluffing. Results revealed that when the lie recipient appeared to be genuinely knowledgeable about their transgression, even 3-year-olds were significantly less likely to lie compared with when the lie recipient appeared to be bluffing. Thus, preschool children are able to make strategic decisions about whether to lie or tell the truth based on whether the lie recipient is genuinely knowledgeable about the true state of affairs.

Introduction

Since the dawn of developmental psychology, researchers have debated about whether young children are capable of telling lies strategically. After observing his son, Darwin (1877) suggested that

* Corresponding authors. Address: Institute of Child Study, University of Toronto, 45 Walmer Road, Toronto, ON, Canada M5R 2X2 (K. Lee).
E-mail addresses: fugy@zjnu.cn (G. Fu), kang.lee@utoronto.ca (K. Lee).

0022-0965/$ - see front matter © 2012 Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.jecp.2012.04.003

even at 2.5 years of age children are motivated and will attempt to tell strategic lies to cover up their transgressions, a phenomenon Darwin called "planned deceit". In contrast, some psychologists (e.g., Stern & Stern, 1909) and professionals (e.g., judges, social workers, psychologists) have argued that young children are incapable of strategic lying (see Bala, Ramakrishnan, Lindsay, & Lee, 2005).

Strategic lying involves two levels of planning. The first level concerns whether individuals take into consideration various contextual factors (e.g., the lie recipient's current state of mind) when deciding whether or not to lie. The second level concerns how individuals, once having decided to lie, craft their lies in such a strategic manner that their untruthful statements are believable and their deceit is undetectable.

Much of the existing research has focused on the second level of strategic lying. One method commonly used to assess this ability is a temptation resistance paradigm (e.g., Lewis, Stanger, & Sullivan, 1989; Polak & Harris, 1999; Talwar & Lee, 2002). In the temptation resistance paradigm, children are left alone with an exciting toy hidden from their view and are asked not to look at (or play with) the unseen toy while the experimenter is out of the room. Because this situation is extremely tempting, many children violate the experimenter's request and peek at or play with the toy. On returning to the room, the experimenter asks whether the children peeked at or played with the toy while the experimenter was gone to determine the lying and truth-telling tendencies in children. Previous studies have consistently shown that approximately half of 3-year-olds tell lies, and the proportion of children who lie increases significantly with age (Chandler, Fritz, & Hala, 1989; Lewis et al., 1989; Peskin, 1992; Polak & Harris, 1999; Talwar & Lee, 2002; Talwar, Murphy, & Lee, 2006; Wilson, Smith, & Ross, 2003), demonstrating that young children do tell lies.

To assess whether the child lie tellers are able to engage in the second level of strategic lying, they are asked follow-up questions after they initially denied having peeked at or played with the forbidden toy. For example, they are asked, "What do you think the toy is?" Given their initial denials, strategic lie tellers should refrain from stating the correct identity of the toy. Rather, they must ensure that their subsequent statements are consistent with the initial lie (e.g., feigning ignorance to the toy's identity). By maintaining the consistency between their statements, children's transgressions can be strategically concealed and their lies can be undetected.

Existing studies have consistently found that this level of strategic lying is highly difficult for young children (e.g., Polak & Harris, 1999; Talwar, Gordon, & Lee, 2007; Talwar & Lee, 2002, 2008). Most children under 5 years of age and approximately half of 6- and 7-year-olds tend to fail at maintaining consistency between statements by correctly naming the toy that they just claimed not to have peeked at or played with (Polak & Harris, 1999; Talwar & Lee, 2002). Polak and Harris (1999) and Talwar and Lee (2002) proposed a second-order theory of mind hypothesis to account for this difficulty. They suggested that for children to maintain consistency between their initial lie and subsequent statements, the lie tellers must be able to reason about what belief they ought to falsely claim to have (e.g., being ignorant about the identity of the toy) based on another false belief (e.g., they have not peeked at the toy). This reasoning requires children to have the ability to think recursively about beliefs, a complex skill that typically does not develop until later during the elementary school years (Wellman & Lui, 2004). This hypothesis was confirmed by Talwar et al. (2007), who found that children's ability to maintain consistency between statements (second level of strategic lie telling) was positively correlated with second-order theory-of-mind understanding.

Although extensive evidence suggests that the ability to construct strategically consistent deceptive statements is a late developmental milestone, limited evidence exists as to whether young children are also incapable of making strategic decisions about whether to lie or tell the truth (first level of strategic lying). There have been several methods used in an attempt to address this question. For example, in Polak and Harris (1999), children were assigned to either the temptation resistance condition mentioned above or a control condition where they were told that they were allowed to play with the toy while the experimenter was gone. No children lied about their playing with the toy in the control condition, whereas the majority of children lied in the temptation resistance condition. Thus, it was suggested that children do not simply lie regardless of context. Peskin (1992) invited children to tell either a "mean" puppet or a "nice" puppet which stickers they preferred. During the introduction session, children learned that the mean puppet would always take their preferred sticker, whereas the nice puppet would only take their nonpreferred sticker. She found that some older pre-

school children, but not younger ones, lied to the mean puppet about their preferences but always told the truth to the nice puppet. A similar finding was obtained by Sodian, Taylor, Harris, and Perner (1991), who found that some older preschoolers engaged in behavioral deception only in a competitive game and not in a cooperative one. Thus, children lie when they have transgressed or are facing a competitor, but they tell the truth when they have not transgressed or the other party is cooperative.

