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Children Show Reduced Trust in Confident Advisors Who are Partially-Informed

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Abstract

Young children trust confident informants over cautious ones, and this tendency can lead them to heed the claims of informants whose confidence is unjustified. The ability to recognize overconfidence, and not be swayed by it, is therefore important for children to obtain accurate information and to make better decisions. In two experiments (total $N = 232$), we show that 4- to 6-year-olds use information about whether speakers are fully or only partially informed to judge whether confident claims should be heeded. In each experiment, children were shown scenarios in which a confident speaker and a cautious one gave conflicting claims. When both speakers were completely informed, children expressed more trust in the confident speaker's claim. However, when both speakers only had partial information, children did not believe the confident speaker over the more cautious one. These effects did not vary with age. The present findings are the first to suggest that children as young as 4 understand when confidence is unwarranted, and they may indicate that reminders that a speaker is only partially informed could help children recognize when confidence is unjustified.

Keywords: overconfidence; partial information; knowledge; trust in testimony; advice-giving; trust

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You want ice cream, so you ask your friends Ben and Jerry about the best place to get some. Their recommendations differ. Ben confidently states that one shop has the best ice cream, while Jerry more cautiously recommends a different one. You might trust Ben's recommendation, as we often trust confident informants over those who are more cautious (e.g., Price & Stone, 2004). But suppose you learn that Ben and Jerry have each tried just one of the many flavors at each shop. This news should undermine your trust in Ben, but it may not affect your trust in Jerry—Ben's confidence is unwarranted given how little information he has, but Jerry's cautious response fits his limited knowledge. As this example shows, our trust in confident informants depends on whether they have full information.

Young children are influenced by informants' confidence and certainty (e.g., Birch, Akmal, & Frampton, 2010; Sabbagh & Baldwin, 2001; Stock, Graham, & Chambers, 2009). For instance, when two speakers offer different labels for the same object, 3-year-olds are more likely to trust whichever speaker is more confident (Jaswal & Malone, 2007). Similarly, from age 4, children are more likely to base decisions about where to search for a hidden object on the testimony of an informant who uses confident phrases such as "I know," than on an informant who uses less confident phrases such as "I think" or "I guess" (Moore, Bryant, & Furrow, 1989).

Nonetheless, children may put too much trust in confident informants, and they appear to have difficulty understanding when confidence is unwarranted (e.g., Kominsky, Langthorne, & Keil, 2016; Tenney, Small, Kondrad, Jaswal, & Spellman, 2011). For example, in one study, 5- and 6-year-olds and adults heard a scenario in which two informants, one confident and one cautious, each gave conflicting accounts of an accident they had witnessed (Tenney et al., 2011). Initially, adults and children trusted the confident informant. The experimenter then revealed errors in both informants' accounts of the accident. Adult participants recognized that these errors undermined the confident informant's credibility, and they shifted their trust to the cautious informant. In contrast to adults, children continued to trust the confident informant over the cautious one. These findings suggest 5- and 6-year-olds may be unable to use past inaccuracy to recognize when confidence is unwarranted.¹

Other factors, though, may also qualify trust in an informant's confidence. Here, as illustrated in the opening example, we focus on situations in which trust may depend on whether informants have access to complete or partial information. Children often show sensitivity to informedness when judging who to trust (e.g., Brosseau-Liard & Birch, 2011; Kondrad & Jaswal, 2012; Kushnir, Wellman & Gelman, 2008; Nurmsoo & Robinson, 2009; Sabbagh & Baldwin, 2001). For example, 3-4-year-olds are more likely to base decisions about the contents of a box on the testimony of a speaker who is well informed and has looked inside the box than on one who is poorly informed and has only seen the box's exterior (Robinson, Champion, & Mitchell, 1999). Similarly, 4- to 7-year-olds view an agent's claim about the contents of several containers more acceptable if the agent has looked in all of the containers, than if the agent only looked in some of them, or in none (Butler, Schmidt, Tavassolie, & Gibbs, 2018). Even infants may be sensitive to speaker's visual access to information when responding to their utterances or using their gaze to guide search (Chow, Poulin-Dubois, & Lewis, 2008; Koenig & Echols, 2003).

¹ This is not to deny past accuracy affects children's trust. Young children sometimes mistrust confident advisers who have consistently been incorrect (Brosseau-Liard, Cassels, & Birch, 2014; Kushnir & Koenig, 2017). Such findings do not address children's ability to assess whether confidence is warranted, as this requires comparing confident and cautious speakers who are otherwise equated (e.g., have equivalent histories of inaccuracy).

