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The roles of liar intention, lie content, and theory of mind in children's evaluation of lies

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ABSTRACT

This study found that 7-, 9-, and 11-year-old children and young adults identified prosocial lies as lies less frequently and evaluated them less negatively than selfish lies (liar intention effect); lies about opinions were identified as lies less frequently and evaluated less negatively than those about reality (lie content effect). The lie content effect was more pronounced in the prosocial lies than in the selfish lies for both identification and evaluation. Overall, the older participants considered liar intention more than the younger participants in lie evaluation. For the child participants, second-order belief understanding correlated marginally with sensitivity to liar intention in the opinion lies, but not with content sensitivity. Finally, lie identification correlated with evaluation in the prosocial–opinion lies for all of the children. The independent effects of intention and content could potentially explain children's development in "white lie" understanding demonstrated in the literature. Although the content effect appears to stem from a more general concern for whether communication is about objective reality, the intention effect may involve theory of mind.

Introduction

Lie-telling is commonplace among 3- and 4-year-olds (Reddy, 2007; Talwar & Crossman, 2011). One recent study reported that children start to tell lies to conceal transgressions before their third birthday (Evans & Lee, 2013). This study, and many others, used the temptation resistance paradigm,

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in which the children were asked not to peek at a toy. Many of them peeked nevertheless and also lied about the transgression when later asked. Although early lies are usually told to serve selfish purposes, later in development the motivations of lie-telling become more varied. For instance, "white lies" are told to protect another person's feelings when the blunt truth is considered hurtful or impolite (Popliger, Talwar, & Crossman, 2011; Talwar & Lee, 2002b; Talwar, Murphy, & Lee, 2007; Xu, Bao, Fu, Talwar, & Lee, 2010; Xu, Luo, Fu, & Lee, 2009). In many of these studies, white lies were elicited with the disappointing gift paradigm, in which the child received an unwanted gift and was asked by the gift sender whether he or she liked it. Children would usually lie about their true non-preference for the gift so that the feelings of the gift sender were spared. Popliger et al. (2011) showed that preschoolers and elementary school children were able to consider both self-interest and others' feelings in deciding whether to tell a white lie; the older children tended to consider others' feelings more than the younger ones.

Children's considerations behind lie identification and evaluation also change as development progresses (Broomfield, Robinson, & Robinson, 2002; Bussey, 1999; Gao, 2012). Maas (2008) found that 4- and 6-year-olds were able to assess the speaker's sincerity in deciding whether a lie was told. Lee and Ross (1997) showed that adolescents were more likely to call a false statement a lie when the speaker intended to hurt, rather than help, another person. False statements were also seen as lies more frequently when the situation called for information accuracy rather than politeness. Xu et al. (2009) replicated these results in 7- to 11-year-olds and showed that lies meant to help were judged as less morally wrong than those meant to hurt. Bussey (1992) reported that although preschoolers were concerned with both the falsity of the statement and whether it would lead to punishment when asked to evaluate it, fifth-graders appeared to consider falsity only. Bussey (1999), Heyman, Sweet, and Lee (2009), and Xu et al. (2010) confirmed that white lies told to protect another person's feelings were evaluated by children as more acceptable than lies without a prosocial motive. When evaluating white lies, 7- to 11-year-olds also consider the actual consequence of withholding the truthful information and the presence of others that would result in more embarrassment if the blunt truth were told (Ma, Xu, Heyman, & Lee, 2011).

Some research has shown that culture may play a role in children's lie evaluation. Although there is little evidence for cultural variations in selfish lie evaluation, children from different cultures appear to respond differently to lies motivated by non-selfish reasons. For instance, Chinese children in particular may regard staying modest as a good reason for lying about one's achievements or good deeds. Fu and colleagues (2010) showed that Chinese 7-, 9-, and 11-year-olds rated modest lies more favorably than boastful truths, and this modesty effect increased with age. Other studies demonstrated that Chinese children were more likely than their North American counterparts to rate modest lies more positively than boastful truths (Cameron, Lau, Fu, & Lee, 2012) and ordinary lies to conceal transgressions (Fu, Lee, Cameron, & Xu, 2001; Lee, Cameron, Xu, Fu, & Board, 1997; Lee, Xu, Fu, Cameron, & Chen, 2001). This cultural effect on lie evaluation may have to do with the emphasis on interpersonal harmony and interdependence in the Chinese culture (Fu et al., 2010; Kim, Kam, Sharkey, & Singelis, 2008; Wang, Bernas, & Eberhard, 2012; but see also Sweet, Heyman, Fu, & Lee, 2010). Cultural factors may also contribute to other variations in the perception of non-selfish lies such as how good or bad it is to lie for the collective benefit of one's own group against individual interest (Fu, Evans, Wang, & Lee, 2008; Fu, Xu, Cameron, Heyman, & Lee, 2007).

