Evaluating and Approaching a Strange Animal: Children's Trust in Informant Testimony

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Abstract:

This study examined 3- to 7-year-old children's reliance on informant testimony to learn about a novel animal. Sixty participants were given positive or negative information about an Australian marsupial from an informant described as a maternal figure or a zookeeper. Children were asked which informant was correct and were invited to touch the animal, which was a stuffed toy hidden in a crate. Overall, younger children endorsed the zookeeper's testimony about the animal, but touched the animal more readily when the maternal figure provided positive information. Older children endorsed the informant who provided positive information, but showed some sensitivity to zookeeper expertise. Age differences were obtained in the association between participant characteristics and informant selection and animal approach behavior.

Keywords: Children | Positive Information | Learning | Informants | Child Psychology

Article:

Children display selective trust in others as sources of information about the world (Harris et al., 2012). For example, in learning new words, 3- and 4-year-olds accept labels more readily from informants who named objects correctly rather than incorrectly in the past (Jaswal & Neely, 2006). In addition to language learning, evidence of selective trust has been obtained for object categorization (e.g., Jaswal, 2004), object function (Koenig & Harris, 2005), and object search (e.g., Robinson & Nurmsoo, 2009). With age, there is increased sensitivity to subtle differences in informant accuracy (e.g., relative frequency of correct information; Pasquini, Corriveau, Koenig, & Harris, 2007) and in the ability to distinguish valid from unacceptable reasons for informant errors (e.g., Nurmsoo & Robinson, 2009). Children also become increasingly aware that behavior can be motivated by self-interest (Mills & Keil, 2005; Vanderbilt, Liu, & Heyman, 2011).

This study extends research on children's use of informant testimony to a novel domain: learning about a potentially fearful entity. Specifically, we examined the degree to which children accept information about a novel animal from a zookeeper versus a maternal figure and whether their choice depended on the valence of the information provided (i.e., positive or negative). This is one of few studies to examine children's perception of valenced testimony in a putatively emotional situation, as much research has focused on perceptions of neutral testimony in benign learning contexts as described above. Previous research has examined effects of valence (e.g., Field, Argyris, & Knowles, 2001), parental transmission of information (e.g., Muris, Van Zwol, Huijding, & Mayer, 2010), and experimenter transmission of information (Kelly, Barker, Field, Wilson, & Reynolds, 2010) on children's animal perceptions. This study is the first to explore children's selective trust in informants who present conflicting testimony about an unknown animal. It is important to examine reactions to conflicting testimony, as this approach enables us to gain insight about the criteria that children employ in deciding to trust one informant over another (Harris et al., 2012). Another novel aspect of this study is the inclusion of a behavioral measure (i.e., willingness to touch the animal) to determine whether children's actions mirrored their verbal responses. Inclusion of this measure is beneficial in moving toward more ecologically valid assessments of social learning (see Mills, 2012).

Children's Perception of Animals

Attitudes about animals are cultivated through experience (Kidd, Kidd, & Zasloff, 1995). Some children show natural interest in animals (e.g., Kellert, 1985), but fear of animals is common (see Meltzer et al., 2008). Mild or transient fears are normative (Ollendick, King, & Muris, 2002), whereas excessive or irrational fears can lead to psychological difficulties (e.g., Muris & Field, 2008). Research supports Rachman's (1977) assertion that children's perceptions of animals are influenced by experience (Field & Storksen-Coulson, 2007), observation (e.g., Broeren, Lester, Muris, & Field, 2011), and verbal transmission of information (Field & Lawson, 2003).

Here, we focus on acceptance of verbal information from others about a novel animal. Verbal transmission is a major way in which children learn about the world (Harris, 2007) and it may be particularly influential in animal perceptions (e.g., Ollendick & King, 1991). In research that examined effects of the valence of information (positive, neutral, or negative) provided by an experimenter about a novel animal, children's fear was highest when they were given negative or ambiguous verbal information and lowest when given positive information (e.g., Field & Lawson, 2003; Field et al., 2001; Muris et al., 2009). Moreover, parents who received negative or positive information about an unknown animal passed these respective views on to their children (Muris et al., 2010).