Taken together, these studies suggest that older preschoolers do not lie indiscriminately. Rather, they lie when the needs arise (e.g., to protect the self), and they do not tell lies in situations where there is no need to do so (e.g., no transgression has occurred, they are in a cooperative interaction). This finding is not surprising because in the cooperative situations in Sodian and colleagues (1991) and Peskin (1992) studies, and in the permissive situation in Polak and Harris (1999) study, children have nothing to lose but much to gain by telling the truth. However, these findings do not tell us whether preschoolers are able to make further strategic decisions about whether to lie or tell the truth when both options may incur potential costs/benefits. For example, when children have transgressed, they could lie to conceal the transgression. If their lies are undiscovered, they could avoid any negative consequences associated with the transgression. However, if their lies are discovered, severe negative consequences may result because they have compounded one transgression with yet another transgression (i.e., lying). On the other hand, if they choose to tell the truth, they might be forgiven for telling the truth. However, they might be punished for their transgression. To date, no evidence exists to suggest that preschoolers are able to make such strategic decisions about lying or truth telling.

To bridge this gap in the literature, we conducted the current study. More specifically, we examined whether children at 3, 4, and 5 years of age, after having committed a transgression, will make a strategic decision to lie (first level of strategic lying) or tell the truth based on the likelihood that their transgression may or may not be discovered by the lie recipient. All children were left alone in a room and asked not to peek at a toy in the experimenter's absence. On returning to the room, the experimenter asked children whether they had peeked at the toy in one of two conditions. In one condition the likelihood of the child's transgression being discovered was high, and in the other condition the likelihood of the transgression being discovered was unlikely. In Experiment 1, we randomly assigned children into either the Present condition (where an eyewitness to their transgression remains in the room during the experimenter's questioning about peeking) or the Absent condition (where the eyewitness to their transgression leaves the room during the experimenter's questioning about peeking). The Present condition created a possibility that the eyewitness might inform the experimenter and potentially contradict children's denial of peeking.

In Experiment 2, we more directly manipulated whether the experimenter obtained knowledge about children's transgression from a credible informant (i.e., the eyewitness) or an ignorant informant (i.e., a person who did not directly witness children's transgression). Children were randomly assigned to either the Informant condition (where the experimenter told children that she had learned of their peeking from a knowledgeable informant who was present during the children's transgression) or the Bluff condition (where the experimenter told children that she had learned of their transgression from an ignorant informant who was absent during the transgression). If children are less inclined to tell lies in the Absent and Bluff conditions than in the Present and Informant conditions, it would suggest that young children are able to tell first-level strategic lies, supporting Darwin's original observation. In contrast, if children tell lies at similar rates in both the Absent/Bluff and Present/Informant conditions, it would suggest that young children tell lies indiscriminately and are incapable of making strategic decisions to lie (Bala et al., 2005; Stern & Stern, 1909).

Experiment 1

Method

Participants

The participants were 168 3-, 4-, and 5-year-olds from a middle-class urban city in Zhejiang Province of the People's Republic of China: 52 3-year-olds (26 boys and 26 girls, mean age = 3.5 years, *SD* = 0.32, range = 36–47 months), 58 4-year-olds (30 boys and 28 girls, mean age = 4.6 years,

SD = 0.27, range = 49–59 months), and 54 5-year-olds (28 boys and 26 girls, mean age = 5.6 years, *SD* = 0.32, range = 60–71 months). All children were recruited from local preschools and had not yet begun formal schooling. Informed consent was obtained from all parents prior to beginning the study, and oral assent was obtained from all children. According to school records, nearly 50% of the children's parents had at least a college degree, 35% had education from a technical college, and the remaining 15% had a high school or elementary school diploma.

Design and procedure

Children were taken individually from their class to a quiet room with the experimenter. The experimenter invited children to play a guessing game, based on a temptation resistance paradigm, where they would guess the names of toys based on the noises the toys made. The experimenter asked children to sit in a chair with their back to the experimenter. Children then completed two practice trials where the experimenter placed a toy on the table and played an audio track related to the toy (e.g., a duck quacking). After two practice trials, the experimenter told children that she must go talk to their teacher. The experimenter told children that she would place the last toy on the table with the noise playing and that when she returned she would ask them what the toy was. All children were told not to turn around and peek at the toy while the experimenter was gone and that if they guessed correctly they would receive a prize. The experimenter then placed a toy on the table and played a sound that could not be linked to the toy (a tune played by a greeting card) and left the room for 1 min.