Because lying involves instilling wrong information into other minds and assessing what others know and sometimes how they feel, it calls for organized knowledge about how the mind works in terms of how different mental states are related to one another, to perception, and to behavior. Such understanding is known as theory of mind (ToM). A specific sub-ability under the broader concept of ToM that is particularly relevant to lie-telling and perception is false belief understanding, which is children's ability to represent an inaccurate representation of reality alongside their own correct representation. A typical false belief understanding task assesses children's recognition that an agent acts in accordance with his or her own belief, albeit a wrong one because of faulty perception or deliberate deception by others (Wimmer & Perner, 1983). Second-order false belief understanding represents a more advanced form of belief understanding concerning children's recognition that an agent may have a wrong representation of another agent's knowledge about reality (Hogrefe, Wimmer, & Perner, 1986; Perner & Wimmer, 1985). To use and understand lies, children would need to know how a

(false) belief works in relation to the perception and behavior of the lie recipient (Chandler, Fritz, & Hala, 1989; Peskin, 1992; Talwar & Crossman, 2011). For instance, in lie maintenance, children need to carefully monitor their subsequent communication with the lie recipient so that information that is inconsistent with the lie does not leak. They need to constantly update what the recipient ought to know about what they know, which calls for second-order belief understanding (Evans, Xu, & Lee, 2011; Polak & Harris, 1999; Talwar, Gordon, & Lee, 2007; Talwar & Lee, 2002a, 2008). When deciding whether a white lie should be told in an undesirable gift setting, one needs to assess the prospective lie recipient's feelings on hearing the truth versus a lie and also to appreciate that whether a gift is liked is a matter of personal taste. In addition to lie-telling, the understanding of ordinary and white lies has also been shown to correlate with first-order belief understanding (Bigelow & Dugas, 2008) and second-order belief understanding (Hsu & Cheung, 2013; Maas, 2008).

The current study examined 7-, 9-, and 11-year-olds' evaluation of lies differing in intention (lying for a selfish vs. prosocial purpose) and content (lying about reality vs. opinions) and how such evaluation changes with age and ToM. Liar intention and lie content are conceptually orthogonal dimensions, yet in past research they have been confounded into the conventional demarcation between ordinary lies (self-serving + about reality) and white lies (prosocial + about opinions). Hence, the first aim of the current study was to distinguish the independent effects of intention and content. We hypothesized that (1) lies serving a prosocial purpose are less frequently regarded as lies and are evaluated less negatively than those serving a selfish purpose (i.e., the intention effect), (2) lies about opinions and personal preference are less frequently regarded as lies and are evaluated less negatively than those about reality (i.e., the content effect), (3) the content effect is more marked for prosocial lies than for selfish lies, and (4) the intention and content effects become more pronounced with increasing age.

Hypotheses 1 and 2 are based on the previous finding that white lies, which are both prosocial and about opinions, are considered less bad than selfish reality lies. In addition, lies about opinions should be considered less wrong because the speaker is communicating some personal thought that belongs to himself or herself after all, and such "ownership" may justify less stringent moral scrutiny than in reality lies. In the current study, "reality" refers to the fact that the lie statement is about some objective happening that does not belong to anyone, which should be distinguished from the concept of "factuality." According to Strichartz and Burton (1990), factuality is whether the statement matches facts. These authors showed that although preschoolers' conceptualization of a lie depended on factuality, from the first grade onward whether a statement matched facts became irrelevant. Note that the concept of factuality is orthogonal to the reality–opinion contrast examined in the current study, which has more to do with what one lies about than whether the lie matches facts. Conceptually, factuality applies to both reality and opinion lies, where an opinion is simply a kind of subjective reality that can also match or mismatch a description (i.e. factuality). In Strichartz & Burton, 1990 study, factuality was examined only with reality lies; in the current study, both reality and opinion lies were examined and they all mismatched facts. Therefore, Strichartz and Burton's finding that factuality is irrelevant to defining a lie from the first grade onward is not in conflict with the current content effect hypothesis, which compares statements mismatching objective reality with those mismatching the liar's own subjective reality (i.e., opinion). Children's evaluations of lies about reality versus opinions are also compared with their perceptions of truthful statements. If lying about reality is worse because it disrespects an objective world that does not belong to the liar, then speaking a reality truth, which respects it, should be evaluated more favorably than voicing one's true opinion.