Sensitivity to Variation in Expertise

Given the influence of parental information on children's beliefs about animals, we might expect children to endorse the testimony of a maternal figure readily, even if she is technically a layperson who lacks animal expertise. This trust may stem from children's general beliefs that mothers are best positioned to navigate the world safely, as well as their personal experience of a

nurturing and protective relationship with their own mothers. Children engage in social referencing with their mothers at an early age and place a premium on information provided by adults, who are assumed to be trustworthy (Zarbatany & Lamb, 1985). Moreover, preschoolers prefer to accept information about novel objects from their mother as compared to a stranger when they do not have relevant perceptual cues for determining labels independently (Corriveau et al., 2009). Thus, in making a decision about a novel animal, it is possible that a maternal figure would be seen as more reliable than a zookeeper and that children will extend expectations of their mother's general knowledge to another maternal figure (i.e., someone who is a mother, but not their mother).

It is also possible that children will be influenced to a greater extent by testimony from an expert, in this case, a zookeeper. Children are aware of variation in expertise, or divisions of cognitive labor (e.g., Aguiar, Stoess, & Taylor, 2012; Keil, Stein, Webb, Billings, & Rozenblit, 2008). Four- and 5-year-olds, and to a lesser extent, 3-year-olds, expect that a mechanic knows different things than a doctor (e.g., why a car needs gas vs. why people's noses get runny; Lutz & Keil, 2002). Even preschoolers generalize their knowledge in a basic way, although an appreciation that knowledge can be clustered according to underlying principles does not emerge until the elementary school years. For example, preschoolers and second graders were more likely to predict that a person who knew why old, worn-out keys do not work well would know why people forget which keys open the car door versus the trunk (Danovitch & Keil, 2004). In contrast, sixth graders were more likely to predict that this same person would know why it is hard to turn wheels on a rusty bicycle. Thus, with age, children cluster knowledge in a manner that is discipline consistent (i.e., physics, in this example) rather than simply goal or topic oriented. By 5 years of age, children appreciate that clusters of knowledge are specific to academic disciplines (e.g., natural vs. social sciences; Keil et al., 2008). These findings reveal awareness that some people are more credible sources of information than others and that people can serve as distinct resources for information acquisition. Accordingly, children might assume that a zookeeper would provide more accurate information about a novel animal than a maternal figure given her expertise about a variety of animals not typically accessible to laypersons.

Valence Effects in Social Cognition

In addition to informant expertise, we examined whether valence of the information (positive vs. negative) influenced children's beliefs about the animal. Some research suggests that infants and toddlers exhibit a negativity bias, or a propensity to learn from and pay attention to negative information more than positive information. Infants' toy selection is influenced to a greater extent by negative than positive information from their mothers (see Vaish, Grossmann, & Woodward, 2008, for a review on the negativity bias). In early childhood, children's conversations with parents tend to center on negative rather than positive emotions (Lagattuta & Wellman, 2002). In middle childhood, there is evidence of sensitivity to biased decision making for negative relationships as compared to positive relationships (see Mills & Grant, 2009). The negativity bias is thought to be evolutionarily adaptive and it may be potent in this context given potential dangers associated with novel animals.

Other research indicates that in early to middle childhood, children show a positivity bias in social cognition in which they tend to acquire or maintain positive views of oneself or others by attending to, processing, or interpreting information selectively (see Boseovski, 2010). Young children tend to overgeneralize positive characteristics to others (Cain, Heyman, & Walker, 1997; Lane, Wellman, & Gelman, 2013; but see Koenig & Jaswal, 2011), assume that negative characteristics improve over time (Heyman & Giles, 2004), and expect that positive rather than negative events will occur in the future (Grant & Mills, 2011). In one study, 3- to 6-year-olds were more likely to endorse positive rather than negative trait labels about a stranger irrespective of the informant reliability (Boseovski, 2012). Preschoolers also prefer to endorse information that is provided by people with positive traits (niceness, honesty; Lane et al., 2013; Mascaro & Sperber, 2009). Based on these results, we might expect participants to endorse positive information about a novel animal more readily than negative information.

