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PAPER

When do children trust the expert? Benevolence information influences children's trust more than expertise

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Abstract

How do children use informant niceness, meanness, and expertise when choosing between informant claims and crediting informants with knowledge? In Experiment 1, preschoolers met two experts providing conflicting claims for which only one had relevant expertise. Five-year-olds endorsed the relevant expert's claim and credited him with knowledge more often than 3-year-olds. In Experiment 2, niceness/meanness information was added. Although children most strongly preferred the nice relevant expert, the children often chose the nice irrelevant *expert when the relevant one was mean. In Experiment 3, a mean expert was paired with a nice* non-*expert. Although this nice informant had no expertise, preschoolers continued to endorse his claims and credit him with knowledge. Also noteworthy, children in all three experiments seemed to struggle more to choose the relevant expert's claim than to credit him with knowledge. Together, these experiments demonstrate that niceness/meanness information can powerfully influence how children evaluate informants.*

Introduction

Children are biased to trust testimony (e.g. Harris, 2002; Jaswal, Croft, Setia & Cole, 2010), and although this bias often is useful (e.g. language acquisition; Burge, 1993), it can be problematic: not all informants provide accurate information (e.g. Mills, 2012), and different informants' claims may conflict. To determine whether to trust a claim, particularly when lacking background knowledge, children must instead evaluate each informant's credibility.

When evaluating others' credibility, children and adults tend to focus on their perceptions of characteristics indicating competence and benevolence (see Fiske, Cuddy & Glick, 2007; Mascaro & Sperber, 2009; Shafto, Eaves, Navarro & Perfors, 2012). The competence dimension includes characteristics indicating an informant's ability, such as reliability and expertise; the benevolence dimension includes characteristics indicating an informant's motivation, such as honesty or dishonesty (e.g. Shafto *et al.*, 2012) and niceness or meanness (e.g. Sperber, Clement, Heintz, Mascaro, Mercier, Origgi & Wilson, 2010). Previous research found that adults can use their evaluations of informant competence and benevolence to make trust decisions (e.g. Schoorman, Mayer & Davis, 2007; White, 2005). Moreover, even young children can evaluate informants based on these two dimensions when presented separately.

Evaluating informants: competence

Children have some ability to choose between sources by evaluating indicators of each source's likely competence, such as capability (e.g. Mills & Landrum, 2012), experience (e.g. VanderBorght & Jaswal, 2009), prior accuracy (e.g. Birch, Vauthier & Bloom, 2008; Brosseau-Liard & Birch, 2010, 2011; Koenig & Harris, 2005; Scofield, Gilpin, Pierucci & Morgan, 2012), access to information (Pillow, 1989; Robinson, Champion & Mitchell, 1999), and expressions of certainty, uncertainty, or ignorance (e.g. Jaswal & Malone, 2007; Mills, Legare, Grant & Landrum, 2011; Poulin-Dubois & Chow, 2009).

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Children have also demonstrated an ability to evaluate another indicator of competence – expertise, or 'the skill of a person with special knowledge in a domain' (*Merriam-Webster*, n.d.), at least when anticipating what an expert likely knows (e.g. Danovitch & Keil, 2004, 2007; Lutz & Keil, 2002; Aguiar, Stoess & Taylor, 2012). As different informants can have different bodies of semantic knowledge (i.e. domains of expertise), it is important for children who are seeking information to recognize whether an expert has the relevant knowledge for providing accurate information.

To infer whether an informant has expertise in a particular domain, preschoolers can use a variety of clues. For one, they can use explicit labels and descriptions of expertise (e.g. someone is labeled as a 'doctor' or a 'car mechanic'; Lutz & Keil, 2002, see also Aguiar *et al.*, 2012). Also, they can use prior demonstrations of a person's domain-specific knowledge (e.g. someone correctly solved problems in that domain previously; Sobel & Corriveau, 2010). Moreover, they can think about someone's knowledge to infer whether she has broader knowledge associated with that particular domain (see Keil, Stein, Webb, Billings & Rozenblit, 2008). For instance, 4- and 5-year-olds recognize that an eagle expert is likely to have knowledge about eagles as well as some knowledge about birds (i.e. near-category domain), animals (i.e. middle-category domain), and biology (i.e. underlying principles domain; Lutz & Keil, 2002). Thus, preschoolers have some ability to reflect on cues for inferring expertise to determine whether an informant possesses the necessary knowledge to make accurate claims.

Although children can use expertise to credit informants with knowledge, less is known about whether children can use these cues to choose between conflicting claims. In fact, choosing between conflicting claims is likely more difficult than crediting informants with knowledge. For one, children need to put aside their own biases regarding the claims, like which one sounds most interesting. In addition, they must recognize that a person who volunteers information may be wrong even when no negative characteristics (e.g. meanness, deceptiveness) are attributed to him. Moreover, children need to recognize that providing accurate claims in one domain does not guarantee providing accurate claims in all domains. Thus, choosing between experts' conflicting claims is likely to be more difficult than crediting them with knowledge.

When examining children's abilities to use expertise to choose between conflicting claims, there is evidence that 4- and 5-year-olds, but not 3-year-olds, can endorse the claim provided by someone that they witnessed demonstrate expert understanding of how something works (Sobel & Corriveau, 2010). That said, there is currently no research showing how children use other cues, such as expert labels and descriptions of knowledge, to choose between conflicting claims. Given that children do not always have opportunities to infer expertise by witnessing informants responding to questions, it is useful to examine how children rely on their understanding of knowledge domains to evaluate specific claims. In addition, there is little research examining how children generalize expertise to infer that someone has knowledge about broader domains (e.g. near-category: Lutz & Keil, 2002; see also subordinate versus basic, Rosch, Mervis, Gray, Johnson & Boyes-Braem, 1976). Thus, the first aim of the current research is to determine whether children use taxonomically rich expertise labels (i.e. 'eagle expert' and 'bicycle expert') and descriptions of expertise to choose between conflicting claims regarding broader domains (e.g. birds and vehicles) and whether their ability to choose between conflicting claims is on par with their ability to credit informants with knowledge.

Evaluating informants: benevolence

When it comes to evaluating informant benevolence, research has demonstrated that even infants can distinguish between benevolent and malevolent actions, such as the intent to help versus the intent to hinder (e.g. Hamlin, Wynn & Bloom, 2007). By age 2, children begin to label people as 'nice' or as 'mean' (e.g. Bretherton & Beeghly, 1982). By age 3, children are more trusting of claims made by nice informants than mean ones (Mascaro & Sperber, 2009). As children grow older, they also consider someone's previous behaviors when predicting future ones (e.g. Cain, Heyman & Walker, 2006). For instance, 4-year-olds can anticipate a lie from someone labeled a liar, and 5- to 6-year-olds can recognize a lie from someone described as intending to deceive the participant (Mascaro & Sperber, 2009). Similarly, 4- and 5-year-olds can recognize when someone is tricking or helping, but only 5-year-olds selectively trust advice from helpers and not trickers (Vanderbilt, Liu & Heyman, 2011). In fact, children's sensitivity to benevolence information continues to develop into the late elementary school years, such that they are willing to forgive previous lie-telling if a source intends to help (e.g. Xu, Evans, Li, Li, Heyman & Lee, in press). Still, given that even very young children can use trait labels and previous behaviors to selectively trust informants and that 4- and 5-year-olds begin to understand how a lack of benevolence may indicate a potential for deception, it is likely for the current study that perceptions of benevolence will be very influential in children's evaluations of informants.

Evaluating informants: competence and benevolence

Generally, a preferred informant would both have relevant knowledge (i.e. be competent) and intend to share it (i.e. be benevolent; e.g. Shafto *et al*., 2012). However, given that such an informant may not always be available (and children and adults may often encounter informants with varying characteristics in real life), it is useful to reflect on how these two components will be weighed. For instance, a child might encounter an experienced, yet ill-tempered, doctor providing useful advice on how to treat flu symptoms (high competence, low benevolence), or a well-intentioned older peer providing unsafe advice on how to handle bullies (low competence, high benevolence). Although children may have some ability to use competence and benevolence characteristics *independently* to guide trust decisions, much less is known about whether competence or benevolence would be more influential when both are perceptible.

Theoretically, at least in some cases, it is useful to reflect first on whether someone has the ability to provide information before considering whether the informant seems benevolent (e.g. Mills & Landrum, 2012). For instance, if someone is incompetent, that person will provide inaccurate answers, regardless of her intentions. That said, there may be times when niceness matters more to a person, either for good reasons or for bad. For instance, when adults are asked to evaluate investment experts with differing levels of competence and benevolence, they tend to prefer a more competent informant when the decisions are not emotionally difficult (e.g. investing money given by a living aunt for band camp) but a more benevolent (yet still somewhat competent) informant when those decisions are emotionally difficult (e.g. investing money left by deceased parents for college; White, 2005).

Given that even adults sometimes lessen focus on competence in favor of benevolence, it seems likely that children might sometimes do so as well. However, the most closely related research with children has not directly compared informant competence to benevolence *per se*. Instead, it has pitted competence against characteristics that might indicate some degree of benevolence to children, such as native accent, familiarity, and group membership. Moreover, the evidence so far seems to mixed with respect to whether preschoolers weigh competence over other less relevant characteristics. For instance, when accuracy is crossed with native accent (e.g. Corriveau, Kinzler & Harris, in press) or familiarity (e.g. Corriveau & Harris, 2009; see also Corriveau, Harris, Meins, Ferneyhough, Arnott, Elliott, Liddle, Hearn, Vittorini & de Rosnay, 2009; Harris & Corriveau, 2011), children are able to defer to the accurate informant by 5 years of age. In contrast, when accuracy is crossed with group membership, 3- to 7-year-olds are unable to endorse the accurate out-group member over the inaccurate group member (Elashi & Mills, 2012). One potential explanation for the variability between these previous studies is that participants perceived the different characteristics (i.e. familiarity, accent, and group membership) to represent different degrees of benevolence and maybe even competence.