All children were randomly assigned to either the Present condition or the Absent condition by a confederate. In the Present condition, as soon as the experimenter left the room, the confederate, who had been hiding behind a curtain in the room, quietly appeared behind the children. After children peeked at the toy, the confederate coughed, made eye contact, and said that she saw the children peeking at the toy. The experimenter returned 1 min after leaving the room. The eyewitness did not speak to the experimenter but remained in the room while the experimenter asked children the critical question: "Did you turn around and look at the toy?" The Absent condition was the same as the Present condition except that, prior to the critical question being asked, the eyewitness left the room. In both conditions, there was no interaction between the eyewitness and the experimenter to ensure that children did not think that the experimenter knew whether they had peeked. To ensure that the experimenter was not biased when asking the critical question, (a) the confederate did not inform the experimenter of children's behavior and (b) those children who did not peek at the toy were also randomly assigned to the two conditions. Therefore, the experimenter was blind to whether children had peeked when she asked the critical question.

Results and discussion

Peeking behavior

Overall, due to the highly tempting nature of the game, 74% (125/168) of children peeked at the toy in the experimenter's absence, including 76% (41/54) of 3-year-olds, 76% (44/58) of 4-year-olds, and 71% (40/56) of 5-year-olds. A logistic regression was performed with age and gender as the predictors and peeking behavior as the predicted variable (where 1 = *peeked* and 0 = *did not peek*). No significant effect of age or gender was found. Only the responses of the 125 children who peeked at the toy were examined further.

Lie-telling behavior

None of the children who refrained from peeking at the toy falsely confessed to peeking. Of the 125 children who peeked at the toy, approximately 50% (63/125) lied about their transgression. Preliminary analyzes revealed that gender was not significantly related to children's lies; thus, gender is not considered in the following analyzes. To examine the effect of age and condition on children's lie-telling behavior, a logistic regression was performed on lie-telling behavior (where 0 = *truth* and 1 = *lie*), with age (in months) entered on the first step, condition (where 0 = *Present* and 1 = *Absent*) entered on the second step, and age (in months) by condition entered on the third step. The model with age was not significant, Nagelkerke's $R^2 = .02$, $\chi^2(3) = 0.211$, $p = .64$. The second block was significant, Nage-

lkerke's $R^2 = .24$, $\chi^2(3) = 23.68$, $p < .01$. Specifically, children were significantly more likely to lie in the Absent condition compared with the Present condition, $ß = 1.88$, *Wald* = 21.29, $p < .01$. However, the third block (Age × Condition) was also significant, Nagelkerke's $R^2 = .28$, $\chi^2(3) = 4.67$, $p < .01$. Further inspection of the final logistic equation revealed that only the age (in months) by condition interaction was a significant predictor of children's lie-telling behavior, indicating that as age increased children were significantly more likely to lie in the Absent condition, $ß = 1.04$, *Wald* = 4.47, $p < .01$, odds ratio = 2.82. Specifically, the odds ratio indicates that for every 1-month increase in age, children were at least 2 times more likely to lie in the Absent condition compared with the Present condition.

To assess where this age difference in deception occurred, children were divided into three age categories (3-, 4-, and 5-year-olds) and chi-square analyzes were performed between lie telling and condition for each age group. Results revealed that whereas 4- and 5-year-olds were significantly more likely to lie in the Absent condition compared with the Present condition ($\chi^2 = 11.02$, $p < .05$, and $\chi^2 = 13.49$, $p < .05$, respectively), 3-year-olds were not significantly more likely to lie in one condition over the other ($\chi^2 = 2.93$, $p = .12$) (see Fig. 1). The results indicate that children as young as 4 years were able to adjust their decision to lie based on whether there was a potential informant in the room. However, although the pattern of 3-year-olds' responses was in the same direction as that of 4- and 5-year-olds' responses, 3-year-olds as a group failed to adjust their decision to lie according to whether they had a potential informant on hand. Furthermore, in the Present condition, 40% of 3-year-olds told a lie, whereas only 20 and 25% of 5- and 4-year-olds, respectively, told a lie.

One possible alternative explanation for the lack of significant difference between 3-year-olds' lie-telling rates in the Present and Absent conditions, as well as their relatively high rate of lie telling in the Present condition, is that 3-year-olds might be more likely to believe that the eyewitness would not reveal their transgression to the experimenter, whereas the older children might be more likely to suspect that the eyewitness would tell on them. Thus, it is possible that 3-year-olds failed to differentiate the Present and Absent conditions in their decision to lie because they did not understand that the confederate could reveal their transgression to the lie recipient. To eliminate the potential confound of young children not understanding that the confederate could reveal their transgression, Experiment 2 was performed.