Present Research

We adapted Field and Lawson's (2003) paradigm to the question of interest. Participants were given positive or negative information about a novel Australian marsupial by a zookeeper or a maternal figure. The primary question of interest, addressed in 'Experiment 1A', was whether children endorsed information from the zookeeper or the maternal figure and whether endorsement was influenced by valence. Afterward, participants were invited to pet the “animal” which was a stuffed toy concealed in a crate. This technique measures anxiety (e.g., Vernon & Berenbaum, 2002) and permitted us to determine whether children's behavior matched their verbal endorsements. For exploratory purposes, we administered the Child Behavior Questionnaire (Putnam & Rothbart, 2006) to parents. We were interested in whether children's general fear levels, shyness, smiling and laughter, impulsivity, and inhibitory control were related to informant endorsement, the tendency to show biases in informant endorsement, and the tendency to touch the animal. Finally, we conducted 'Experiment 1B' to determine whether a comparison group of children trusted each informant at a baseline level, in the absence of competing testimony.

Given previous findings of sensitivity to expertise in early childhood, we expected participants to endorse the zookeeper's claims to a greater extent than those of the maternal figure. We also predicted that children would be more likely to endorse positive information about the animal with age, irrespective of informant type. We based this latter prediction on the robustness of the positivity bias in middle childhood, particularly in studies that compared directly children's response to positive versus negative valence information, as was done here.

Experiment 1A

Method

Participants

Sixty-six participants were tested as part of a larger study on children's fears. Data from six children were unusable due to experimenter error or child noncompliance. The final sample consisted of thirty 3- to 5-year-olds (M = 53.5 months, SD = 9.7; 12 girls) and thirty 6- to 7.5-

year-olds (*M* = 85.4 months, *SD* = 6.7; 16 girls). Participants were recruited via a laboratory database in a midsized North American city. In terms of racial and ethnic composition, 66.7% of the participants were White, 11.6% were African American, 1.4% were Hispanic, 4.3% were from mixed ethnic backgrounds, and 15.9% chose not to self-classify on this variable. The majority of participants were from middle-class backgrounds.

Materials

Color photographs of unfamiliar Australian marsupials (cuscus and quoll; Field & Lawson, 2003) were edited to black and white (see Figures 1a and 1b). A stuffed animal toy (felt, but unseen, by the child) served as the animals. There were two color photographs of female informants who were identical twins accessorized according to role (e.g., vest for zookeeper, purse for maternal figure; see Figures 2a and 2b). For the Behavioral Approach Task (BAT; Field & Lawson, 2003), a wooden crate with a hole in the top housed the stuffed animal. Parents completed the Child Behavior Questionnaire–Short Form (CBQ–Short Form; Putnam & Rothbart, 2006).

Figure 1. Stimulus image of (a) cuscus marsupial and (b) quoll marsupial.

Figure 2. Stimulus image of (a) maternal figure and (b) zookeeper.

Design and procedure

Participants in each age group (3- to 5-year-olds vs. 6- to 7.5-year-olds) were given information about a novel animal from a maternal figure and a zookeeper. Half of the participants were assigned randomly to receive positive information from the maternal figure and negative information from the zookeeper. The remaining participants received negative information from the maternal figure and positive information from the zookeeper. Within each group, half of the participants were told about a “cuscus,” whereas the remaining half were told about a “quoll.”

Participants were tested in a 30-min session by a male or female experimenter. First, children were shown a photograph of the cuscus or quoll. The experimenter confirmed that children had not heard of the animal and provided them with basic information, “Cuscuses (quolls) come from Australia. They have white teeth and eat all sorts of things. If you ever saw one, you would see that it has claws and scratches trees” (adapted from Muris et al., 2010). The experimenter then showed the child the images of the informants, a maternal figure and a zookeeper, paired with brief introductions of each person. The maternal informant was described as “just like your mom with two kids just your age, who knows a lot about being a mom, just like your mom does.” The zookeeper was described as a person who “works with many different kinds of animals, who knows a lot about animals that we don't know about.” Based on condition assignment, participants received positive information from one informant and negative information from the other informant. For example, in the positive information condition, children were told that cuscuses (quolls) are “small and cuddly… love playing with children and the other animals.” In the negative condition, participants were told that cuscuses (quolls) are “dirty and smelly… hunt other creatures” (see the Appendix for the full text). Speaking order was counterbalanced across children.