Therefore, in the current set of studies we seek to compare an indicator of competence (i.e. expertise) to a more pure indicator of benevolence (i.e. niceness/meanness) given that these are the two dimensions on which people typically draw their judgments of others (e.g. Fiske *et al*., 2007; Shafto *et al*., 2012). This comparison will help us examine our second aim for the current research – to determine whether children weigh benevolence information (i.e. descriptions of previous nice and mean behaviors) more than competence information (i.e. descriptions of expertise) when evaluating informants. For this aim we seek to determine both if children put more weight on benevolence than competence and if children are using benevolence to indicate competence.

Overview of current research

The current research investigates the relative importance of competence and benevolence in children's evaluation of sources by varying whether an informant had relevant, irrelevant, or no expertise with whether an informant was described as nice or as mean. Experiment 1 examined our first aim: to determine whether children use expertise information (i.e. eagle expertise or bicycle expertise) to choose between conflicting claims regarding related knowledge domains (e.g. birds and vehicles) and if choosing between informants' conflicting claims is more difficult than crediting them with knowledge. Although we hypothesized that children would struggle more to endorse the relevant expert's claim than to credit him with knowledge, we still anticipated that preschoolers would succeed, to some extent, at considering expertise when choosing between conflicting claims.

Experiment 2 began to examine our second aim: to determine whether children see relevant expertise or niceness/meanness as more important for choosing between conflicting claims and crediting informants with knowledge. Experiment 3 further examined our second aim by contrasting a mean expert with a nice but ignorant informant. If participants endorse claims from the nice informant, despite the fact that he is described as not knowing anything about the topic, then our results would suggest that children weigh benevolence information more than expertise when determining whom to trust.

Experiment 1

Experiment 1 examined whether children could apply their understanding of what knowledge underlies different domains of expertise to choose between conflicting claims from two different experts. To familiarize children with each expert's knowledge domain, we first established that one informant was a bicycle expert and that the other was an eagle expert, using descriptions from previous research (Lutz & Keil, 2002). Then, we provided children with conflicting claims from the experts about novel object names, either related to one of the expertise domains (i.e. bird-related objects and vehicle-related objects) or not related to either (i.e. 'neutral' objects). Children's endorsements of one expert's claim over the other showed whether they were using expertise information to endorse claims from the most relevant expert. Finally, children were presented with knowledge attribution questions for which participants were asked to credit informants with knowledge from each domain to make sure that their understanding of knowledge underlying the expertise domains was similar to previous research.

Method

Participants

Sixteen 3-year-olds (M_{age} = 3.5 years; range: 3.1–3.9 years; nine females), 16 4-year-olds (M_{age} = 4.5 years; range: 4.1–5.0 years; 13 females), and 16 5-year-olds (M_{age} = 5.6 years; range: 5.0–5.9 years; 12 females) were recruited from the greater North Dallas area and were predominately white and middle class.

Materials

Training stimuli. Two 9-second videos introduced a bicycle expert and an eagle expert. Each video showed an adult male informant saying, 'Hi, Sally told me that she found a bunch of stuff and asked me to tell her what I think each thing is named. I gave her a list of names for the things she showed me', while providing visual cues related to the informant's expertise (i.e. the eagle expert wore an eagle T-shirt; the bicycle expert wore a bicycle T-shirt). Bicycle and eagle experts were chosen because preschoolers distinguished between them in previous research (Danovitch, 2009; Lutz & Keil, 2002) and because there were no specific biases or stereotypes that might influence children's decisions (unlike a contrast between familiar experts like doctors and car mechanics). To control for actor characteristics, the same male acted as both experts, and they were introduced as twins. The introduction order of the experts was counterbalanced.

Endorsement items. These 12 items were based on the 'near category' knowledge items from the second experiment in Lutz and Keil's (2002) study examining expertise. For each domain (vehicle, bird, and neutral), we created four novel items, each performing a particular function: to count, to open and close, to warm, and to help. For instance, the novel item used 'to warm' something for the vehicle domain was 'something used to warm car seats', and the corresponding object for the bird domain was 'something used to warm chicken eggs'. For each item, experts provided conflicting names. The names for each novel item, given in pairs by the experts, were selected from pairs used in various word learning studies (e.g. Birch *et al.*, 2008; Koenig & Harris, 2005). For the novel words, we counterbalanced which one of the pair was presented first and the expert who said them (see Table 1). In addition, controlling for potential item order effects, we created two different orders on a list randomizing program on Random.org: vehicle, bird, and neutral endorsement items were listed together and randomized twice to create two item orders.

Knowledge attribution items. Eight knowledge attribution questions tested whether participants understood that eagle experts know different things from bicycle experts. For these items, children were asked to indicate which expert knows more about each item. The questions were structured similarly to prior work (i.e. Lutz & Keil, 2002) but were based on the endorsement items in the current experiment (neutral items were excluded from the knowledge attribution items). For example, the experimenter said to the participant, 'Point to the person who knows more about how to warm car seats' (see Table 2). Again, to limit any potential question order effect, we used the list randomizing program to create two different knowledge attribution item orders.

Procedure

The primary experimenter approached children whose parents provided consent and asked if they would like to come and play a game. A child's agreement to participate was taken as assent. After confirming assent, the experimenter and the confederate, 'Sally', tested participants individually. The researcher explained that Sally

Table 1 *Endorsement items and novel words*

Endorsement items	Expert 1 Response	Expert 2 Response
Vehicle items		
I found something used to warm car seats.	Blicket	Dawnoo
I found something used to open and close fire truck doors.	Cham	Roke
I found something used to help motorcycles go 'vroom'.	Mido	Loma
I found something used to count wheel pieces.	Toma	Gobi
Bird items		
I found something used to warm chicken eggs.	Koba	Modi
I found something used to open and close parrot beaks.	Snegg	Yoon
I found something used to help ducks swim.	Blurg	Yeck
I found something used to count turkey bones.	Plick	Lorg
Neutral items		
I found something used to warm cold hands.	Grimmel	Terber
I found something used to open and close cookie jars.	Gilly	Cheena
I found something used to help people dance.	Wug	Dax
I found something used to count stars in the sky.	Merval	Feppin

Note: The endorsement items as well as the novel word lists were presented in one of two orders generated on a list randomizing program at Random.org. Further, the experts were counterbalanced so that half of the participants were presented with the eagle expert's response first and the other half of participants were presented with the bicycle expert's response first.

Table 2 *Knowledge and behavior attribution items*

Knowledge Attribution Items
Vehicle items
Point to the person that knows more about how to warm car seats.
Point to the person that knows more about how fire truck doors open and close.
Point to the person that knows more about how motorcycles go.
Point to the person that knows more about how many pieces a car wheel has.
Bird items
Point to the person that knows more about how chickens lay eggs.
Point to the person that knows more about how parrots open and close their beaks.
Point to the person that knows more about how ducks swim.
Point to the person that knows more about how many bones turkeys have.
Neutral items (Experiment 3 only)
Point to the person that knows more about how to warm cold hands.
Point to the person that knows more about how to open and close cookie jars.
Point to the person that knows more about how to help people dance.
Point to the person that knows more about how to count stars in the sky.
Behavior Attribution Items
Nice behaviors
Point to the person you think hugged his neighbor.
Point to the person you think helped somebody clean her room.
Point to the person you think made silly faces to make a little girl have fun.
Point to the person you think shared his drink with a girl who didn't have one.
Mean behaviors
Point to the person you think hit his neighbor.
Point to the person you think stole somebody's lunch money.
Point to the person you think broke somebody's phone on purpose.
Point to the person you think pushed a girl to make her spill her drink.

Note: For each question group (i.e. Competence Attribution Questions and Behavior Attribution Questions), the questions were presented in one of two semi-random orders generated on a list randomizer program at Random.org. Also, for Experiments 2 and 3, after the endorsement questions, half of the participants answered the Behavior Attribution Questions before the Knowledge Attribution Questions and the other half of participants answered the Knowledge Attribution Questions first.

found a bunch of stuff she did not know the names for, but was hoping the participant could help. Sally explained that she asked twin brothers to help her name the objects, but they gave different names for the same object. Next, the participant was shown the videos described above. After each video, the experimenter presented the participant with an image of that informant and read the description of his expertise. For example, describing the eagle expert, the researcher said, 'This person knows all about eagles. He knows all about what kinds of foods eagles eat, how many babies they have, and how big they can grow.' Describing the bicycle expert, the researcher said, 'This person knows all about bicycles. He knows what they are made out of, how their brakes work, and how to fix them if they get broken.'

After both videos, the researcher reminded the participant that Sally needed help deciding who was more likely to give the accurate name for each new item. Then, the participant answered 12 endorsement items about novel item labels read by Sally. For instance, Sally said: 'I found something used to warm car seats. This guy [points to the bicycle expert] said it's a blicket, and this guy [points to the eagle expert] said it's a dawnoo.' The participant was instructed to point to the person providing the correct name. After the endorsement items, participants answered eight knowledge attribution items. With the pictures still placed in front of the participant, the experimenter said, 'Now, I'm going to ask you about what each informant *knows*. What they *know* inside their heads.' Then, the experimenter asked, for instance, 'Point to the person who you think knows how to warm car seats.' Having the participants endorse experts by pointing allowed shy or less verbal children to provide answers.