Experiment 2

Rather than using the absence or presence of the confederate to manipulate the experimenter's knowledge about children's transgression indirectly, Experiment 2 made clear whether the experimenter actually obtained genuine information about children's transgression. Specifically, we manipulated whether the lie recipient appeared to be genuinely knowledgeable or merely bluffing about her knowledge of children's transgression. In the Informant condition, the experimenter told children that

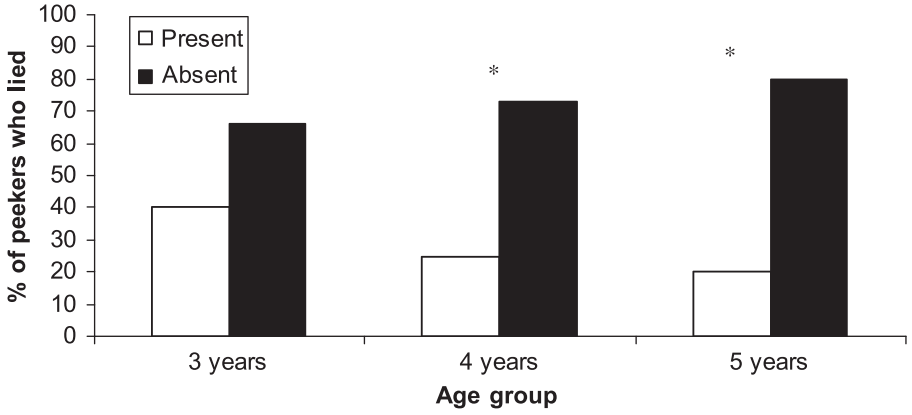

Fig. 1. Percentages of children who peeked at the toy and lied about their peeking in the Present and Absent conditions (Experiment 1). * $p < .05$.

she had knowledge of their peeking from a knowledgeable informant who was present during their transgression (i.e., the eyewitness). Conversely, in the Bluffing condition, the experimenter told children that she had knowledge of their peeking behavior from an ignorant informant who was absent during the transgression (their teacher in a classroom several floors far away from the testing room). Evidence to date suggests that children as young as 18 months understand that adults who are absent from a room cannot know the behavior of those in the room, and adults not only need to be present but also must have visual access to have knowledge about an event in the room (O'Neill, 1996). This understanding is held by most children beyond 2 years of age. Consequently, children in the current study should understand that their teacher, several floors away, is ignorant of their behavior and that the experimenter could not gain genuine knowledge of their peeking from their teacher (Bluffing condition). Thus, if children are strategic in their decision to lie, they should be more likely to choose to lie in the Bluffing condition (because lying would not contradict the experimenter's current knowledge) than in the Informant condition (because lying would contradict the experimenter's knowledge). In the Informant condition, children should be more inclined to choose to confess about their transgression. In contrast, if young children simply tell lies indiscriminately, their decision about whether to lie should not be different in the two conditions.

Method

Participants

The participants were 168 3-, 4-, and 5-year-olds from a middle-class urban city in Zhejiang Province: 57 3-year-olds (29 boys and 28 girls, mean age = 3.5 years, *SD* = 0.29, range = 36–47 months), 51 4-year-olds (28 boys and 23 girls, mean age = 4.5 years, *SD* = 0.28, range = 48–59 months), and 60 5-year-olds (33 boys and 27 girls, mean age = 5.7 years, *SD* = 0.35, range = 60–73 months). All children were recruited from local preschools and had not yet begun formal schooling. Informed consent was obtained from all parents prior to beginning the study, and oral assent was obtained from all children. According to school records, nearly 50% of the children's parents had at least a college degree, 35% had education from a technical college, and the remaining 15% had a high school or elementary school diploma.

Design and procedure

The exact same guessing game from Experiment 1 was played. All children were randomly assigned to either the Informant condition or the Bluffing condition by a confederate. In the Informant condition, as soon as the experimenter left the room, the confederate, who had been hiding behind a curtain in the room, quietly appeared behind the children. After children peeked at the toy, the confederate coughed, made eye contact, and said that she saw the children peeking at the toy. The experimenter returned 1 min after leaving the room and said, "Oh, [confederate's name], what are you doing in here?" The confederate said, "I just passed by and saw you with him/her [depending on child's gender], so I stayed to watch, but I have to leave because I have a meeting." The confederate then turned around and left the room. As the confederate exited the room into the hallway, the experimenter said, "Just a second. When I was gone, did [child's name] peek?" and then nodded her head to indicate that the confederate gave the answer. However, it is important to note that the confederate was out of view of the children and did not reveal anything to the experimenter, thereby allowing the experimenter to remain blind to children's peeking behavior.

The experimenter then claimed that the confederate had told her what the children did in her absence and asked them the critical question: "Did you turn around and look at the toy?" The Bluffing condition was the same as the Informant condition except that instead of claiming to have gained information from the eyewitness, the experimenter claimed that the children's teacher, who was in their classroom several floors away from the testing room, knew everything that the children did while the experimenter was gone and had told the experimenter about it. As in Experiment 1, to ensure that the experimenter was not biased when asking the critical question, (a) the confederate did not inform the experimenter of the children's behavior and (b) even those children who did not peek at the toy were also randomly assigned to the two conditions. Therefore, the experimenter was blind to whether children had peeked when she asked the critical question.