Behind Hypothesis 3 is the assumption that liar intention is the primary consideration and plays a more pivotal role than lie content. If the motive is seen as selfish, then the lie is bad anyway and we become less interested in how the selfish purpose is served. On the other hand, for prosocial lies with all of the good intentions, we may be more inclined to consider lie content. Thus, we predicted that the content effect is more pronounced with prosocial lies than with selfish lies. Hypothesis 4 is derived from the previous finding that older children are generally more sensitive to the motivation (Xu et al., 2009) and content (e.g., modesty) of lies than younger children (Fu et al., 2010).

The second aim of this study was to examine whether ToM correlates with children's sensitivity to liar intention and lie content in their evaluation, with sensitivity defined as the evaluation difference between lies of different intentions or contents. Hypothesis 5 stipulates that ToM correlates with intention sensitivity but not content sensitivity because intention is a mental state, whereas lie

content is not. Children do not need to think about the liar's mental world in considering whether the lie is about reality or an opinion. Although it is conceivable that in evaluating both reality and opinion lies children may spontaneously think about the lie recipient's feelings as a result of receiving a false statement that is supposed to be helpful (see Appendix), the amount of ToM involved in this is controlled between the two lie types. Hence, the only difference between them is whether the lie is about reality or an opinion. Thus, ToM might not correlate with content sensitivity because it is non-mentalistic. A further question is whether the age-related increase in intention sensitivity could be explained by the corresponding age-related increase in ToM.

In this study we used second-order belief understanding as a proxy for ToM for several reasons. First, to evaluate the current lies, the children need to pay attention to the calculated intention of the liar who tries to instill a false belief into the recipient's mind. Such mentalizing is more akin to the recognition of rational thoughts than of emotions or feelings; thus, we prefer a false belief understanding to a hidden emotion task (Hsu & Cheung, 2013). Second, as reviewed above, the majority of previous studies examining the lying–ToM relationship have correlated lying with second-order belief understanding. Third, second-order belief understanding is more age appropriate than first-order belief understanding for the current participants (Coull & Leekam, 2006; Sullivan, Zaitchik, & Tager-Flusberg, 1994).

The current study included an adult participant group so that there was a standard with which the children's performance could be compared. The adults were asked to read and respond to the same lie and truth stories as the children. They were not required to do the nonverbal intelligence, verbal ability, and ToM tasks because we were not interested in how these abilities may predict adults' lie evaluation and it is highly likely that their performances on these tasks would be very close to the respective ceilings.

Method

Participants

In total, 44 7-year-olds (mean age = 6;11 [years;months], *SD* = 4.6 months, 20 boys and 24 girls), 35 9-year-olds (mean age = 8;11, *SD* = 4.4 months, 18 boys and 17 girls), 43 11-year-olds (mean age = 10;11, *SD* = 8.8 months, 22 boys and 21 girls), and 30 young adults (15 men and 15 women) between 19 and 21 years of age participated in the current study. We used these age groups because previous studies have shown that in this age range children's lie evaluation is influenced by their perception of liar motivation, consequence of lying, and other social concerns (e.g., Fu et al., 2010; Ma et al., 2011; Xu et al., 2009). The child participants were Chinese-speaking children recruited through two primary schools in the same middle-class neighborhood in Hong Kong. The young adults were undergraduates participating for course credit. Parent consent and individual consent were obtained before testing for the child and adult participants, respectively. None of the participants reported any linguistic or psychological abnormality. All of the participants had normal hearing and normal or corrected-to-normal vision.

Tasks and materials

Control variables

Nonverbal intelligence and verbal ability were measured as control variables in examining the relationship between sensitivity to lie intention/content and ToM. Nonverbal intelligence was assessed with the Raven's Standard Progressive Matrices Set A (Raven, Raven, & Court, 1995) with a total score of 12. Verbal ability was measured through the Chinese version of the Stanford–Binet Intelligence Scale Vocabulary subtest with a total score of 64.

Lie identification and evaluation

In the lie identification and evaluation task, 12 scenarios were verbally presented to each participant with hand-drawn illustrations. Each scenario was a simple story in which the protagonist either

tells a lie to another character (eight stories) or makes a truthful statement (four stories). The two within-participant factors of intention and content were crossed and manipulated across the eight lie stories. For intention, the liar tells a lie because of either a selfish or prosocial reason. For content, the liar lies about either reality or an opinion. Therefore, four lie types resulted, each having two individual stories. In the truth stories, the protagonist makes a truthful statement about either reality (two stories) or an opinion (two stories) without a noticeable motive. The protagonist simply reports what happens or tells another character what he or she really thinks with no intention to help or hurt anyone. The intention factor, therefore, was not manipulated. The lie and truth stories were randomly presented to each participant. Examples of these stories are presented in the Appendix.