Results

Preliminary analysis

To broadly examine main effects and interactions, we first calculated the number of relevant expert preferences (i.e. pointing to the eagle expert for the four bird-related items and pointing to the bicycle expert for the four vehicle-related items) for both the eight endorsement items and the eight attribution items as our dependent variable. Then, we conducted an omnibus mixed-design ANOVA where item-type (endorsement items, attribution items) and domain (bird-related items, vehicle-related items[1]) were within-subjects variables and age (3-, 4-, 5-year-olds) was a between-subjects variable.

As predicted, we found an overall main effect of age, $F(2, 42) = 5.758$, $p = .006$, $\eta^2 = .215$. Follow-up paired-samples *t*-tests with Bonferroni correction revealed that 5-year-olds preferred the relevant expert more often than 3-year-olds (5-year-olds: $M = 3.35$ of 4, $SD = .45$, 95% CI [2.99, 3.72]; 3-year-olds: $M = 2.55$ of 4, $SD = .57$, 95% CI [2.23, 2.86]), $p = .005$. Four-year-olds, in contrast, did not vary significantly from the other age groups (4-year-olds: $M = 2.95$ of 4, $SD = .76$, 95% CI [2.55, 3.36]), both *p*s > .300.

In addition, we found a main effect of item-type, $F(1, 42) = 30.348$, $p < .001$, $\eta^2 = .419$, wherein participants had fewer relevant expert claim endorsements ($M = 2.62$ of 4, $SD = 0.82$, 95% CI [2.36, 2.88]) than relevant expert knowledge attributions ($M = 3.28$ of 4, $SD = .82$, 95% CI [3.06, 3.51]). We follow up on these significant results below; however, as no main effect was found for domain (bird items, vehicle items; $p = .806$), further analyses are collapsed across this variable. Thus, for the remaining analyses our dependent variable is the total number of relevant expert preferences (i.e. of eight: four bird-related items plus four vehicle-related items) for the endorsement and attribution items, separately.

Endorsement items

Following up on the main effect of age and to test whether children endorsed the claim of the relevant expert in his domain of expertise more than chance, we conducted single-sample *t*-tests comparing the number of endorsements for the relevant expert to chance (four of eight endorsements), separately for each age group. We found that 3-year-olds did not endorse the relevant expert more than chance, whereas 4- and 5-year-olds did (3-year-olds: $M = 4.56$ of 8, $SD = 1.32$, 95% CI [3.78, 5.34], $t(15) = 1.71$, $p = .108$; 4-year-olds: $M = 5.19$ of 8, $SD = 1.80$, 95% CI [4.41, 5.97], $t(15) = 2.59$, $p = .020$; 5-year-olds: $M = 6.13$ of 8, $SD = 1.46$, 95% CI [5.34, 6.91], $t(15) = 5.84$, $p < .001$). (See Figure 1.)

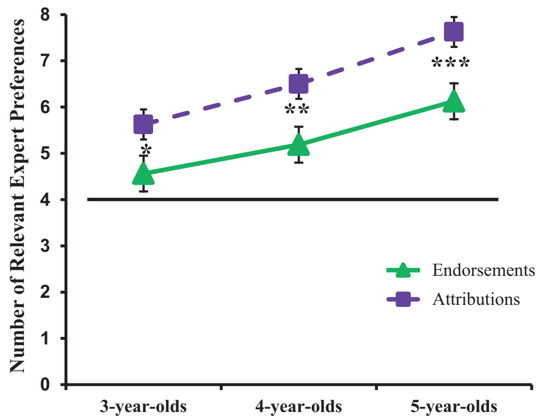

Figure 1 Mean values representing the endorsement of the relevant expert for each age group for endorsement items and knowledge attribution items in Experiment 1. All mean values (with the exception of 3-year-olds' endorsement items, $p = .11$) are above chance level. Standard errors are represented in the figure by the error bars. Significance for the differences between endorsements and attributions for each age group are displayed. * $p < .05$; ** $p < .01$; *** $p < .001$.

Further, to determine whether children displayed bias towards one expert (eagle or bicycle) when endorsing claims about the neutral items, we conducted a single-sample *t*-test.[2] To do this, we calculated the number of times one expert (e.g. the bicycle expert) was endorsed (of four) as the dependent variable and compared that number to chance (two). We found no preference for either expert in the neutral domain ($M = 1.90$ of 4, $SD = 1.21$, 95% CI [1.55, 2.25]), $t(47) = .60$, $p = .553$.

Attribution items

Continuing to follow up on the main effect of age and to test whether children attributed knowledge to the relevant expert in his domain of expertise more than chance, we conducted single-sample *t*-tests comparing the number of attributions for the relevant expert to chance (four of eight attributions), separately for each age. We found that all ages attributed knowledge to the relevant expert above chance: 3-year-olds ($M = 5.63$ of 8; $SD = 1.46$, 95% CI [4.97, 6.28]; $t(15) = 4.468$, $p < .001$), 4-year-olds ($M = 6.50$ of 8, $SD = 1.59$, 95% CI [5.85, 7.15]; $t(15)$

[1] Note that as neutral items did not have a relevant expert, they were left out of this analysis.

[2] A preliminary univariate ANOVA revealed no differences in endorsements for neutral items based upon age (i.e. no main effect of age), $F(2, 45) = 0.263$, $p = .770$. Thus, this single-sample *t*-test is collapsed across age.

= 6.283, $p < .001$); and 5-year-olds ($M = 7.63$ of 8, $SD = 0.62$, 95% CI [6.97, 8.28]; $t(15) = 23.420$, $p < .001$). See Figure 1.

Discussion

The first aim for our study was to determine whether children use expertise to choose between conflicting claims and whether children have more difficulty choosing between conflicting claims than attributing knowledge to informants. Consistent with our predictions, Experiment 1 demonstrated that 4- and 5-year-olds endorsed the relevant expert's claim when the two experts provided conflicting information and attributed knowledge to the relevant experts. That said, 3-year-olds seemed unable to endorse the claim of the most relevant expert even though they attributed knowledge to him.

Also consistent with our predictions, all age groups struggled more to endorse the relevant expert's claim than to attribute knowledge to him. It is also important to note that although 4- and 5-year-olds performed better than chance, overall their accuracy was modest. Four- and 5-year-olds were accurate for only 65% and 77% of the endorsement items compared to 81% and 95% accuracy for the attribution items (mirroring prior work; i.e. about 80% for 4-year-olds and about 92% for 5-year-olds; Lutz & Keil, 2002).

Despite differences in the preschoolers' abilities to endorse claims versus attribute knowledge to informants, 4- and 5-year-olds did endorse the claim of the most relevant expert above chance levels, demonstrating that they can use expertise as an indicator of whom to trust. Yet, it is unclear whether this modest preference for the relevant expert's claims would hold when children are also provided with indicators of benevolence. This may be particularly difficult because adding benevolence information might strengthen biases in favor of the nice informant and in opposition to the mean one, making it harder for children to focus on who has the most relevant knowledge.

Experiment 2

In Experiment 2, we crossed niceness/meanness information with expertise information to begin to examine our second aim: if children weigh benevolence more than expertise when choosing between conflicting claims. The design of Experiment 2 was similar to Experiment 1 except that children were also informed about each expert's niceness/meanness and asked additional questions requiring them to attribute nice and mean behaviors to the informants. Thus, we were able to examine how niceness/meanness information influenced both children's endorsements of the experts' claims and their attributions of knowledge to the informants.

Method

Participants

Participants were 20 3-year-olds (M_{age}= 3.7 years; range: 3.1–3.9; six females), 23 4-year-olds (M_{age} = 4.6 years; range: 4.1–4.9; 12 females) and 24 5-year-olds (M_{age} = 5.3 years; range: 5.0–5.7; 10 females). The sample was recruited from the North Dallas area and was predominately white and middle class.

Materials

Training stimuli. Similar videos to those used in Experiment 1 were used, except that children were also provided with visual and auditory cues to each informant's niceness or meanness (e.g. the nice informant smiled and spoke with a happy voice, and the mean informant had crossed arms and spoke with a grumpy voice). Informant niceness or meanness and expertise (bicycle or eagle) were counterbalanced between participants: the bicycle expert was the nice informant for one condition and the eagle expert was the nice informant for the other.

Endorsement items. The same 12 endorsement items from Experiment 1 were used (see Table 1).

Knowledge attribution items. The same eight knowledge attribution items from Experiment 1 were used (see Table 2).

Behavior attribution items. Eight additional items were used to test whether the children differentiated between the nice and mean informants. These items required children to choose which informant likely engaged in a series of behaviors: four nice (e.g. 'point to the person who you think hugged his neighbor') and four mean (e.g. 'point to the person who you think hit his neighbor'; see Table 2). The behaviors used received the most extreme ratings from 19 adults on a 7-point Likert scale of niceness versus meanness.

Procedure

Similar to Experiment 1, children were introduced to the problem of determining object names and were told that the twins provided conflicting answers. As in Experiment 1, children were presented with expertise information. However, children were also provided with information about each informant's niceness or meanness. Describing the nice informant, the researcher said, 'This person is very nice. He shares things, he gives presents to his friends and family, and he really cares about other people's feelings.' Describing the mean informant, the researcher said, 'This person is very mean. He refuses to share things, he steals presents from his friends and family, and he does not care at all about other people's feelings.' Then, participants answered the 12 endorsement items followed by the eight knowledge attribution items from Experiment 1. Finally, participants answered the eight behavior attribution items.

Results

Niceness/meanness differentiation

To examine potential differences in the ability to recognize that the nice informant was likely to exhibit nice behaviors and the mean informant was likely to exhibit mean behaviors, we conducted a mixed-design ANOVA. No significant main effects or interactions of behavior type (nice vs. mean) or age group were found; thus, the following analysis is collapsed across these variables so that the dependent variable is the total number of appropriate behavior attributions (i.e. of eight: four nice behaviors plus four mean behaviors).