Results and discussion

Peeking behavior

Overall, due to the highly tempting nature of the game, 73% (122/168) of children peeked at the toy in the experimenter's absence, including 70% (40/57) of 3-year-olds, 80% (41/51) of 4-year-olds, and 68% (41/60) of 5-year-olds. A logistic regression was performed with age and gender as the predictors and peeking behavior as the predicted variable (where 1 = *peeked* and 0 = *did not peek*). No significant effect of age or gender was found.

Lie-telling behavior

None of the children who refrained from peeking at the toy falsely confessed to peeking. Only the responses of the 122 children who peeked at the toy were examined further. Of these children, approximately 55% (67/122) lied about their transgression. Preliminary analyzes revealed that gender was not significantly related to children's lies; thus, gender is not considered in the following analyzes. To examine the effects of age and condition on children's lie-telling behavior, a logistic regression was performed on lie-telling behavior (where 0 = *truth* and 1 = *lie*), with age (in months) entered on the first step, condition (where 0 = *Informant* and 1 = *Bluff*) entered on the second step, and age (in months) by condition entered on the third step. The model with age was not significant, Nagelkerke's $R^2 = .01$, $\chi^2(1) = 0.44$, $p = .51$. In the second block, condition was significant, Nagelkerke's $R^2 = .15$, $\chi^2(1) = 14.20$, $p < .01$. Specifically, children were significantly more likely to lie in the Bluff condition compared with the Informant condition, $ß = 1.43$, *Wald* = 13.31, $p < .01$. However, the third block with Age × Condition was also significant, Nagelkerke's $R^2 = .25$, $\chi^2(1) = 10.25$, $p < .01$, indicating that as age increased, children were significantly more likely to lie in the Bluff condition, $ß = 1.04$, *Wald* = 9.23, $p < .01$, odds ratio = 2.82. Specifically, the odds ratio indicates that for every 1-month increase in age, children were at least 2 times more likely to lie in the Bluff condition compared with the Informant condition.

To assess where this age difference in deception occurred, children were divided into three age categories (3-, 4-, and 5-year-olds) and chi-square analyzes were performed between lie telling and condition for each age group. Results revealed that whereas 4- and 5-year-olds were significantly more likely to lie in the Bluff condition ($\chi^2 = 5.53$, $p < .05$, and $\chi^2 = 16.94$, $p < .05$, respectively), 3-year-olds were equally likely to lie in both conditions ($p = 1.00$) (see Fig. 2). The results from the 4- and 5-year-olds confirmed the strategic lying hypothesis, indicating that children as young as 4 years are able to adjust their lie-telling behavior based on the lie recipient's knowledge. However, 3-year-olds as a group were not able to adjust their lie-telling behavior based on the lie recipient's knowledge. However, it should be noted that the sample size of peekers was relatively small (only 20 children per con-

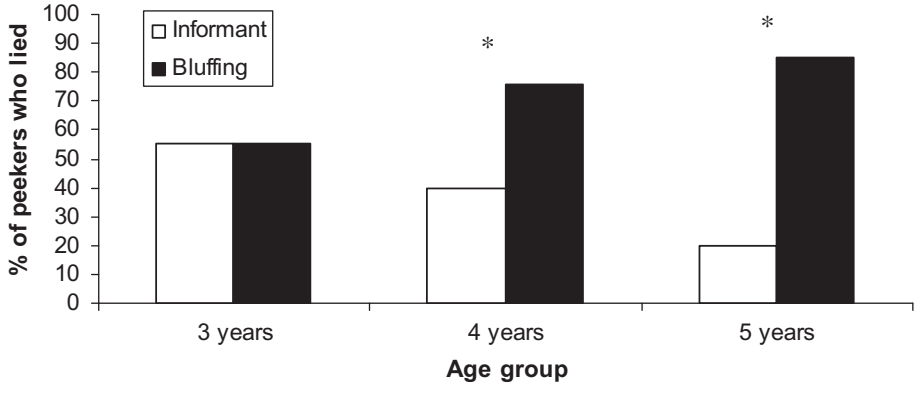

Fig. 2. Percentages of children who peeked at the toy and lied about their peeking in the Informant and Bluffing conditions (Experiment 2). * $p < .05$.

dition), and there might be considerable variability among the 3-year-olds who could or could not lie strategically. It is possible that with an increased sample size of 3-year-olds, a significant finding may emerge. Thus, to address this potential issue and to avoid Type II error, Experiment 3 was conducted.

Experiment 3

Method

Participants

The participants were 76 3-year-olds (31 boys and 45 girls, mean age = 43.73 months, *SD* = 3.19, range 36–47) from a middle-class urban city in Zhejiang Province. All children were recruited from local preschools and had not yet begun formal schooling. Informed consent was obtained from all parents prior to beginning the study, and oral assent was obtained from all children. According to school records, nearly 50% of the children's parents had at least a college degree, 35% had education from a technical college, and the remaining 15% had a high school or elementary school diploma.

Design and procedure

The exact same procedure from Experiment 2 was used.