Afterward, participants were asked “Who do you think is right about the animal?” which was the main dependent measure. To assess the degree to which children believed their chosen informant was correct, a follow-up “degree of correctness” question was asked “How right do you think [selected informant] is?” To determine whether children credited the *other* informant with some knowledge, children were asked this same question about the nonselected informant. For both questions, participants were given forced-choice options along a visual scale: *not a whole lot* (1 star), *some* (2 stars), and *a lot* (3 stars).

Children then underwent a behavioral measurement of fear via the BAT (Field & Lawson, 2003; Field, Lawson, & Banerjee, 2008). The experimenter placed the animal crate in front of the child. Children were told, “OK, now I've got a box here with the (animal) in it. It is nocturnal, which means that it only comes awake at night, so it should be asleep right now. Would you like to touch the (animal)?” Notably, the crate was opaque so that children could not see the true contents and would assume that the animal was real. Participants were shown a receptacle through which they could place their hand. After placing the box in front of the child, a timer was started to determine children's reaction time if they chose to touch it. The timer was stopped once the child's hand was submerged in the box. Afterward, children were debriefed about the study with a factual worksheet about the animal. While participants were tested, parents filled out the CBQ.

Results and Discussion

There were no significant effects of experimenter, speaker order, participant gender, or animal type on responses. These variables were excluded from the analyses reported below.

Choice of maternal figure or zookeeper as correct

The main dependent measure was children's selection of the maternal figure or zookeeper as correct. Children received a score of 0 for selecting the maternal figure and a score of 1 for selecting the zookeeper. Logistic regression was conducted with age in months, positive informant (maternal figure vs. zookeeper), and the Age × Positive Informant interaction as independent variables. The model was significant, $\chi^2(3, N = 60) = 12.72$, $p = .005$, $R_L^2 = .225$. With increasing age, participants were significantly less likely to choose the zookeeper as correct ($\beta = -1.15$, Wald = 5.37, $p = .02$). There was no significant effect of positive informant, ($\beta = 0.912$, Wald = 1.3 $p = .253$), but there was a significant Age × Positive Informant interaction ($\beta = 2.31$, Wald = 7.81 $p = .005$; see Figure 3). For the 3- to 5-year-olds, selection of the zookeeper did not differ significantly based on which informant provided positive information, $\chi^2(1, N = 30) = 1.43$, $p = .23$. As a group, these participants were more likely than expected by chance to choose the zookeeper as correct, $t(29) = 2.35$, $p = .026$. In contrast, 6- to 7.5-year-olds' selection of the zookeeper as correct did not differ significantly from chance, $t(29) = 0.724$, $p = .475$. However, selections differed based on which informant provided positive information, $\chi^2(1, N = 30) = 6.65$, $p = .01$. Participants were more likely to select the zookeeper as correct when she provided positive information than when the maternal figure provided positive information.

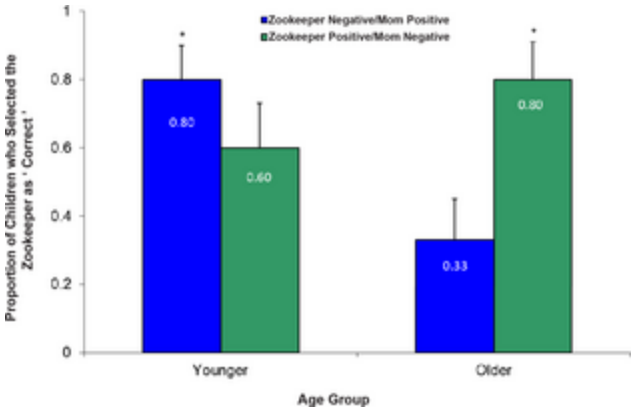

Figure 3. Proportion of participants who selected the zookeeper as correct by age group and valence of testimony. Asterisks indicate greater than chance performance.