To determine whether participants correctly attributed nice and mean behaviors to the informants, we conducted a single-sample t-test comparing the number of correct behavior attributions to chance (four of eight attributions). We found that participants correctly attributed behaviors to the informants above chance (M = 7.27 of 8, SD = 1.18, 95% CI [6.97, 7.54]), $t(66) = 22.765$, $p < .001$.

Endorsement for neutral items

To determine whether children preferred the nice informant for the items in which relevant expertise was not clear (i.e. neutral items), we calculated the number of times participants endorsed the nice informant's claim for the four neutral items (as the dependent variable) and conducted a single-sample t-test comparing this number to chance (two of four endorsements). Although children in Experiment 1 did not demonstrate a preference for either expert's claim for neutral items, we found that children in Experiment 2 preferred to endorse the nice informant's claim (M = 2.94 of 4, SD = 1.15, 95% CI [2.66, 3.22]), $t(66) = 6.68$, $p < .001$.

Other preliminary analyses

To broadly examine potential main effects and interactions for the endorsement items and the attribution items, we first calculated the number of relevant expert preferences (i.e. the number of times preschoolers chose the relevant expert, regardless of niceness or meanness) for the endorsement and the attribution items as our dependent variable. Then, we conducted an omnibus mixed-design ANOVA where item-type (endorsement items, attribution items) and domain (bird-related items, vehicle-related items) were our within-subjects variables and age (3-, 4-, 5-year-olds) and condition (nice bicycle expert/mean eagle expert, nice eagle expert/mean bicycle expert) were our between-subjects variables.

In contrast with our predictions (and Experiment 1 findings), we found no overall main effect of age, $F(2, 61) = 1.421$, $p = .249$, $\eta^2 = .045$. However, consistent with our predictions, we found the main effects and interactions described below. Besides these, no other main effects or interactions were found.

First, we found a main effect of item-type where children struggled more to endorse the relevant expert's claims (i.e. endorsement items, $M = 2.31$ of 4, $SD = 0.73$) than to attribute knowledge to him (i.e. attribution items, $M = 2.70$ of 4, $SD = 0.86$), $F(1, 55) = 15.596$, $p < .001$, $\eta^2 = .221$.

Moreover, there was an interaction effect of item-type by age, $F(2, 55) = 4.26$, $p = .019$, $\eta^2 = .134$. Follow-up tests with Bonferroni correction were conducted, where the dependent variable was the total number of expert preferences of eight (four eagle items plus four vehicle items), revealing age differences for the attribution items, where 5-year-olds (M = 6.04 of 8, SD = 1.65, 95% CI [5.39, 6.74]) more often attributed knowledge to the relevant expert than 3-year-olds (M = 4.65 of 8, SD = 1.53, 95% CI [3.93, 5.37), $p = .022$. However, age differences were not found for endorsement items. (See Figure 2.)

Also consistent with our predictions, there was an interaction effect of condition by domain such that children preferred the relevant expert for a domain more when he was described as nice than mean, $F(1, 61) = 46.493$, $p < .001$, $\eta^2 = .433$. For more detail, see Figure 3.

Interestingly, a three-way interaction between item-type, condition, and domain suggests that the difference between the endorsement and attribution items (main effect of item-type) is modified by the condition by domain interaction. In other words, the difference between children's relevant expert endorsements and knowledge attributions varied depending on which expert was relevant (i.e. domain) and which one was nice/mean (i.e. condition), $F(1, 61) = 10.790$, $p = .002$, $\eta^2 = .150$ (see Figure 3). Follow-up paired-samples t-tests showed that for Condition 1 (nice bicycle expert versus mean eagle expert), there was no significant difference between how often children endorsed the nice bicycle expert's claims about vehicles (M = 3.36,

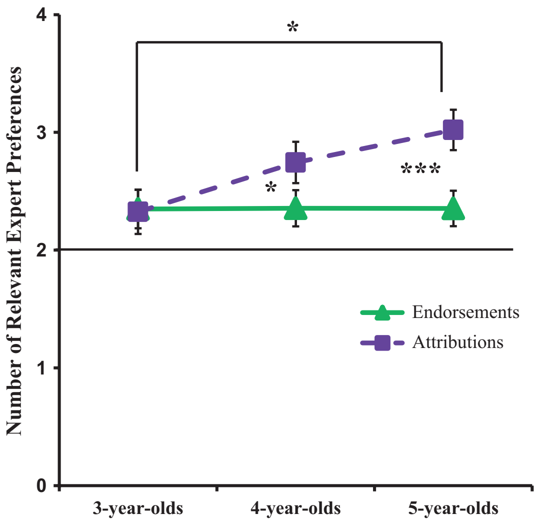

Figure 2 Mean values representing the preference for the relevant expert in each age group for endorsement items and knowledge attribution items in Experiment 2. All mean values are above chance level. Standard errors are represented in the figure by the error bars. Significance for the differences between endorsements and attributions are displayed as well as the developmental difference between 3- and 5-year-olds for attribution items. * p < *.05.* **p < *.01.* ***p < *.001.*

SD = 0.78) and how often they attributed vehicle knowledge to him (M = 3.30, SD = 0.88), $t(32)$ = .494, p = .625. However, there was a significant difference between how often children endorsed the mean eagle expert's claims about birds (M = 1.67, SD = 1.47) versus how often they attributed bird knowledge to him (M = 2.18, SD = 1.40), $t(32)$ = 2.707, p = .011. For Condition 2 (nice eagle expert versus mean bicycle expert), there was no significant difference between children's abilities to endorse the nice eagle expert's claims about birds (M = 2.97, SD = 1.03) and to attribute bird knowledge to him (M = 3.25, SD = 0.96), $t(33)$ = 1.664, p = .106. However, there was a difference between children's abilities to endorse the mean bicycle expert's claims about vehicles (M = 1.41, SD = 1.16) versus the ability to attribute vehicle knowledge to him (M = 2.12, SD = 1.45), $t(33)$ = 3.522, p = .001. Thus, it appears that children's endorsements for the relevant expert when he was mean suffered more than their attributions of knowledge to him. We examine the extent to which niceness/meanness affects claim endorsements and knowledge attributions in more detail below.

Endorsement items

To examine whether children preferred to endorse the relevant expert's claim, we conducted two analyses.

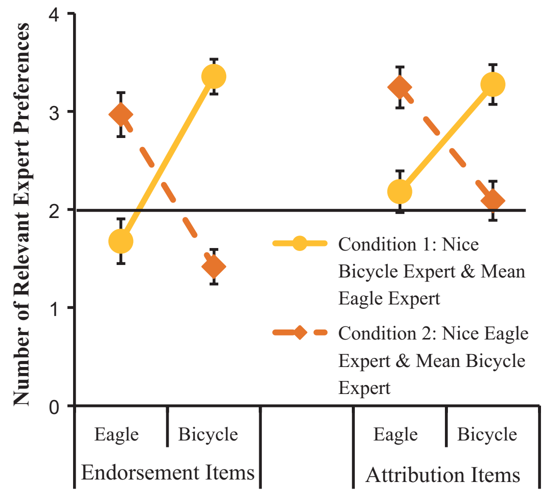

Figure 3 Item-type by condition by domain interaction: mean values representing the preferences for each expert in the two conditions from Experiment 2 for the two item-types (endorsement items and attribution items). Note that, for Condition 1, the nice bicycle expert was selected more often for his relevant items (i.e. vehicle items) than the mean eagle expert was selected for his relevant items (i.e. bird items), $t(32)$ = 5.050, p < .001. For Condition 2, the nice eagle expert was selected more often for his items (i.e. bird items) than the mean bicycle expert was selected for his items (i.e. vehicle items), $t(33)$ = 4.908, p < .001. Standard errors are represented in the figure by the error bars.

First, to determine whether participants endorsed the relevant expert's claim above chance levels, despite niceness or meanness information, we compared the total number of times the relevant expert was selected (of eight possible) as the dependent variable and compared that to chance (four). We found that children endorsed the relevant expert's claim above what could be accounted for by chance (M = 4.70 of 8, SD = 1.457, 95% CI [4.34, 5.06]), $t(66)$ = 3.942, p < .001.

Second, to determine how much niceness/meanness information may have impacted whether an expert's claim was endorsed, we measured the number of relevant expert claim endorsements for when he was nice (of four) and then the number of relevant expert claim endorsements for when he was mean (of four) as our dependent variables and compared them each to chance (two) using a single-sample t-test. Also, as there was no main effect of age for endorsement items, we collapsed across that variable. We found that participants endorsed the nice informant when he had relevant expertise above chance levels (M = 3.16 of 4, SD = .93, 95% CIs [2.94, 3.39]), $t(66)$ = 10.237, p < .001. However, participants endorsed the mean informant when he had relevant expertise below chance levels (M = 1.54 of 4, SD = 1.32, 95% CIs

[1.24, 1.85]), $t(66) = 2.873$, $p = .005$, instead preferring the nice irrelevant expert. These results suggest that when information on both expertise and niceness/meanness is available, children will endorse the relevant expert when he is nice, but not when he is mean.

Attribution items

Although we expected an expert's niceness/meanness to affect whether children endorsed his claim, we were unsure whether it would affect whether children thought he had knowledge. After all, although niceness/meanness may be relevant to whether information from an informant should be trusted, those characteristics should not affect whether an informant has accurate knowledge. Therefore, to determine how much niceness/meanness may have impacted children's knowledge attributions, we conducted a similar series of single-sample *t*-tests as for the endorsement items, first comparing the number of appropriate knowledge attributions for the relevant expert despite niceness/meanness information and then comparing appropriate knowledge attributions for the relevant expert when he was nice and when he was mean. Moreover, as there were significant age differences for knowledge attribution items, the *t*-tests are conducted for each age group separately.