Results and discussion

Peeking behavior

Overall, due to the highly tempting nature of the game, 79% (60/76) of 3-year-olds peeked at the toy in the experimenter's absence. A logistic regression performed with age and gender as the predictors and peeking behavior as the predicted variable (where 1 = *peeked* and 0 = *did not peek*). No significant effect of age or gender was found. Only the responses of the 60 children who peeked at the toy were examined further.

Lie-telling behavior

None of the children who refrained from peeking at the toy falsely confessed to peeking. Of the 60 children who peeked at the toy, half were randomly assigned to the Informant condition ($n = 30$) and half were assigned to the Bluff condition ($n = 30$). Overall, approximately 51% (31/60) lied about their transgression. Preliminary analyzes revealed that gender was not significantly related to children's lies; thus, gender is not considered in the following analyzes.

To examine the effect of age and condition on children's lie-telling behavior, a logistic regression was performed on lie-telling behavior (where 0 = *truth* and 1 = *lie*), with age (in months) entered on the first step and condition (where 0 = *Informant* and 1 = *Bluff*) entered on the second step. The model with age (in months) was not significant, Nagelkerke's $R^2 = .04$, $\chi^2(1) = 1.82$, $p = .18$. The second block was significant, Nagelkerke's $R^2 = .15$, $\chi^2(1) = 5.29$, $p = .021$. Specifically, children were significantly more likely to lie in the Bluff condition compared with the Informant condition, $\beta = 1.24$, *Wald* = 5.05, $p = .025$, odds ratio = 3.44. The odds ratio indicates that 3-year-olds were at least 3 times more likely to lie in the Bluff condition compared with the Informant condition. Specifically, 67% ($n = 20$) told a lie in the Bluff condition and 37% ($n = 11$) told a lie in the Informant condition (see Fig. 3). Thus, the findings of Experiment 3 indicate that even children as young as 3 years are able to make strategic decisions about when to tell a lie and when to tell the truth.

General discussion

The current investigation tested Darwin's hypothesis of young children's ability to lie strategically after committing a transgression. Previous studies have focused on the second level of strategic lying (concerning how individuals, once having decided to lie, craft their subsequent statements in such a strategic manner that their untruthful statements are believable and their deceit is undetectable), demonstrating that young children are not able to make such strategic lies. We focused on the first

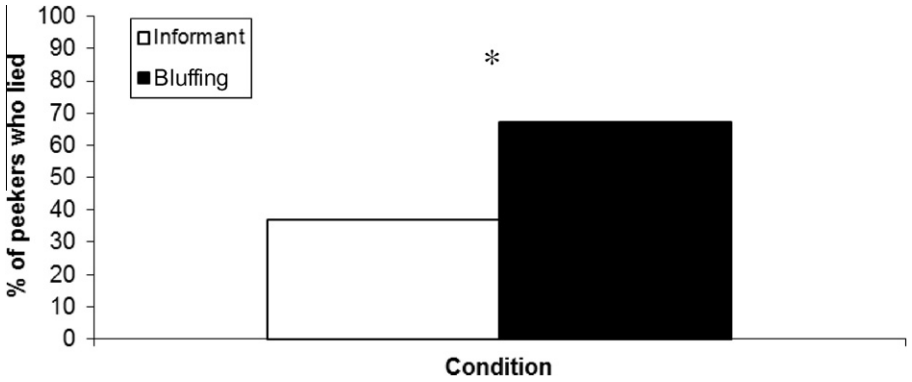

Fig. 3. Percentages of 3-year-olds who peeked at the toy and lied about their peeking in the Informant and Bluffing conditions (Experiment 3). * $p < .05$.

level of strategic lying, taking into consideration contextual factors when deciding whether or not to lie. Specifically, we examined whether young children's decision to lie was strategically based on the lie recipient's knowledge or whether young children simply told lies indiscriminately. In the current investigation, children were asked not to peek at a toy while the experimenter was out of the room, and the majority of children transgressed and peeked at the toy. Children were then questioned about their transgression, and the knowledge of those in the room during questioning was manipulated.

In terms of lie-telling behavior, we found that overall approximately half of the children lied about their transgression. Furthermore, taking the results of all three experiments together, we found that young children are capable of making strategic decisions about when to tell a lie based on the knowledge of those present when they are questioned about a transgression. Specifically, in Experiment 1, 4- and 5-year-olds were more likely to tell a lie when there was not a threat of someone in the room revealing their transgression. Experiments 2 and 3 assessed whether making the lie recipient's knowledge (or lack of knowledge) about their transgression clear (rather than having uncertainty about whether the eyewitness would reveal their transgression) would result in children being able to make strategic decisions about when to tell a lie. All three age groups (3-, 4-, and 5-year-olds) were significantly less likely to lie when the lie recipient appeared to be genuinely knowledgeable than when the lie recipient appeared to be bluffing about her knowledge of the children's transgression, although the condition effect required a larger sample size for the 3-year-olds than for the older children, suggesting greater variability in 3-year-olds' ability to make strategic decisions to lie.

Taken together, our findings provide evidence to support the hypothesis indicating that children as young as 3 years can tell strategic lies when the lie recipient's knowledge appears to be known.