Degree of correctness ratings for the zookeeper and maternal figure

Participants indicated "how right" each informant was about the animal. Scores ranged from 0 to 2 points (*not a whole lot, some, a lot*). A 2 (age: 3- to 5-year-olds vs. 6- to 7.5-year-olds; between-subject variable) × 2 (positive informant: zookeeper vs. maternal figure; between-subject variable) × 2 (question: zookeeper vs. maternal figure; within-subject variable) mixed analysis of variance (ANOVA) revealed a significant three-way interaction between all variables, $F(1, 56) = 9.01$, $p = .004$, $\eta_p^2 = .14$. Follow-up analyses indicated that the results were consistent with those above (i.e., significant Age × Positive Informant interactions for each question); thus, they are not reported here.

Comparison of degree of correctness ratings

Finally, we examined whether children's ratings of the maternal figure differed significantly from those of the zookeeper by age and positive informant. When the zookeeper provided negative information and the maternal figure provided positive information, there was no significant difference in correctness ratings for the zookeeper ($M = 1.0$) as compared to the maternal figure ($M = 1.33$) by the older children, $t(14) = -1.00$, $p = .33$. In contrast, younger children were significantly more likely to choose the zookeeper as more correct ($M = 1.53$) than the maternal figure, ($M = 0.60$), $t(14) = 2.35$, $p = .034$. When the maternal figure provided negative information and the zookeeper provided positive information, older children chose the zookeeper as more correct ($M = 1.87$) than the maternal figure ($M = 0.47$), $t(14) = 7.36$, $p < .001$. There was no significant difference in correctness ratings for the zookeeper ($M = 1.26$) as compared to the maternal figure ($M = 0.67$) by younger children, $t(14) = 1.46$, $p = .17$.

Behavioral approach

Of 60 children in 'Experiment 1A', sixteen 3- to 5-year-olds and nineteen 6- to 7.5-year-olds reached into the crate. An Age × Positive Informant ANOVA was conducted on participants' log-transformed reaction times. The only significant effect was an Age × Positive Informant interaction, $F(1, 31) = 5.38$, $p = .027$, $\eta_p^2 = .148$. There were no significant main effects of condition or age (Fs < 1 and ps > .10). Fisher's least significant difference tests indicated that

younger children submerged their hands significantly more quickly when the maternal figure provided positive information (M = 0.82, SE = .05) than when the zookeeper provided positive information (M = 1.06, SE = .11). Specifically, these children were more reluctant to touch the animal when the maternal figure provided negative information than when the zookeeper provided negative information. There was no significant difference in older children's responses when the maternal figure provided positive information (M = 1.0, SE = .09) as compared to the zookeeper (M = 0.84, SE = .08). Reaching into the crate was associated with endorsement of the positive informant, $\chi^2(1, N = 58) = 3.87$, $p = .049$.

Relation between CBQ and task performance

Pearson correlations were computed separately for the younger and older children. We examined the relation between specific subscales of the CBQ (fear, impulsivity, inhibitory control, shyness, and smiling and laughter) and children's selection of the zookeeper, selection of the positive informant (i.e., positivity bias), and whether they reached into the crate. For 3- to 5-year-olds, there were no significant correlations between any of the CBQ variables and children's selection of the zookeeper as correct. There was a marginally significant positive correlation between smiling and laughter and selection of the positive informant, $r(30) = .35$, $p = .058$. There was a significant negative correlation between shyness and reaching into the crate, $r(30) = -.379$, $p = .039$, and fear and reaching into the crate, $r(30) = -.355$, $p = .054$. There was a marginal positive correlation between smiling and laughter and reaching into the crate, $r(30) = .34$, $p = .07$.