First, to determine whether participants appropriately attributed knowledge to the relevant expert above chance levels, despite niceness/meanness information, we compared the total number of times children in each age group appropriately attributed knowledge to the relevant expert (of eight) as the dependent variable and compared that to chance (four). We found that 4-year-olds ($M = 5.48$ of 8, $SD = 1.76$, 95% CI [4.79, 6.17]) and 5-year-olds ($M = 6.04$ of 8, $SD = 1.65$, 95% CI [5.37, 6.72]) attributed knowledge to the relevant expert more than chance (both *t*s >4.0, both *p*s < .001), but 3-year-olds merely trended towards preferring to attribute knowledge to him ($M = 4.65$ of 8, $SD = 1.53$, 95% CI [3.91, 5.39]), $t(19) = 1.898$, $p = .073$.

Second, to determine how much the niceness/meanness information may have affected whether children appropriately attributed knowledge to the relevant expert, following up on the domain by condition interaction, we measured the number of knowledge attributions for when the relevant expert was nice (of four) and when he was mean (of four) as our dependent variables and compared them each to chance (two) using single-sample *t*-tests.

From the *t*-tests, we found that when the informant was nice, each age group attributed knowledge relevant to his expertise to him above chance: 3-year-olds ($M = 2.70$ of 4, $SD = 1.08$, 95% CI [2.25, 3.15]), $t(19) = 2.896$, $p = .009$; 4-year-olds ($M = 3.39$ of 4, $SD = .89$, 95% CI [3.04, 3.73]) $t(22) = 7.486$, $p < .001$; 5-year-olds ($M = 3.63$ of 4, $SD = 0.58$, 95% CI [3.38, 3.83]) $t(23) = 13.826$, $p < .001$. On the other hand, when the informant was mean, each age group attributed knowledge relevant to his expertise to him at chance levels: 3-year-olds ($M = 1.95$ of 4, $SD = 1.20$, 95% CI [1.45, 2.45]), $t(19) = 0.188$, $p = .853$; 4-year-olds ($M = 2.09$ of 4, $SD = 1.54$, 95% CI [1.48, 2.70]), $t(22) = 0.272$, $p = .788$; 5-year-olds: ($M = 2.42$ of 4, $SD = 1.50$, 95% CI [1.83, 3.00]), $t(23) = 1.360$, $p = .187$. Thus, niceness/meanness information also affected whether children perceived informants to have knowledge relevant to their expertise.

Strength of niceness with expertise

As the above analyses support that niceness/meanness information affects how children (1) endorse expert claims and (2) attribute knowledge to experts, it is important to determine whether children were using *only* niceness/meanness information or both niceness/meanness and relevant/irrelevant expertise information to choose informants. Thus, we conducted two sets of paired-samples *t*-tests: (1) endorsement items: comparing the number of endorsements for the nice informant with relevant expertise (i.e. nice relevant expert) to the number of endorsements for the nice informant with *irrelevant* expertise (i.e. nice irrelevant expert), and (2) knowledge attribution items: comparing the number of knowledge attributions for the nice relevant expert to the number of knowledge attributions for the nice irrelevant expert. The absence of a significant difference between the two would indicate an overall preference for a nice informant, regardless of relevant expertise. In contrast, a preference for the nice informant when he had relevant expertise would indicate that children prefer someone who is both nice and who has relevant expertise.

For the endorsement items, we found that there was indeed a significant difference, in which children preferred the nice relevant expert ($M = 3.16$ of 4, $SD = .93$, 95% CI [2.94, 3.39]) more than they preferred the nice irrelevant expert ($M = 2.46$ of 4, $SD = 1.32$, 95% CI [2.14, 2.78]), $t(66) = 3.942$, $p < .001$. Thus, children's endorsement decisions seemed to be influenced by both niceness/meanness and relevant/irrelevant expertise.

For the knowledge attribution items, we conducted the analysis by age group as there was a main effect of age for attribution items. Both 4-year-olds and 5-year-olds attributed more knowledge to the nice relevant expert than they attributed to the nice irrelevant one (4-year-olds: nice relevant, $M = 3.39$ of 4, $SD = 0.89$, 95% CI [3.01, 3.78]; nice irrelevant, $M = 1.91$ of 4, $SD = 1.53$;

$t(22) = 4.04$, $p = .001$, 95% CI [1.25, 2.58]; 5-year-olds: nice relevant, $M = 3.63$ of 4, $SD = 0.58$, 95% CI [3.38, 3.87]; nice irrelevant, $M = 1.58$ of 4, $SD = 1.50$, 95% CI [0.95, 2.22]; $t(23) = 6.045$, $p < .001$). Three-year-olds trended in the same direction attributing more knowledge to the nice relevant expert ($M = 2.70$ of 4, $SD = 1.08$, 95% CI [2.19, 3.21]) than the nice irrelevant expert ($M = 2.05$ of 4, $SD = 1.19$, 95% CI [1.49, 2.61]), $t(19) = 1.898$, $p = .073$. Thus, children's knowledge attributions also seemed to be influenced by both niceness/meanness and relevant/irrelevant expertise.

Discussion

Results from Experiment 2 began to provide answers to the questions we set out to explore with our second research aim; we found several pieces of converging evidence that preschoolers weigh benevolence information (i.e. niceness/meanness) more than competence information (i.e. relevant/irrelevant expertise) when choosing between conflicting claims. Specifically, Experiment 2 showed that preschoolers endorsed 70% of the nice informant's claims in general (i.e. for both bird and vehicle items), although this preference for the nice informant was higher when he had relevant expertise (i.e. 79%) and lower when he had *irrelevant* expertise (i.e. 62%). Therefore, it is likely that children did take expertise into account when choosing between conflicting claims; however, they only preferred an expert's claims more than chance when he was also nice. This result suggests that children of all ages seemed powerfully influenced by benevolence information when choosing between informant claims.

In addition, despite expectations, benevolence information influenced children's evaluations of what each informant knows: they attributed knowledge to the relevant expert when he was nice, but they were at chance when he was mean. This differed from Experiment 1; when given no benevolence information, children in all age groups attributed knowledge to the relevant expert above chance. That said, it is important to note that although older children were just as strongly influenced by niceness/meanness information as younger children for endorsement items (i.e. no main effect of age), 5-year-olds were better than 3-year-olds at attributing knowledge to the most relevant expert, demonstrating that some developmental changes are occurring (see Figure 2).

Although the current experiment provides evidence that niceness/meanness information is more influential than expertise information for children's endorsements and knowledge attributions, the study design may have biased children to focus less on expertise than on niceness/meanness. Specifically, although we introduced one expert as having eagle expertise and the other has having bicycle expertise, we never clarified that the eagle expert *lacked* bicycle knowledge or that the bicycle expert lacked eagle knowledge. Thus, children may have preferred the nice irrelevant expert because they assumed he had global knowledge, including that of the opposing domain (i.e. a 'halo effect'; e.g. Boseovski, 2010). We address this concern in Experiment 3 by comparing a mean expert to a nice non-expert.

Experiment 3

In Experiment 3, we introduced children to an informant who is always mean but has expertise (knows all about eagles) and one who is always nice but has no expertise (knows nothing about eagles) to further examine our second aim: do children weigh benevolence more than expertise when choosing between conflicting claims and crediting informants with knowledge? If children still prefer to endorse the nice informant when he is described as knowing nothing about a topic, then the evidence that benevolence matters more to children than expertise becomes much more compelling.

Method

Participants

Participants were 16 3-year-olds ($M = 3.68$ years; range: 3.13–3.98; seven females), 16 4-year-olds ($M = 4.35$ years; range: 4.07–4.98; nine females) and 17 5-year-olds ($M = 5.32$ years; range: 5.02–5.73; nine females). The sample was recruited from the North Dallas area and was predominantly white and middle class.

Materials

Training stimuli. Similar to the previous experiments, two videos provided cues related to the informants' expertise (e.g. the eagle expert wore an eagle T-shirt; the non-expert wore a plain white T-shirt) and benevolence (i.e. the nice informant smiled and spoke with a happy voice; the mean informant had crossed arms and spoke with a grumpy voice).

Endorsement items. The same four items regarding the knowledge bases of an eagle expert (i.e. bird-related items) from Experiment 1 were used (see Table 1). However, as we removed the second expertise (i.e. the bicycle expert), we excluded the vehicle-related items.

Thus, only the four bird-related items and four neutral items were used.

Knowledge attribution items. The four knowledge attribution questions from Experiment 1 were used to test participants' understanding that eagle experts have specialized knowledge. In addition, we included four new neutral items (see Table 2).

Behavior attribution items. The same eight benevolence questions from Experiment 2 were used to test whether the children differentiated between the nice and mean informants (see Table 2).

Procedure

The procedure for Experiment 3 was similar to Experiments 1 and 2: children were introduced to the problem of determining the names of objects and were told that the twins provided conflicting names. As in Experiments 1 and 2, children were presented with expertise information. However, for Experiment 3, children were introduced to an informant described as an eagle expert and an informant described as knowing nothing about eagles (i.e. 'This person knows nothing about eagles. He has no idea what they eat, he doesn't know how many babies they can have, and he doesn't even know how big they can grow! He knows nothing about eagles!'). Further, the researcher read the same descriptions of informant niceness or meanness used for Experiment 2. The participants were presented with the bird-related and neutral items from Experiments 1 and 2 (see Table 1) followed by the eight knowledge attributions items and the eight behavior attribution items.