Given that young children only recently mastered the basics of their native language, which is acquired mostly through truthful communications, it is intriguing that by 3 years of age children already not only begin to tell lies but also are able to lie strategically. Two factors that may be related to children's ability to make strategic decisions to lie are their theory-of-mind understanding and their executive functioning skills. One form of theory-of-mind understanding (false belief understanding) is the ability to understand that we can have false beliefs that differ from the true state of affairs. It should be related to children's deception because lying by definition involves the instilling of a false belief into the mind of a lie recipient. Extensive research indicates that there is a shift in children's false belief understanding between 3 and 6 years of age (Milligan, Astington, & Dack, 2007; Perner, 1991; Wellman, 1990; Wellman, Cross, & Watson, 2001). Previous research has demonstrated that the development of lying during the preschool years is indeed correlated with children's false belief understanding (Polak & Harris, 1999; Talwar et al., 2007; Talwar & Lee, 2008). Polak and Harris (1999) found that 3- and 5-year-olds' false belief understanding was significantly related to their lie telling about a transgression. Talwar and Lee (2008) demonstrated that children's first-order theory-of-mind understanding was related to their initial denials of their transgression and their sec-

ond-order theory-of-mind understanding was related to their ability to maintain consistency between statements.

Whereas previous studies have examined theory-of-mind understanding and whether children will lie to conceal their transgression, theory of mind and children's decisions of whether to lie strategically based on the lie recipient's knowledge remain unexamined. Thus, the current finding bridges this gap in our knowledge. However, because we did not measure children's theory-of-mind understanding directly, a potential relation between children's theory-of-mind understanding and their first-level strategic lying needs to be established empirically in future studies. Nevertheless, given the existing finding that children's second-order theory-of-mind understanding is significantly correlated to their second-level strategic lying (Talwar et al., 2007), it is highly likely that children's first-order theory-of-mind understanding is significantly related to their first-level strategic lying. This is because first-level strategic lying calls for the lie teller to take into consideration only the lie recipient's current belief about the true state of affairs.

The second factor that may be related to preschoolers' ability to make strategic decisions about whether to lie is executive functioning skills or an individual's ability to inhibit one action while planning and completing a separate action in order to achieve a goal. It has been suggested that executive functioning skills are required to tell lies because individuals must inhibit the truth (e.g., reporting that they peeked under the cup) while reporting false information. Carlson, Moses, and Hix (1998) found that children who demonstrated difficulty with inhibitory control had difficulty in deceiving someone by pointing to the wrong location of an object. Building on Carlson and colleagues' findings, Talwar and Lee (2008) assessed children's verbal lie-telling behavior and found that children who told lies to conceal their transgression had better executive function skills than children who told the truth. Given that making a strategic decision to lie requires the lie teller not to respond impulsively but rather to weigh the pros and cons about whether it is advantageous to lie, a certain level of executive function skills may be needed to enable children to make appropriate decisions.

One potential limitation of the current investigation is that children's understanding of the rule that they were not allowed to peek at the toy was not assessed. However, a previous study conducted by Polak and Harris (1999) demonstrated that children as young as 3 years do indeed understand that they are not allowed to play with the toy in the experimenter's absence. Polak and Harris used the temptation resistance paradigm and included a control condition where children were allowed to peek at the toy in the experimenter's absence. Results revealed that children were significantly more likely to admit that they played with the toy in the control condition compared with the standard experimental condition, demonstrating that they understood they were forbidden to play with the toy in the experimental condition. A second potential limitation of the current investigation is that it is unknown whether children believed that the confederate told the experimenter about their transgression (Experiment 2) or whether children expected negative consequences to result if the experimenter learned about their transgression. If children did not believe that the confederate told the experimenter what happened, they may have been more likely to tell a lie. Given that older children were more likely to tell a lie in the Informant condition, it supports the idea that children believed the transfer of knowledge from the confederate to the experimenter. However, a future study including a manipulation check to assess whether children believed the transfer of knowledge would allow an assessment of individual differences in children's behavior (e.g., perhaps those children who did not believe the transfer of knowledge were the ones who told a lie in the Informant condition). In regard to children's belief about the consequences of transgressing, if children did not believe that there were consequences for cheating, they may have been significantly more likely to tell the truth. However, as mentioned earlier, Polak and Harris (1999) demonstrated that even 3-year-olds clearly understand the rules of the game and understand that they should not play with the toy. In addition, Talwar and Lee (2002) used the same temptation paradigm as that used in the current study. They showed that most preschoolers lied about their peeking even when there was no incentive to do so (Experiment 2). Thus, preschoolers appear to understand that they must follow the experimenter's instructions about the rule of the game (i.e., not peeking at the toy) and attempt to conceal their violation of the rule. Nevertheless, future studies using our paradigm, but at the same time manipulating the consequences of cheating similar to Talwar and Lee (2002), would shed light on the motivation of children's lie telling about a transgression.