After the presentation of each story, two comprehension questions were asked. If the participant failed to correctly answer any of these questions, the story would be retold and the questions asked again (up to three presentations in total). The experimenter would ask the test questions only if all of the comprehension questions were correctly answered; otherwise, the trial would be scored as missing after three unsuccessful attempts. For identification, the participant was to judge whether the protagonist had lied; for evaluation, the participant was to rate the protagonist's lie statement on a 7-point scale regarding how morally "good" or "bad" it was (1 = *extremely bad* and 7 = *extremely good*). This statement evaluation procedure was used in many past studies examining lie perception in children in similar age ranges such as Fu et al. (2010), Ma et al. (2011), and Xu et al. (2009).

Theory of mind

We adopted the second-order belief understanding task used by Sullivan et al. (1994) to assess ToM. Each child was told two stories illustrated by hand-drawn pictures. In one story, John and Emma want to buy some ice cream from an ice cream man in the park, but they have no money. So, Emma goes home to get some money for that. While Emma is gone, the ice cream man tells John that he is going to the school to sell ice cream and subsequently bumps into Emma on his way to the school. So, he tells her that he is going to the school to sell ice cream. The story ended, and the comprehension questions "What did the ice cream man tell John?" and "Where is the ice cream man going now?" were asked. If the child failed to correctly answer any of these questions, the story would be retold and the questions asked again (up to three presentations in total). The experimenter would ask the belief questions only if the child answered the comprehension questions correctly; otherwise, the trial would be scored as missing. The belief questions were "Does John know that Emma knows where the ice cream man is now? Why?" and "Where does John think Emma will go to buy ice cream? Why?" The second story was similarly structured. A child was given 1 point for a belief question if the child could both answer the question and explain the answer. The total ToM score from the two stories was 4.

Procedure

Testing was done in a quiet room in the school. Participants were tested individually by an experimenter who administered all of the tasks. For each child participant, the presentation of the tasks followed a different random order. We identified the children whose parents had signed and returned the consent form and invited them to the test interview individually. The experimenter greeted each child and carried out a casual conversation with him or her to warm up for approximately 2 min. A task was then randomly picked by the experimenter, and testing started. Testing was administered in two sessions, each lasting approximately 20 min, separated by a 5-min break. As a general rule, test instructions, stories, and questions would be presented up to three times in total if the child failed to comprehend the materials, gave the "I don't know" response, or was momentarily inattentive. The trial would be scored as missing if inattentiveness and lacking of understanding of materials persisted, including failing the comprehension questions in the lie/truth stories and ToM task three times, and scored as incorrect if the "I don't know" response to the test question was consistently given.

Informed consent was obtained before testing for the adult participants, who responded only to the lie/truth stories. Testing was done in one session lasting approximately 20 min.

Results

Seven 7-year-olds, four 9-year-olds, one 11-year-old, and two adults contributed missing scores to some of the tasks; thus, their data were excluded. The reasons for not completing all of the tasks included inattentiveness, not understanding some of the tasks, and consistently failing the comprehension questions in the lie or ToM stories. Only the data from those who completed all of the tasks were used in the subsequent analyses.

Identification: truthful statements

Only two 7-year-olds ever mislabeled a truthful statement a lie. One of them mislabeled a reality statement, whereas the other mislabeled an opinion statement. These identification data were not analyzed further because of a lack of variability.

Identification: lies

The lie identification data were analyzed by the adjusted rank transformation test suggested by Conover and Iman (1981). In this test, each participant's binary lie/not lie decisions in each condition were transformed into a rank score and submitted to a 2 (Intention) × 2 (Content) × 4 (Age) repeated measures analysis of variance (ANOVA). All of the main effects were significant: intention, $F(1, 134) = 13.57$, $p < .001$, $\eta_p^2 = .09$; content, $F(1, 134) = 11.14$, $p = .001$, $\eta_p^2 = .08$; and age, $F(3, 134) = 2.72$, $p = .047$, $\eta_p^2 = .06$. The intention and content main effects support Hypotheses 1 and 2. Bonferroni post hoc comparisons for the age main effect indicated that the only significant difference was that between the 7-year-olds and the adults ($p = .043$).

The content effect was qualified by intention, $F(1, 134) = 5.69$, $p = .018$, $\eta_p^2 = .04$, suggesting that the content effect was more pronounced in the prosocial lies, $F(1, 134) = 967.95$, $p < .001$, $\eta_p^2 = .92$, than in the selfish lies, $F(1, 134) = 1604.71$, $p < .001$, $\eta_p^2 = .88$. Hypothesis 3 is supported. Identification frequencies are presented in Table 1.