For the 6- to 7.5-year-olds, there was a positive correlation between inhibitory control and zookeeper selection, $r(30) = .365$, $p = .047$. There was a significant negative correlation between inhibitory control and selection of the positive informant, $r(30) = -.469$, $p = .009$. Lower inhibitory control was associated with selection of the positive informant, whereas higher inhibitory control was associated with selection of the negative informant. Higher impulsivity was marginally associated with selection of the positive informant, $r(30) = .346$, $p = .06$, whereas lower impulsivity was associated with selection of the negative informant. None of the correlations between the CBQ and reaching emerged significant for this age group. There was a significant positive correlation between selection of the positive informant and reaching into the crate, $r(28) = .38$, $p = .046$.

Experiment 1B

To determine whether children trust each type of informant in the absence of competing testimony, we tested a comparison group of participants who were given a description of the animal by *one* informant only (i.e., zookeeper or maternal figure).

Method

Participants

There were 32 participants: sixteen 3- to 5-year-olds (M = 53.1 months, SD = 10.5; 11 girls) and sixteen 6- to 7.5-year-olds (M = 83.0 months, SD = 5.2; 8 girls). In this group, 59.4% of the

participants were White, 18.8% were African American, 15.6% were from mixed backgrounds, and 6.3% did not report this information.

Design and procedure

As in 'Experiment 1A', participants were given basic information about the animal, followed by the maternal figure and zookeeper descriptions. However, participants were then exposed to the testimony of only one informant, “I'm going to tell you about what maternal figure (zookeeper) says about the cuscus (quoll).” Half of the participants were given information from the maternal figure and the remaining participants were given information from the zookeeper. For each informant, half of the participants were given positive information and the remaining participants were given negative information about the animal. Participants were asked whether the informant was correct about the animal.

Results and Discussion

All participants accepted the informant testimony as correct with the exception of one 6-year-old in the maternal figure positive condition, who reported that she was incorrect.

General Discussion

This is the first study to examine the influence of competing informant testimony on children's perceptions of a novel animal. In doing so, we advance knowledge about children's selective social learning, sensitivity to clusters of knowledge, and biases in information processing. The performance of children in the comparison condition provides a context for interpreting the results, as these children heard positive or negative testimony from one informant *only* (i.e., the zookeeper or the maternal figure). Almost all participants accepted the information as correct irrespective of valence, indicating that both informants were considered credible individually. This is unsurprising given that most claims encountered by children are likely to be correct (Mills, 2012).

When conflicting testimony was presented, there were striking age differences in verbal endorsements. Overall, younger children endorsed the zookeeper's statement about the animal. However, two pieces of evidence suggest that negative testimony from the zookeeper was especially influential. First, participants exhibited greater than chance performance for zookeeper selection only when she provided negative rather than positive information about the animal. Second, participants judged the zookeeper as more correct than the maternal figure when she provided negative information, but there was no significant difference in these comparison ratings when the zookeeper provided positive information. Thus, for these children, the combination of expertise and negative testimony was potent.

Older children did not show an overall preference for the zookeeper's testimony and instead were influenced to a greater extent by valence: They were more likely than expected by chance to select the zookeeper as correct when she provided positive information, but responded at chance levels when she provided negative information (i.e., tended to choose as correct the maternal figure's positive endorsement). For the degree of correctness ratings, older children also showed the opposite pattern from younger children in that they were more likely to choose the zookeeper

rather than the maternal figure as correct when she provided positive information, whereas there was no significant difference in ratings when the maternal figure provided positive information. Thus, positive information, together with some appreciation of expertise, was particularly influential to this group.

Sensitivity to Informant Expertise in Early Childhood

Younger children's overall preference for the zookeeper's testimony is consistent with findings of sensitivity to divisions of cognitive labor in early childhood (e.g., Keil, Lockhart, & Schlegel, 2010). However, it is important to note that this task was simple in comparison to tasks administered in previous research. We used a familiar expert informant that children recognized readily (see Lutz & Keil, 2002) and participants were not required to make inferences about informants' knowledge. Thus, these findings likely reflect an understanding of stereotypical roles that people play rather than reasoning that reflects an appreciation of principles that underlie different types of knowledge (Lutz & Keil, 2002).