Results

Niceness/meanness differentiation

To examine potential developmental differences in the ability to recognize that the nice informant was likely to exhibit nice behaviors and the mean informant was likely to exhibit mean behaviors, we totaled the number of appropriate behavior attributions (of four nice behaviors and four mean behaviors) as the dependent variable and conducted a mixed-design ANOVA where behavior type (nice behaviors, mean behaviors) was our within-subjects variable and age (3-year-olds, 4-year-olds, and 5-year-olds) was our between-subjects variable. We found a main effect of age in attributing nice and mean behaviors to the informants, $F(2, 46) = 8.175$, $p = .011$, $\eta^2 = .177$. Follow-up paired-samples t-tests with Bonferroni correction revealed that 5-year-olds ($M = 3.79$ of 4, $SD = 0.40$, 95% CI [3.35, 4.25]) attributed more behaviors accurately than 3-year-olds ($M = 2.84$ of 4, $SD = 1.19$, 95% CI [2.39, 3.30]), $p = .020$. Also, there was a trend towards 4-year-olds ($M = 3.59$ of 4, $SD = 0.97$, 95% CI [3.14, 4.05]) attributing more behaviors accurately than 3-year-olds, $p = .065$. However, there was no significant difference between 4- and 5-year-olds, $p = .962$. No other main effects or interactions were found; thus, the following analysis is collapsed so that the dependent variable is the total number of appropriate behavior attributions (i.e. of eight: four nice behaviors plus four mean behaviors).

Finally, to see if children accurately attributed behaviors above chance (four of eight), we conducted single-sample t-tests for each age group. We found that each age group correctly attributed the behaviors above chance: 3-year-olds ($M = 5.69$, $SD = 2.39$, 95% CI [4.77, 6.60]), $t(15) = 2.83$, $p = .013$; 4-year-olds ($M = 7.19$, $SD = 1.94$, 95% CI [6.27, 8.10]), $t(15) = 6.57$, $p < .001$; and 5-year-olds ($M = 7.59$, $SD = 1.94$, 95% CI [6.70, 8.48]), $t(16) = 18.61$, $p < .001$.

Other preliminary analyses

Next, we conducted a preliminary analysis for the endorsement items and the knowledge attribution items to examine potential main effects and interactions. For each child, we calculated the number of preferences for the mean eagle expert for the four endorsement and the four attribution items as our dependent variable. Then, we conducted a mixed-design ANOVA where age was our between-subjects variable and item-type was our within-subjects variable. As in Experiment 2, we found that there was no main effect of age (no developmental differences) in the participants' preference for the mean eagle expert between 3-, 4-, and 5-year-olds, $F(2, 46) = 0.138$, $p = .872$, $\eta^2 = .006$. Thus, further analysis will be collapsed across age group. However, see Figure 4 and footnotes for some results by age group. In addition, consistent with Experiments 1 and 2, we found a main effect of item-type, showing that participants' preferences for the mean eagle expert varied between the endorsement and attribution items, $F(1, 46) = 4.105$, $p = .049$, $\eta^2 = .087$. No other main effects or interactions were found.

Endorsement items

To determine whether preschoolers endorsed the mean eagle expert's claim above chance, we conducted a single-sample t-test comparing the number of mean eagle endorsements for the bird-related items ($M = 1.49$ of 4, $SD = 1.29$, 95% CI [1.12, 1.86]) to chance (two of four

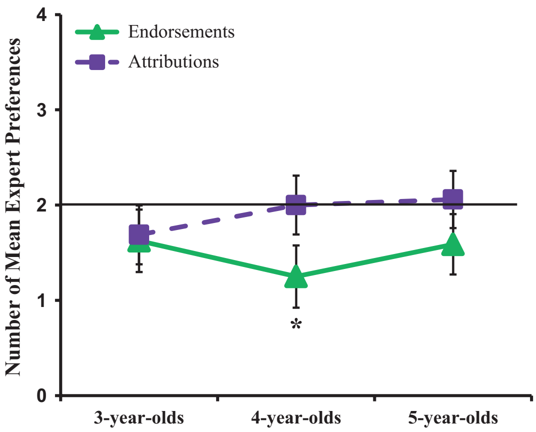

Figure 4 Mean values representing the preference for the mean expert for each age group for endorsement items and knowledge attribution items in Experiment 3. Standard errors are represented in the figure by the error bars. Note that only the 4-year-olds' endorsement items were different from chance. * p *< .05; ***p *< .01; ****p *< .001.*

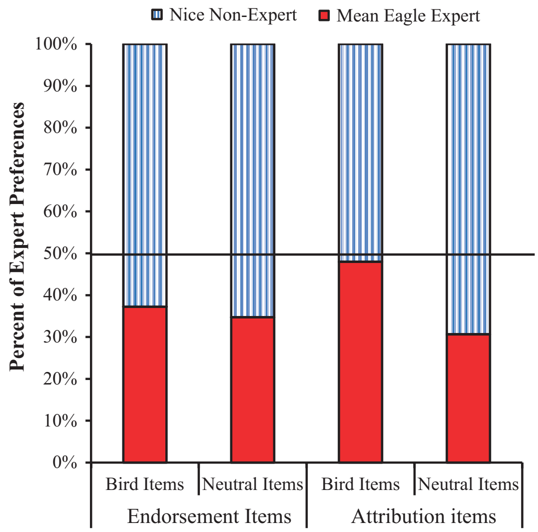

Figure 5 Mean values representing the percent of endorsement and knoweldge attribution for each expert (the mean eagle expert and the nice non-expert) for the bird items and neutral items in Experiment 3.

endorsements). We found that children endorsed the mean eagle expert's claim for the bird-related items fewer times than could be accounted for by chance, thus demonstrating a preference, instead, for the nice non-expert, $t(48) = 2.762$, $p = .008$.[3]

Then, to determine whether preschoolers preferred to endorse the mean expert's claim for the items for which expertise was not clear (i.e. the neutral items) above chance, we conducted a single-sample t-test comparing the number of endorsements for the mean eagle expert's claim regarding neutral items ($M = 1.39$ of 4, $SD = 1.17$, 95% CI [1.06, 1.71]) to chance (two of four endorsements). Like the bird-related items, we found that children endorsed the mean eagle expert's claim for the neutral items fewer times than could be accounted for by chance, thus demonstrating a preference, instead, for the nice non-expert, $t(48) = 3.665$, $p = .001$.[4]

Finally, to determine whether children endorsed the informants' claims for bird-related items and neutral items differently, we conducted a paired-samples t-test. We found that there was no significant difference between children's endorsements for the claims about bird-related items versus neutral items, $t(48) = 0.475$, $p = .637$. Thus, it seems to be the case that the relevance of the eagle expert's expertise had no effect on whether his claim was endorsed (see Figure 5).

Attribution items

To determine whether preschoolers attributed bird-related knowledge to the mean eagle expert (over the nice non-expert), we conducted single-sample t-tests comparing the number of bird-related knowledge attributions to the mean eagle expert ($M = 1.92$ of 4, $SD = 1.22$, 95% CI [1.59, 2.27]) to chance (two of four attributions). We found that children did not attribute knowledge to the mean eagle expert differently from chance, $t(48) = 0.468$, $p = .642$.[5] Thus, preschoolers did not prefer to attribute the bird-related knowledge to either informant (mean expert or nice non-expert).

Then, to determine whether preschoolers attributed knowledge regarding the neutral items to the mean eagle expert (i.e. items unrelated to birds), we conducted a single-sample t-test comparing the number of knowledge attributions for the neutral items ($M = 1.22$ of 4, $SD = 1.06$, 95% CI [0.94, 1.53]) to chance (two of four endorsements). We found that children attributed knowledge regarding the neutral items to the mean eagle expert below chance, thus demonstrating a preference for attributing this knowledge, instead, to the nice non-expert, $t(48) = 5.093$, $p < .001$.[6]

[3] When broken down by age, only 4-year-olds differed from chance ($p = .048$), whereas 3- and 5-year-olds were at chance (both $ps > .160$).
[4] When broken down by age, only 4-year-olds differed from chance ($p = .005$), whereas 3- and 5-year-olds were at chance (both $ps > .130$).
[5] This result is consistent when broken down by age group (all $ps > .230$).
[6] When broken down by age, only 5-year-olds differ from chance ($p < .001$), whereas 3- and 4-year-olds trended towards significance (3s: $p = .072$, 4s: $p = .060$).

Finally, to determine whether children attributed knowledge regarding bird-related items differently from knowledge regarding neutral items, we conducted a paired-samples *t*-test comparing the number of bird knowledge attributions (of four) to the number of neutral knowledge attributions (of four) for the mean eagle expert. We found that there was a significant difference between children's knowledge attributions regarding bird-related items and neutral items, $t(48) = 3.067$, $p = .004$. (See Figure 5.)

Discussion

In Experiment 3, we paired a mean eagle expert with a nice non-expert to examine the strength of children's reliance on niceness/meanness information over expertise. Overall, our findings in Experiment 3 closely parallel those of Experiment 2, demonstrating that niceness/meanness information plays an important role both in how children choose between informant claims and in how children attribute knowledge to informants. Importantly, though, the Experiment 3 findings strengthen those of Experiment 2 by showing that children continue to be swayed by niceness when choosing between conflicting claims and attributing knowledge even when they are explicitly told that the nice person lacks relevant expertise.

So, were children attending to expertise at all? Unlike Experiment 2, for claim endorsements, children did not clearly distinguish between situations when the expertise information was relevant and when it was not (e.g. trusting 62% of the nice informant's claims for items clearly relevant to the mean informant's expertise versus 65% of the nice informant's claims about neutral items). In contrast, for knowledge attributions, children attended to expertise at least somewhat: they were more willing to say that a mean eagle expert knew about his own domain than about another. However, this result is mitigated by the fact that children did not attribute knowledge to him more than chance. Thus, the bottom line is that children trusted the nice informant despite his lack of expertise – endorsing more of his claims and attributing more knowledge to him than the mean expert. In sum, Experiment 3 provides additional support that children are more powerfully influenced by niceness/meanness information than expertise.