Evaluation: truthful statements

The evaluation data from the truthful statements were submitted to a 2 (Content) × 4 (Age) repeated measures ANOVA. The significant effects were content, $F(1, 134) = 12.84$, $p < .001$, $\eta_p^2 = .09$, and age, $F(3, 134) = 13.80$, $p < .001$, $\eta_p^2 = .24$. Bonferroni post hoc comparisons for the age main effect indicated that the three child groups did not differ from one another but that they all differed from the adults (all $ps < .001$). Hence, communicating truth about reality was evaluated more positively than telling one's true opinion. The adults generally gave lower ratings to the truthful statements than the children.

Table 1
Frequencies of lie identification.

Number of trials on which the target statement was identified as a lie:	7-Year-olds ($n = 37$)			9-Year-olds ($n = 31$)			11-Year-olds ($n = 42$)			Adults ($n = 28$)			Total ($N = 138$)		
	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2
Truthful statement about reality	36	1	0	31	0	0	42	0	0	28	0	0	137	1	0
Truthful statement about opinion	36	1	0	31	0	0	42	0	0	28	0	0	137	1	0
Selfish lie about reality	0	2	35	0	0	31	0	1	41	0	0	28	0	3	135
Selfish lie about opinion	0	5	32	0	2	29	0	1	41	0	0	28	0	8	130
Prosocial lie about reality	0	1	36	0	4	27	0	4	38	0	0	28	0	9	129
Prosocial lie about opinion	1	6	30	2	3	26	1	6	35	0	0	28	4	15	119

Note. Numbers indicate numbers of participants.

Evaluation: lies

The lie evaluation ratings were submitted to a 2 (Intention) × 2 (Content) × 4 (Age) repeated measures ANOVA. All of the main effects were significant: intention, $F(1, 134) = 483.49$, $p < .001$, $\eta_p^2 = .78$; content, $F(1, 134) = 70.80$, $p < .001$, $\eta_p^2 = .35$; and age, $F(3, 134) = 13.05$, $p < .001$, $\eta_p^2 = .23$. The intention and content main effects support Hypotheses 1 and 2. Bonferroni post hoc comparisons for the age main effect indicated that the 7-year-olds gave lower ratings than the 9-year-olds ($p = .007$), 11-year-olds ($p < .001$), and adults ($p < .001$), whereas the three older groups did not differ from one another.

The content main effect was qualified by intention, $F(1, 134) = 6.49$, $p = .012$, $\eta_p^2 = .05$, indicating that the content effect was more pronounced in the prosocial lies, $F(1, 134) = 45.48$, $p < .001$, $\eta_p^2 = .25$, than in the selfish lies, $F(1, 134) = 27.93$, $p < .001$, $\eta_p^2 = .17$. Hypothesis 3 is supported.

The intention main effect was qualified by age, $F(3, 134) = 12.28$, $p < .001$, $\eta_p^2 = .22$. This interaction indicated that the intention effect was more pronounced with increasing age, although it was significant in all the age groups: 7-year-olds, $F(1, 36) = 30.64$, $p < .001$, $\eta_p^2 = .46$; 9-year-olds, $F(1, 30) = 145.55$, $p < .001$, $\eta_p^2 = .83$; 11-year-olds, $F(1, 41) = 213.39$, $p < .001$, $\eta_p^2 = .84$; and adults, $F(1, 27) = 209.66$, $p < .001$, $\eta_p^2 = .89$. We further examined the overall Intention × Age effect by redoing the analysis at three age levels: 7- versus 9-year-olds, 9- versus 11-year-olds, and 11-year-olds versus adults. The Intention × Age effect was significant for the 7- versus 9-year-olds comparison, $F(1, 66) = 7.17$, $p = .009$, $\eta_p^2 = .10$, and the 11-year-olds versus adults comparison, $F(1, 68) = 10.00$, $p = .002$, $\eta_p^2 = .13$. Hence, there are age-related increases in awareness of liar intention from 7 to 9 years of age and from 11 years to adulthood. Hypothesis 4 is partially supported because age interacted with intention but not content. Means and standard deviations of the evaluation ratings and the other variables are presented in Table 2.

Lie evaluation and ToM

For each child, we calculated the evaluation difference between the selfish and prosocial lies in each content condition to indicate sensitivity to liar intention and the evaluation difference between the reality and opinion lies in each intention condition to indicate sensitivity to lie content. Partial correlations were then performed to correlate ToM with intention sensitivity and content sensitivity while controlling for age, nonverbal intelligence, and verbal ability. Results showed that ToM correlated marginally with intention sensitivity for the opinion lies, $r(100) = .19$, $p = .055$, thereby partially supporting Hypothesis 5.