This is the first study to demonstrate that, as a group, very young children prioritize the verbal endorsement of an expert over a maternal figure when it comes to learning about a novel animal. To some extent, this result is surprising given the strong influence of parents on children's fear beliefs (e.g., Muris et al., 2010). However, the deference to expertise about animal safety is consistent with findings that children prefer to learn information about dogs from dog experts (Koenig & Jaswal, 2011) and that they are capable of determining the type of expertise needed to answer questions about animals (Aguiar et al., 2012). Strong appreciation of expertise, combined with salient negative information about the animal, may have resulted in heightened attention to personal safety in this circumstance. Indeed, research indicates that children are attentive to visually threatening stimuli (see LoBue, 2009).

Preference for Positive Information in Middle Childhood

In considering older children's response patterns, these findings suggest that there are limitations in the ability to appreciate stereotypical knowledge associated with maternal figures and zookeepers. The tendency to endorse the testimony of, and rate as more accurate, the informant who made positive statements is consistent with findings of a positivity bias in social judgments (Boseovski, 2010), although it is an open question why this bias extends to animals. Given that children's personal experience influences fear beliefs (Lobue, 2010), one possible explanation of the positive endorsements is that older children's exposure to animals is largely positive. Sensitivity to this statistical pattern may have resulted in an assumption that future encounters with novel animals will also be favorable, irrespective of informant claims. These children are also likely to have received formal education about the importance of positive attitudes toward wildlife (see Kidd et al., 1995). In contrast, it is likely that younger children have had less experience with animals in general.

It is also possible that older children made spontaneous inferences about the informants' mental states that affected their endorsements. With age, children appreciate the role of the mind in generating fear beliefs, including a developing awareness that different people have different amounts of fear even when they are in the same situation (Sayfan & Lagattuta, 2009). Lack of

responsiveness to negative information from the maternal figure, in particular, may reflect assumptions that she had excessive or unwarranted concerns about the animal. Perhaps negative information from the zookeeper was given more credence because children reasoned from the perspective of the zookeeper's knowledge state rather than drawing on more emotion-centered reasoning that they may have associated with the maternal figure.

Irrespective of the precise explanation of the response pattern, the correlational pattern for the 6- to 7.5-year-olds supports the notion that these children may need to exert self-control to override what may be a prepotent expectation that novel animals have positive attributes. Reflection may be required to overcome this expectation (see Boseovski & Marcovitch, 2012), as selection of the zookeeper was associated with greater reported inhibitory control, while selection of the positive informant was associated with lower inhibitory control and greater impulsivity. These associations were not obtained for the younger children, which is perhaps unsurprising given that the positivity bias peaks in middle childhood (i.e., these children may not need to recruit executive resources to facilitate endorsement of the zookeeper). For younger children, selection of the positive informant was related to a reported tendency to show general positive affect in response to novel stimuli in the environment.

Children's Willingness to Touch the Animal

A unique aspect of this study concerned inclusion of a behavioral measure of the influence of testimony on children's responses, namely, willingness to touch the animal. Here, too, there were age differences in response patterns. Older children's behavior was fairly consistent with their verbal responses and reaction time did not differ based on which informant provided positive information. However, those children who endorsed the positive informant were also more likely to reach into the crate, indicating that valence influenced the behavior, not just verbal testimony, of a subgroup of participants.

For younger children, there was a dissociation between verbal selections and readiness to touch the animal. Despite explicit endorsement of zookeeper testimony, these children submerged their hands more quickly when the maternal figure provided positive information. Thus, they appear to have been influenced implicitly by her, consistent with previous findings that, as early as infancy, parents exert a prominent role in determining children's behavioral responses to fear (e.g., von Hofsten & Siddiqui, 1993). Turning attention to the entire sample of younger children (those who did and did not submerge their hands), the decision to reach into the crate was marginally related to general positive dispositionality. Together with the finding that verbal endorsement of the positive informant was associated with positive affect, this result suggests that temperament played an important role in young children's performance beyond information provided in the experimental context. Indeed, research indicates that children with temperamental exuberance show positive reactions to novel situations (Lahat et al., 2012). In contrast, shyness and fear were associated with reduced willingness to reach into the crate.