Although the current investigation was conducted in the People's Republic of China, children's overall behavior on the temptation resistance paradigm was consistent with previous studies conducted in Canada, the United Kingdom, the United States, West Africa, and Japan (Lewis, Cleland, Kawakami, & Kawakami, 2000; Lewis et al., 1989; Polak & Harris, 1999; Sears, Rau, & Alpert, 1965; Talwar & Lee, 2002, 2011). One potential cultural motivational factor that may have influenced children's responses to the experimenter is that, due to the hierarchical collectivist society in China, Chinese children may have been more likely to defer to the knowledge of the adult authority figure than children from less hierarchical cultures. Although it was evident that 4- and 5-year-olds were still able to make strategic decisions about whether to lie, 3-year-olds in the current study may have been more influenced by the adult figures' knowledge, resulting in a weaker effect. Future studies using these same methodologies with children from other cultural backgrounds are needed to assess whether similar effects would be found in less hierarchical societies.

Overall, although cognitive development may assist in children's ability to tell lies strategically after committing a transgression, we speculate that young children's lying is generally motivated by their adaptive tendency for self-preservation and self-enhancement, similar to the reason why other species use deceptive strategies (e.g., mimicry, camouflage) to deceive their predators and prey. Lying is an especially adaptive and cost-effective strategy for young children because it compensates for their lack of physical strength and social standing. By lying, a young child can manipulate the minds of physically stronger and socially more powerful individuals so that they will act in the child's favor.

Acknowledgment

This study was supported by The Social Sciences Research Council of Canada, the National Institute of Child and Human Development Grand (HD047290-01A2), The National Natural Science Foundation of China (No. 31070894) and the Program for Innovative Research Team in Zhejiang Normal University.

References

Bala, N., Ramakrishnan, K., Lindsay, R. C. L., & Lee, K. (2005). Judicial assessment of the credibility of child witnesses. *Alberta Law Review, 42*, 995–1017.

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*, 672–691.

Chandler, M. J., Fritz, A. S., & Hala, S. M. (1989). Small-scale deceit: Deception as a marker of two-, three-, and four-year-olds' early theories of mind. *Child Development, 60*, 1263–1277.

Darwin, C. (1877). A biographical sketch of an infant. *Mind, 2*, 285–294.

Lewis, M., Cleland, C., Kawakami, K., & Kawakami, K. (2000). *American and Japanese children's response to temptation and lying.* Paper presented at the biennial meeting of the International Society for the Study of Behavioural Development.

Lewis, M., Stanger, C., & Sullivan, M. (1989). Deception in 3-year-olds. *Developmental Psychology, 25*, 439–443.

Milligan, K., Astington, J. W., & Dack, L. (2007). Language and theory of mind: Meta-analysis of the relation between language ability and false-belief understanding. *Child Development, 78*, 622–646.

O'Neill, D. K. (1996). Two-year-old children's sensitivity to a parent's knowledge state when making requests. *Child Development, 67*, 659–677.

Perner, J. (1991). *Understanding the representational mind*. Cambridge, MA: MIT Press.

Peskin, J. (1992). Ruse and representations: On children's ability to conceal information. *Developmental Psychology, 28*, 84–89.

Polak, A., & Harris, P. L. (1999). Deception by young children following noncompliance. *Developmental Psychology, 35*, 561–568.

Sears, R. R., Rau, L., & Alpert, R. (1965). *Identification and child rearing*. Stanford, CA: Stanford University Press.

Sodian, B., Taylor, C., Harris, P. L., & Perner, J. (1991). Early deception and children's theory of mind: False trails and genuine markers. *Child Development, 62*, 468–483.

Stern, C., & Stern, W. (1909). *Erinnerung, Aussage, und Luge in der ersten Kindheit [Memory, testimony, and lies in early childhood]*. Leipzig, Germany: Barth.

Talwar, V., Gordon, H., & Lee, K. (2007). Lying in the elementary school: Verbal deception and its relation to second-order belief understanding. *Developmental Psychology, 43*, 804–810.

Talwar, V., & Lee, K. (2002). Development of lying to conceal a transgression: Children's control of expressive behavior during verbal deception. *International Journal of Behavioral Development, 26*, 436–444.

Talwar, V., & Lee, K. (2008). Social and cognitive correlates of children's lying behavior. *Child Development, 79*, 866–881.

Talwar, V., & Lee, K. (2011). A punitive environment fosters children's dishonesty: A natural experiment. *Child Development, 82*, 1751–1758.

Talwar, V., Murphy, S., & Lee, K. (2006). White lie-telling in children for politeness purposes. *International Journal of Behavioral Development, 31*, 1–11.

Wellman, H. M. (1990). *The child's theory of mind*. Cambridge, MA: MIT Press.
Wellman, H. M., Cross, D., & Watson, J. (2001). Meta-analysis of theory-of-mind development: The truth about false belief. *Child Development, 3*, 655–684.
Wellman, H. M., & Lui, D. (2004). Scaling of theory-of-mind tasks. *Child Development, 75*, 523–541.
Wilson, A. E., Smith, M. D., & Ross, H. D. (2003). The nature and effects of young children's lies. *Social Development, 12*, 21–45.