We further examined whether the age-related increase in intention sensitivity for the opinion lies could be sufficiently explained by the corresponding ToM increase. To this end, we performed a one-way analysis of covariance (ANCOVA) looking at the effect of age on intention sensitivity for the opinion lies with ToM as the covariate. ToM turned out to be a significant covariate, $F(1, 106) = 4.64$, $p = .034$, $\eta_p^2 = .04$, yet after its effect was removed the age factor remained significant,

Table 2
Means and standard deviations.

	7-Year-olds ($n = 37$)	9-Year-olds ($n = 31$)	11-Year-olds ($n = 42$)	Adults ($n = 28$)
Nonverbal intelligence (out of 12)	7.35 (2.91)	9.42 (2.39)	10.45 (1.89)	–
Verbal ability (out of 64)	12.00 (4.60)	19.81 (7.65)	25.26 (8.73)	–
ToM (out of 4)	2.11 (1.39)	2.81 (1.28)	3.29 (1.02)	–
Truthful statement about reality (out of 7)	6.73 (0.69)	6.89 (0.28)	6.63 (0.62)	5.89 (1.17)
Truthful statement about opinion (out of 7)	6.70 (0.75)	6.74 (0.51)	6.43 (0.85)	5.54 (1.15)
Selfish lie about reality (out of 7)	1.36 (0.71)	1.50 (0.65)	1.70 (0.77)	1.66 (0.84)
Selfish lie about opinion (out of 7)	1.74 (1.31)	2.08 (1.25)	2.17 (1.11)	2.00 (1.00)
Prosocial lie about reality (out of 7)	2.99 (1.89)	3.76 (1.57)	4.23 (1.24)	5.14 (1.18)
Prosocial lie about opinion (out of 7)	3.31 (1.92)	5.00 (1.81)	5.10 (1.35)	5.93 (0.90)

Note. Standard deviations are in parentheses.

$F(2, 106) = 4.26$, $p = .017$, $\eta_p^2 = .07$. Hence, the effect of age on children's sensitivity to liar intention in the opinion lies could not be sufficiently explained by the corresponding increase in ToM.

Lie evaluation and identification

So far, lie evaluation has been treated as a continuous variable with a range from 1 to 7. To highlight the fact that a lie is usually evaluated qualitatively as either "good" or "bad," and to understand how such binary evaluation may correlate with lie identification, we classified each participant's evaluation response to each lie story as either *good* (rating from 5 to 7) or *not good* (rating from 1 to 4) and examined its association with lie identification. Because there were two stories for each lie type, each participant contributed two binary decisions for both identification and evaluation, thereby resulting in ordinal scores ranging from 0 to 2 in each condition. A gamma coefficient was then calculated to indicate the association strength between identification and evaluation in each condition. Results showed that the coefficient was significant for the prosocial–opinion lies for all of the child participants: 7-year-olds ($\gamma = -.99$, $p < .001$), 9-year-olds ($\gamma = -.99$, $p = .031$), and 11-year-olds ($\gamma = -.99$, $p = .012$).

Discussion

Liar intention and lie content

Our finding on liar motivation is in harmony with previous results showing that children at around the same age find it acceptable to tell white lies in order to protect others' feelings and be polite (Heyman et al., 2009; Ma et al., 2011; Xu et al., 2010) and that older children are more concerned about such considerations (Xu et al., 2009). Although the averaged ratings on the prosocial lies from our 7-year-olds are still below 4 (the midpoint on the scale), our 9-year-olds did produce an overall rating above 4 for the prosocial–opinion lies. The 11-year-olds and adults gave even higher ratings to the prosocial lies. Hence, if a rating above 4 is taken as a positive evaluation, then we may conclude that Chinese children start to see prosocial lies as morally good from around 9 years of age. This is consistent with the findings reported by Ma et al. (2011) and Cameron et al. (2012), who respectively showed that Chinese children's ratings on white and modest lies begin to shift from negative to positive at around 9 years of age. Cameron and colleagues argued that Chinese children pay more attention to modesty than their European counterparts in lie evaluation, and it may also be the case that a similar cultural difference exists concerning liar intention. Yet, this should remain speculation given that no direct cross-cultural comparisons are available with regard to the prominence of liar intention in lie understanding and evaluation.

The current finding on lie content is novel. Whether the lie is about reality or an opinion, independent of the liar's motive, is considered by both children and adults in their evaluation, and this casts new light on children's developing understanding of white lies. Their perceptions of selfish ordinary lies and white lies differ not only because of different liar motivations but also because of different lie contents. Lies about reality are especially difficult to accept because they are clearly in conflict with an objective world that does not belong to the liar. On the other hand, lies about opinions clash only with the liar's own personal thought, and we assume that it is this quality that makes them less like lies and more acceptable in moral terms. Hence, we think that a significant part of older children's general acceptance of white lies demonstrated in the literature has to do with the fact that they clash only with thoughts belonging to the liar.