General discussion

To choose between conflicting claims, people often need to consider whether the available informants are capable of (i.e. competent) and intending to (i.e. benevolent) provide accurate information (e.g. Shafto *et al*., 2012). To make this determination, adults and children may rely on characteristics indicating informant competence and benevolence such as expertise and niceness/meanness information. The current research examines how children weigh these two types of information when determining whom to trust.

Our first research aim was to determine whether children would use descriptions of expertise to choose between conflicting claims and attribute knowledge to the relevant expert. Experiment 1 addressed this aim, finding developmental improvements in preschoolers' abilities to use expertise as a cue for determining which of two conflicting claims is most likely accurate and attribute knowledge to the most relevant experts. Notably, 4- and 5-year-olds in Experiment 1 were able to use expertise as a cue for choosing between claims, but 3-year-olds were not. However, all age groups in this experiment were able to attribute knowledge to the most relevant experts.

Our second research aim was to determine whether children weighed benevolence information (e.g. niceness/meanness) more than competence information (e.g. expertise) when evaluating informants. Not surprisingly, when no relevant expertise was available (i.e. neutral items), children preferred claims from nice informants. Importantly, though, even when expertise information was available, children seemed strongly influenced by benevolence. In Experiment 2, children preferred the relevant expert's claim when he was nice and often chose the *irrelevant* expert's claim when the relevant expert was mean. In Experiment 3, even when children were explicitly told that the nice person lacked expertise, preschoolers still preferred to endorse his claims over the expert who happened to be mean.

Furthermore, although we expected children to have difficulty endorsing the claim of the most relevant expert for Experiments 2 and 3, we did not expect that this would extend to using relevant expertise to attribute knowledge to informants as (1) children were able to do so in Experiment 1 and (2) niceness/meanness information, theoretically, should not affect what a person knows even if it may affect whether a person is trustworthy. Yet, we found that children in Experiment 3 did not attribute relevant knowledge to the mean eagle expert above chance. It is important to reiterate, however, that children were paying attention to expertise somewhat, even if they were not weighing it more heavily than the benevolence information.

So why do preschoolers seem to weigh benevolence information more than competence information when endorsing claims and attributing knowledge? There are at least four potential explanations. One is that children understandably used benevolence as a cue for *trustworthiness* for endorsement items: children may have rejected the mean informant thinking he would be deceptive (e.g. see Vanderbilt *et al*., 2011). If that were the reason, we might expect that when asked who knows a fact (i.e. knowledge attribution questions), children would recognize that the mean informant could still have relevant knowledge, even if he might not share it. However, in Experiments 2 and 3, this was not the case; children struggled to credit a mean expert with knowledge in his domain of expertise. It is important to note, however, that these questions were forced choice; thus, it is possible that they thought the mean informant had some knowledge in his domain but the nice informant had more. To better understand how children think about knowledge held by nice and mean informants, it would be useful to explore other question formats (e.g. Brosseau-Liard & Birch, 2010) and ask additional follow-up questions to determine whether children believed the mean informant did not intend to share the knowledge he possessed.

A second possible reason that children may have selected the nice informant over the mean expert is that they simply liked the nice informant better and were not reasoning at all or that they were demonstrating a negativity bias. A negativity bias occurs when children attend to and recall negative information (e.g. meanness) more than positive information (e.g. niceness; e.g. Baltazar, Schutts & Kinzler, 2012; Baumeister, Bratslavsk, Finkenauer & Vohs, 2001). In the current study, the negativity bias may have caused preschoolers to focus solely on one informant's meanness and completely disregard expertise. There may be some evidence for this; children preferred to endorse claims from and attribute knowledge to the other available informant (e.g. the nice non-expert or nice irrelevant expert). However, it is unlikely that either simply preferring the nice informant or disregarding the mean one (i.e. negativity bias) completely explains why children often preferred a nice informant who was either a non-expert or an irrelevant one. After all, children demonstrated sensitivity in their preferences, sometimes preferring a mean expert despite his meanness. Thus, children must have been attending to and remembering more than just the positive or negative information presented.

In addition to what the negativity bias may be contributing to children's decisions, our final reason that children may have selected the nice informant over the mean expert could be that preschoolers were using benevolence information (i.e. niceness/meanness) as a cue for competence (e.g. knowledge). Specifically, children may have overextended information about someone's benevolence to make assumptions about competence, demonstrating a 'halo effect' (Birch, Akmal & Frampton, 2010; Fusaro, Corriveau & Harris, 2011) and/or a 'pitchfork effect' (Koenig & Jaswal, 2011). The halo effect is the phenomenon wherein an informant with one positive attribute (e.g. niceness) is presumed to have other positive attributes (e.g. competence). The reverse effect, aptly dubbed the 'pitchfork effect', occurs when people assume that someone with one negative characteristic (e.g. meanness) has other, unrelated negative characteristics (e.g. ignorance). The fact that children in our study preferred to attribute more knowledge to the nice non-expert and less knowledge to the mean expert in Experiment 3 (despite correctly attributing knowledge in Experiment 1) supports the possibility that children overgeneralized benevolence information as a cue for competence. But more research is needed to determine whether children were specifically demonstrating skepticism toward the mean informant or trust towards a nice one.

Showing some skepticism towards mean informants (and additional trust towards nice ones) makes sense, given that niceness and meanness are sometimes indicative of how likely it is that someone wants to provide accurate information. What is troubling, however, is the possibility that children may not recognize that characteristics indicating benevolence/malevolence do not also indicate competence. For example, children may conclude that someone who appears nice is both trustworthy and competent, even if the friendly appearance is a carefully crafted act of manipulation. To examine this issue more closely, it will be important to explore how different kinds of benevolence and competence information can shape how children choose between conflicting claims and attribute knowledge. For instance, it could be that children would more appropriately incorporate competence into their endorsement decisions and knowledge attributions if the characteristic that indicated competence were more salient (e.g. reliability). Ongoing research crossing reliability with benevolence will help to answer this question (Johnston, Mills & Landrum, 2012). In addition, it will be important to explore these issues across a larger age span to gain a better sense of how children's abilities to weigh these characteristics change across development.

Our research suggests that the relative niceness and meanness of informants may play a particularly important role in how children determine whose claim to believe. Although 4- and 5-year-olds are able to defer to the most appropriate expert when they are unaware of informant niceness/meanness, they no longer show this preference when the appropriate expert is described as mean (and the opposing informant is described as nice). In some situations, this tendency to rely on benevolence information is clearly appropriate given that it may protect children from messages intended to persuade or deceive. However, in problem-solving or educational situations where children are trying to learn the most accurate information possible, this tendency to rely on benevolence, rather than expertise, can lead children astray.

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References

Aguiar, N.R., Stoess, C.J., & Taylor, M. (2012). The development of children's ability to fill the gaps in their knowledge by consulting experts. *Child Development*, **83** (4), 1368–1381. doi: 10.1111/j.1467-8624.2012.01782.x

Baltazar, N.C., Shutts, K., & Kinzler, K.D. (2012). Children show heighted memory for threatening social actions. *Journal of Experimental Child Psychology*, **112** (2), 102–110. doi: 10.1016/j.jecp.2011.11.003

Baumeister, R.F., Bratslavsk, E., Finkenauer, C., & Vohs, K.D. (2001). Bad is stronger than good. *Review of General Psychology*, **5** (4), 323–370. doi: 10.1037//1089-2680.5.4.323

Birch, S.A., Akmal, N., & Frampton, K.L. (2010). Two-year-olds are vigilant of others' non-verbal cues to credibility. *Developmental Science*, **13** (2), 363–369. doi: 10.1111/j.1467-7687.2009.00906.x

Birch, S.A.J., Vauthier, S.A., & Bloom, P. (2008). Three- and four-year-olds spontaneously use others' past performance to guide their learning. *Cognition*, **107** (3), 1018–1034. doi: 10.1016/j.cognition.2007.12.008

Boseovski, J.J. (2010). Evidence for 'rose-colored glasses': an examination of the positivity bias in young children's personality judgments. *Child Development Perspectives*, **4** (3), 212–218. doi: 10.1111/j.1750-8606.2010.00149.x

Bretherton, I., & Beeghly, M. (1982). Talking about internal states: the acquisition of an explicit theory of mind. *Developmental Psychology*, **18** (6), 906–921. doi: 10.1037/0012-1649.18.6.906

Brosseau-Liard, P.E., & Birch, S.A.J. (2010). 'I bet you know more and are nicer too!': what children infer from others' accuracy. *Developmental Science*, **13** (5), 772–778. doi: 10.1111/j.1467-7687.2009.00932.x

Brosseau-Liard, P.E., & Birch, S.A.J. (2011). Epistemic states and traits: preschoolers appreciate the differential informativeness of situation-specific and person-specific cues to knowledge. *Child Development*, **82** (6), 1788–1796. doi: 10.1111/j.1467-8624.2011.01662x

Burge, T. (1993). Content preservation. *Philosophical Review*, **102** (3), 457–488. doi: 10.2307/1523046

Cain, K.M., Heyman, G.D., & Walker, M.E. (2006). Preschoolers' ability to make dispositional predictions within and across domains. *Social Development*, **6** (1), 53–75. doi: 10.1111/1467-9507.ep11631692

Corriveau, K., & Harris, P.L. (2009). Choosing your informant: weighing familiarity and recent accuracy. *Developmental Science*, **12** (3), 426–437. doi: 10.1111/j.1467-7687.2008.00792.x

Corriveau, K.H., Harris, P.L., Meins, E., Ferneyhough, C., Arnott, B., Elliott, L., Liddle, B., Hearn, A., Vittorini, L., & de Rosnay, M. (2009). Young children's trust in their mother's claims: longitudinal links with attachment security in infancy. *Child Development*, **80**, 750–761. doi: 10.1111/j.1467-8624.2009.01295.x

Corriveau, K.H., Kinzler, K.D., & Harris, P.L. (2013). Accuracy trumps accent in children's endorsement of object labels. *Developmental Psychology*, **49**, 470–479.