Limitations and Future Directions

We assessed children's endorsement of testimony from maternal figures rather than their own mothers and this likely dampened the potential impact of an actual mother–child relationship on

acceptance of testimony. One avenue for future research is to examine whether information from children's own mothers would override competing testimony of an adult who poses as a zookeeper. It would also be worthwhile to investigate whether the mother–child relationship dictates children's trust of her testimony given findings by Corriveau et al. (2009) that children's attachment status affected their willingness to accept maternal claims about novel objects and animal hybrids.

An additional methodological limitation warrants discussion. In our descriptions of informant claims, only the positive and negative testimonies were in complete conflict. Because this was not the case for other informant claims (e.g., with respect to physical descriptions of animals), it is possible that children found it difficult to select one informant as correct or that they were attuned to irrelevant information. Although there was no indication of any difficulty in children's willingness to select an informant and no spontaneous discussion of peripheral reasons for choosing one informant over the other, it is important to control carefully the presentation of information in future research.

Notably, the results obtained with regard to reaction time must be interpreted cautiously, as just over half of the children in the sample touched the animal. However, the finding of a discrepancy between verbal and behavioral measures in the younger children underscores the importance of taking both types of measures into account when examining how children learn about the world in general. Although children may have strong feelings about who they should endorse verbally in a particular situation, these feelings may conflict with automatic response tendencies, particularly when the stakes are high (i.e., personal safety). Discovery of dissociations provides insight about the extent to which thoughts and actions are integrated in social learning.

In light of the preliminary results obtained here, it is important to investigate systematically the potential roles of impulsivity and inhibitory control in the positivity bias seen in older children. Although this bias has been documented widely, its basis and correlates remain unclear, and behavioral measures may help to elucidate whether specific aspects of executive function predict children's treatment of informant testimony. An examination of mental state inferences that children make about informants is also important for understanding links between theory of mind and informant selection (see Nurmsoo & Robinson, 2009). Although we provided information about informants' knowledge, we did not discuss their emotions, desires, or beliefs.

In sum, these results reveal striking age-related change in children's treatment of testimony about a novel animal. Younger children appreciated the zookeeper's expertise, and zookeeper testimony was particularly influential when it was negative, suggesting a heightened awareness of threat that is consistent with findings of sensitivity to fear-relevant information at this age. However, approach behaviors were clearly influenced by the maternal figure, indicating that the factors that influenced verbal endorsements versus behavioral approach were different in this group. For older children, positive information was particularly influential, but they also showed sensitivity to expertise in preferring such information from the zookeeper rather than the maternal figure. We provided preliminary evidence for the role of executive functions and specific aspects of temperament in children's performance and suggested that increased experience with animals fuels positive thinking about them. In future research, comprehensive

measures of children's general fearfulness of animals and other entities, as well as their experience with pets, zoos, and museums can serve as a context in which to understand further the factors that drive selective social learning in this domain.

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Appendix: Positive and Negative Valence Information about the Novel Animals

Positive Information

Cuscuses (quolls) are small and cuddly and their fur is really soft. They are very friendly, and live in the park, where they love playing with children and the other animals. If you went to the park a cuscus (quoll) might come out to see you, and you could stroke and cuddle it. Cuscuses (quolls) eat berries and leaves, and you could feed it out of your hand, which would make it very happy. Everyone in Australia loves cuscuses (quolls).

Negative Information

Cuscuses (quolls) are dirty and smelly and carry lots of germs. They are very dangerous and live in dark places in the woods, where they hunt other creatures with their long sharp teeth and claws. Cuscuses (quolls) eat other creatures, but their favorite foods are scary insects and they like to chomp loudly. If you went to the woods, a cuscus (quoll) might be hiding there, and you might hear its wild growl. No one in Australia likes cuscuses (quolls).

Adapted from Field and Lawson (2003, pp. 1290–1291) and Field, Lawson, & Banerjee (2008).