Our explanation for the lie content effect is consistent with both the child and adult participants' evaluation of the truthful statements. Truthful reality statements are evaluated more favorably than statements about one's true feeling because the former respect an objective world that does not belong to the speaker. Therefore, truthfulness appears to carry more "moral weight" in statements about reality than those about opinions, and the effect can be seen with both truthful and untruthful statements in adults and children as young as 7 years. Within the current age range, however, the lie content effect is not qualified by age. Future research may examine the developmental trajectory of

the content effect by studying younger children. The exact role of "ownership" or "belongingness" of what is being lied about could also be studied in relation to the content effect in future research.

The interaction between liar intention and lie content supports our third hypothesis. We think that this indicates the importance of liar intention in our perception. If the intention is regarded as selfish, then the lie is pretty bad and we care less about what it is about; it is bad anyway. But if there is a good motive behind it, then we shift our attention to how much the statement violates Grice's (1980) maxim of quality that communication should always be truthful. In this respect, as mentioned above, we suspect that truthfulness is qualified by whether the statement is supposed to provide information about the objective world or some personal preference. Truthfulness is taken more seriously when objective reality is involved. Further research is needed to examine the exact nature of the intention–content interaction.

The lie identification data do not support our fourth hypothesis, namely that the effects of intention and content become more pronounced with increasing age for children. We think that lie identification might not be sensitive enough as a dependent measure to reveal these subtle age interaction effects; we notice from Table 1 that response variabilities are generally quite restricted. It is possible that at this age range it is already obvious to children what makes a lie, and as they grow older children are even more in agreement regarding this. Hence, in the adult sample, there is hardly any response variability. We think that lie identification would be a more useful index of how the concept of lying forms and develops at younger ages. For older children, it becomes more interesting to examine their perception of lies in terms of how they make moral judgments about them.

Intention and ToM

The marginal correlation between ToM and sensitivity to liar intention in the opinion lies, controlling for age, nonverbal intelligence, and verbal ability, is a novel finding. It extends the previously reported relation between ToM and lie-telling (Evans et al., 2011; Talwar et al., 2007) and understanding (Hsu & Cheung, 2013). We think that differences in children's perception and evaluation between lies of different motives better reflect how children actually think about lies than an absolute score of lie understanding because such an absolute score may be contaminated by other factors such as how the children have been educated about lies (Wang et al., 2012), what the broader culture is like regarding lying in the context of interpersonal relationships (Fu et al., 2010), and how likely the lie in question would be discovered (Evans et al., 2011). Evaluation differences between lies differing along only one theoretical dimension provide the within-participant control needed for minimizing the effects of these extraneous variables, thereby making it possible to discover more specific and theoretically interesting relationships.

The finding that children's ToM correlates with their concern about liar motive but not lie content in opinion lies suggests that they put ToM into practical use when required to make moral judgments that involve consideration of intention behind action. We argue that this relationship applies generally to children within the age range from 7 to 11 years and does not interact with age within this range because the effect of age has been removed from the partial correlation. The finding is consistent with the results reported by Killen, Mulvey, Richardson, Jampol, and Woodward (2011), who showed that after 5.5 years children become sensitive to others' true intention behind apparent transgressions (not lies) when asked to make moral judgments, and this correlates with their first-order false belief understanding. The current study extends this relation to lie evaluation and further suggests that the relation is specific to considering the intention behind, not content of, lies. Nevertheless, the age-related increase in sensitivity to intention cannot be fully explained by ToM development. There are certainly other factors, such as development of general social and communication skills, which are also at work behind the increasing sensitivity to liar intention.

Identification and evaluation

Our findings show that there is an association between lie identification and evaluation. Untruthful statements that are actually called "lies" are more likely to receive "not good" evaluations than those not regarded as lies. Yet, this relationship is observable with prosocial–opinion lies only. What this

indicates could be an extension of the intention and content effects. As discussed, in prosocial–opinion lies the motive is good and what is being lied about belongs only to the speaker; thus, it is not always clear whether it should be called a lie at all. Such labeling flexibility may actually allow more freedom for identification to covary with evaluation. On the other hand, the other lie types are more clearly lies because of bad motivation and/or involvement of the objective reality; thus, their identification may have little flexibility to covary with evaluation. These findings are generally consistent with the results reported by Wimmer, Gruber, and Perner (1985), who showed that 4- and 5-year-olds were more likely to think punishment should be delivered if a piece of untruthful communication had been labeled as a lie than if it had not. Future studies can focus more on the exact sociocognitive mechanisms behind the relationship between identification (labeling) and evaluation in different types of lies.