Danovitch, J.H. (2009). *Theory of mind, categorization, and the division of cognitive labor*. Poster session presented at the meeting of Cognitive Development Society, San Antonio, TX.

Danovitch, J.H., & Keil, F.C. (2004). Should you ask a fisherman or a biologist? *Developmental shifts in ways of clustering knowledge. Child Development*, **75** (3), 918–931. doi: 10.1111/j.1467-8624.2004.00714.x

Danovitch, J.H., & Keil, F.C. (2007). Choosing between hearts and minds: children's understanding of moral advisors. *Cognitive Development*, **22** (1), 110–123. doi: 10.1016/j.cogdev.2006.07.001

Elashi, F.B., & Mills, C.M. (2012). Trust based on group membership or accuracy? The role of group membership on children's trust decisions. Manuscript under review.

Fiske, S.T., Cuddy, A.J., & Glick, P. (2007). Universal dimensions of social cognition: warmth and competence. *Trends in Cognitive Sciences*, **11** (2), 77–83. doi: 10.1016/j.tics.2006.11.005

Fusaro, M., Corriveau, K.H., & Harris, P.L. (2011). The good, the strong, and the accurate. preschoolers' evaluations of accurate and strong informants. *Journal of Experimental Child Psychology*, **110**, 561–574. doi: 10.1016/j.jecp.2011.06.008

Hamlin, J.K., Wynn, K., & Bloom, P. (2007). Social evaluation by preverbal infants. *Nature*, **450**, 557–560. doi: 10.1038/nature06288

Harris, P.L. (2002). Checking our sources: the origins of trust in testimony. *Studies in History & Philosophy of Science Part A*, **33A** (2), 315–333. doi:10.1016/S0039-3681(02)00007-9

Harris, P.L., & Corriveau, K.H. (2011). Young children's selective trust in informants. *Philosophical Transactions of the Royal Society, B*, **366**, 1179–1187. doi: 10.1098/rstb.2010.0321.

Jaswal, V.K., Croft, A.C., Setia, A.R., & Cole, C.A. (2010). Young children have a specific, highly robust bias to trust testimony. *Psychological Science*, **21**, 1541–1547. doi: 10.1177/0956797610383438

Jaswal, V.K., & Malone, L.S. (2007). Turning believers into skeptics: 3-year-olds' sensitivity to cues to speaker credibility. *Journal of Cognition and Development*, **8** (3), 263–283. doi: 10.1080/15248370701446392

Johnston, A.M., Mills, C.M., & Landrum, A.R. (2012). The power of first impressions: preschoolers trust a reliable source who is proven mean, but not a mean source who is proven reliable. Manuscript under revision.

Keil, F.C., Stein, C., Webb, L., Billings, V., & Rozenblit, L. (2008). Discerning the division of cognitive labor: an emerging understanding of how knowledge is clustered in other minds. *Cognitive Science*, **32** (2), 259–300. doi: 10.1080/03640210701863339

Koenig, M.A., & Harris, P.L. (2005). Preschoolers mistrust ignorant and inaccurate speakers. *Child Development*, **76** (6), 1261–1277. doi: 10.1111/j.1467-8624.2005.00849.x

Koenig, M.A., & Jaswal, V.K. (2011). Characterizing children's expectations about expertise and incompetence: halo or pitchfork effects? *Child Development*, **82** (5), 1634–1647. doi: 10.1111/j.1467-8624.2011.01618.x

Lutz, D.J., & Keil, F.C. (2002). Early understanding of the division of cognitive labor. *Child Development*, **73** (4), 1073–1084. doi: 10.1111/1467-8624.00458

Mascaro, O., & Sperber, D. (2009). The moral, epistemic, and mind reading components of children's vigilance towards deception. *Cognition*, **112** (3), 367–380. doi: 10.1016/j.cognition.2009.05.012

Merriam-Webster's online dictionary (11th edn.). Retrieved from http://www.merriam-webster.com/dictionary/expert

Merriam-Webster's online dictionary (11th edn.). Retrieved from http://www.merriam-webster.com/dictionary/expertise

Mills, C.M. (2012). Knowing when to doubt: developing a critical stance when learning from others. *Developmental Psychology*. Advance online publication. doi: 10.1037/a0029500.

Mills, C.M., & Landrum, A.R. (2012). Judging judges: how do children weigh the importance of capability and objectivity for being a good decision maker? *British Journal of Developmental Psychology*, **30** (3), 393–414. doi: 10.1111/j.2044-835X.2011.02047.

Mills, C. M., Legare, C. H., Grant, M. G., & Landrum, A. R. (2011). Determining who to question, what to ask, and how much information to ask for: The development of inquiry in young children. *Journal of Experimental Child Psychology*, **11** (4), 539–560. doi: 10.1016/j.jecp.2011.06.003

Pillow, B.H. (1989). Early understanding of perception as a source of knowledge. *Journal of Experimental Child Psychology*, **47**, 116–129. doi: 10.1016/0022-0965(89)90066-0

Poulin-Dubois, D., & Chow, V. (2009). The effect of a looker's past reliability on infants' reasoning about beliefs. *Developmental Psychology*, **45**, 1579–1582. doi: 10.1037/a0016715

Robinsion, E.J., Champion, H.H., & Mitchell, P.P. (1999). Children's ability to infer utterance veracity from speaker informedness. *Developmental Psychology*, **35**, 535–546. doi: 10.1037/0012-1649.35.2.535

Rosch, E., Mervis, C.B., Gray, W.D., Johnson, D.M., & Boyes-Braem, P. (1976). Basic objects in natural categories. *Cognitive Psychology*, **8** (3), 382–439. doi: 10.1016/0010-0285(76)90013-X

Schoorman, F., Mayer, R., & Davis, J. (2007). An integrative model of organizational trust: past, present, and future. *Academy of Management Review*, **32** (2), 344–354. doi: 10.2307/20159304

Scofield, J., Gilpin, A.T., Pierucci, J., & Morgan, R. (2012). Matters of accuracy and conventionality: prior accuracy guides children's evaluations of others' actions. *Developmental Psychology*. Advance online publication. doi: 10.107/a0029888

Shafto, P., Eaves, B., Navarro, D.J., & Perfors, A. (2012). Epistemic trust: modeling children's reasoning about others' knowledge and intent. *Developmental Science*, **15** (3), 436–447. doi: 10.1111/j.1467-7687.2012.01135x

Sobel, D.M., & Corriveau, K.H. (2010). Children monitor individuals' expertise for word learning. *Child Development*, **81** (2), 669–679. doi: 10.1111/j.1467-8624.2009.01422.x

Sperber, D., Clement, F., Heintz, C., Mascaro, O., Mercier, H., Origgi, G., & Wilson, D. (2010). Epistemic vigilance. *Mind & Language*, **25** (4), 359–393. doi: 10.1111/j.1468-0017.2010.01394.x

Vanderbilt, K.E., Liu, D., & Heyman, G.D. (2011). The development of distrust. *Child Development*, **82** (5), 1372–1380. doi: 10.1111/j.1467-8624.2011.01629.x

VanderBorght, M., & Jaswal, V.K. (2009). Who knows best? Preschoolers sometimes prefer child informants over adult informants. *Infant and Child Development*, **18**, 61–71. doi: 10.1002/icd.91

White, T.B. (2005). Consumer trust and advice acceptance: the moderating roles of benevolence, expertise and negative emotions. *Journal of Consumer Psychology*, **15** (2), 141–148. doi: 10.1207/s15327663jcp1502_6

Xu, F., Evans, A.D., Li, C., Li, Q., Heyman, G., & Lee, K. (in press). Honesty and benevolence and their relation to children's trust judgments. *International Journal of Behavioral Development*.

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Graphical Abstract

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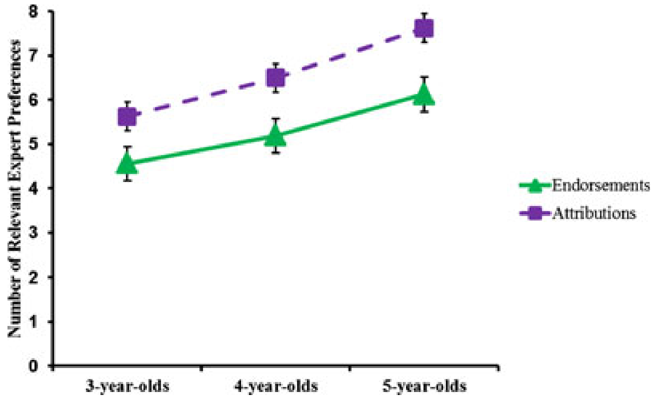

How do children use informant niceness, meanness, and expertise when choosing between informant claims and crediting informants with knowledge? In Experiment 1, preschoolers met two experts providing conflicting claims for which only one had relevant expertise. Five-year-olds endorsed the relevant expert's claim and credited him with knowledge more often than 3-year-olds. In Experiment 2, niceness/meanness information was added. Although children most strongly preferred the nice relevant expert, the children often chose the nice *irrelevant* expert when the relevant one was mean.