Conclusion

During middle to late childhood, children care about whether a lie is told for the liar's own benefit or someone else's benefit, and whether the lie clashes with the objective reality or only someone's personal opinion, in their categorization and evaluation of the lie. These two independent considerations explain children's developing understanding of white lies and may support their further differentiation between lie types, which are important to successful social navigation. Children need to know that some false statements are "lies" nominally yet may be encouraged for other reasons despite the dishonesty; hence, traditional virtues can conflict with one another and might not apply to real social situations in a straightforward fashion. In achieving this, children need to deploy their mentalizing ability to figure out someone else's mental states and to modify their conception of truthfulness in communication, which depends on the objectivity of the entity that is being talked or lied about.

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Appendix Examples. of lie and truth stories

Selfish lie about reality

There is a red and a blue box sitting on the table, and Jack puts some potato chips into the blue box. Now, John comes in and wants some food to eat; thus, he asks Jack, "Is there food in the red or blue box?" Jack wants the chips all for himself and does not want to share them with John, and so he replies, "There are some potato chips in the red box."

Comprehension Question 1: Where are the potato chips?
Comprehension Question 2: Where does Jack say the potato chips are?
Identification question: Jack says, "There are some potato chips in the red box." Is this a lie? (yes/no)
Evaluation question: Jack says, "There are some potato chips in the red box." How good or bad is this? Give it a number, where 1 is *extremely bad* and 7 is *extremely good.*

Selfish lie about opinion

Both Shop A and Shop B sell shoes; Shop A is closer, whereas Shop B is farther. Now, Jane is accompanying Jenny, who wants to buy a new pair of shoes. Jenny asks Jane, "Does Shop A or B sell better shoes?" Jane thinks the shoes in Shop B are much better, yet she does not want to walk that far, so she replies, "I think the shoes in Shop A are better."

Comprehension Question 1: Which shop's shoes does Jane think are better?

Comprehension Question 2: Which shop's shoes does Jane say are better?
Identification question: Jane says, "I think the shoes in Shop A are better." Is this a lie? (yes/no)
Evaluation question: Jane says, "I think the shoes in Shop A are better." How good or bad is this? Give it a number, where 1 is *extremely bad* and 7 is *extremely good.*

Prosocial lie about reality

Maggie wants to watch her favorite TV program but has not finished her homework. Now, it is a quarter to three and she asks Mary, "When does the program start?" Actually, the program starts at three, but Mary does not want Maggie to watch it before she finishes her homework because her mother will scold Maggie, and thus Mary replies, "The program starts at six."

Comprehension Question 1: When does the TV program start?
Comprehension Question 2: When does Mary say the TV program starts?

Identification question: Mary says, "The program starts at six." Is this a lie? (yes/no)
Evaluation question: Mary says, "The program starts at six." How good or bad is this? Give it a number, where 1 is *extremely bad* and 7 is *extremely good.*

Prosocial lie about opinion

Bobby is hungry and wants to eat something, but he cannot decide whether he should eat potato chips or vegetable salad, and so he asks Brent which food he thinks tastes better. Brent thinks potato chips taste better, but he wants Bobby to eat more healthy food and so he replies, "I think vegetable salad tastes better."

Comprehension Question 1: Which food does Brent think tastes better?
Comprehension Question 2: Which food does Brent say tastes better?

Identification question: Brent says, "I think vegetable salad tastes better." Is this a lie? (yes/no)
Evaluation question: Brent says, "I think vegetable salad tastes better." How good or bad is this? Give it a number, where 1 is *extremely bad* and 7 is *extremely good.*

Truthful statement about reality

Karen and Kitty are about to have an exam, but Karen forgets the exam time. So she asks Kitty, "When does the exam begin?" Kitty knows the exam begins at four and so she replies, "The exam begins at four."

Comprehension Question 1: When does the exam begin?
Comprehension Question 2: When does Kitty say the exam begins?

Identification question: Kitty says, "The exam begins at four." Is this a lie? (yes/no)
Evaluation question: Kitty says, "The exam begins at four." How good or bad is this? Give it a number, where 1 is *extremely bad* and 7 is *extremely good.*

Truthful statement about opinion

Dan wants to buy a jacket and is deciding between a blue one and a black one. He asks David, "Which do you think is better?" David thinks the blue one is better and so he replies, "I think the blue one is better."

Comprehension Question 1: Which jacket does David think is better?
Comprehension Question 2: Which jacket does David say is better?

Identification question: David says, "I think the blue one is better." Is this a lie? (yes/no)
Evaluation question: David says, "I think the blue one is better." How good or bad is this? Give it a number, where 1 is *extremely bad* and 7 is *extremely good.*

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