Given such findings, children's trust in confident informants could depend on whether informants are fully or partially informed.

In two experiments, we showed children vignettes in which a confident informant and a cautious one had either complete information or partial information, and gave conflicting recommendations. In contrast with most studies examining children's trust in informants, the recommendations in our studies had a potentially subjective component—the informants made claims about which of two shops had better ice cream. We focused on such claims because it would be implausible for two informants to make contradictory claims about purely objective facts when both have complete information. Based on previous findings, we expected that children would trust the confident informant over the cautious one when both had complete information (e.g., Birch et al., 2010; Jaswal & Malone, 2007; Stock et al., 2009). Our main goal was to examine whether this preference for the confident informant would be diminished when both informants had partial knowledge. To assess potential developmental changes, we tested children aged 4 to 6 years in the first experiment, and extended the age range to also include children aged 7 in the second experiment.

Experiment 1

Method

Participants. We tested 120 children: 40 4-year-olds ($M = 4;6$ [years;months], range = 4;0-4;11, 19 girls), 40 5-year-olds ($M = 5;5$, range = 5;0-5;11, 19 girls), and 40 6-year-olds ($M = 6;5$, range = 6;0-6;11, 17 girls). An additional 7 children were tested, but excluded for failing comprehension questions even after being corrected. In this experiment, we tested 20 children per condition in each age group; this was the stopping rule in the lab at the time this experiment was run. In both experiments, children were tested at daycares, preschools, and elementary schools. Different children participated in each experiment.

Procedure. Children saw one of two versions of a vignette in which two girls each visited two ice cream shops (see Figure 1). In the “complete-information” condition, both girls tried all the flavors at each shop, while in the “partial-information” condition, they tried only one flavor at each shop. Equal numbers of children in each age group were randomly assigned to each condition. After the girls tried flavors at both shops, they expressed opposite opinions about which shop had better ice cream. One girl was confident (e.g., “I *know* that Red’s Ice Cream Shop *definitely* has the better ice cream”), while the other was less confident (e.g., “I *think* Blue’s Ice Cream Shop *probably* has the better ice cream”).

Children were first asked, “Which shop has the better ice cream?” They were then asked a follow-up question: “How sure are you? Are you a little sure, medium sure, or really sure?” These responses were recoded onto a scale ranging from 6 (“really sure” about the more confident informant) to 1 (“really sure” about the less confident informant). Four children did not answer the follow-up question, and were conservatively scored as if they had said “a little sure.”

The vignette also included a comprehension question verifying that children comprehended the complete- versus partial-information manipulation (“So how many flavors did they try at each shop?”). When children answered incorrectly, the experimenter corrected them, and repeated the question. Children who responded incorrectly a second time ($n = 7$) were excluded from analysis.

EXPERIMENT 1

Look, here are two girls. And you know what? They love ice cream!

And look, here are two ice cream shops, Red's Ice Cream Shop and Blue's Ice Cream Shop. Each shop has lots of flavors of ice cream!

The girls went to both ice cream shops. They tried only one [all] of the flavors at Red's Ice Cream Shop...

And they tried only one [all] of the flavors at Blue's Ice Cream Shop. So how many flavors did they try at each shop?

Let's hear what they have to say. She said, "I know [think] Red's Ice Cream Shop definitely [probably] has the better ice cream." and she said, "I think [know] Blue's Ice Cream Shop probably [definitely] has the better ice cream."

I have a question for you: Which shop has the better ice cream? How sure are you about this? A little sure, medium sure, or really sure?

EXPERIMENT 2

Look, here are two girls. And you know what? They love ice cream!

And look, here are two ice cream shops, Red's Ice Cream Shop and Blue's Ice Cream Shop. Each shop has lots of different flavors of ice cream!

The girls went to both ice cream shops. They each tried only half [all] of the flavors at Red's Ice Cream Shop...

And they each tried only half [all] of the flavors at Blue's Ice Cream Shop. So what did the girls try at each shop - all of the flavors or only half of the flavors?

Let's hear what they have to say. She said, "I'm sure [I think] Red's Ice Cream Shop definitely [probably] has the better ice cream." and she said, "I think [I'm sure] Blue's Ice Cream Shop probably [definitely] has the better ice cream."

I have a question for you: Which shop has the better ice cream? How sure are you about this? A little sure, medium sure, or really sure?

Figure 1. Script and slides from Experiments 1 (top) and 2 (bottom). In each experiment, we counterbalanced whether the confident or cautious adviser was the first to speak.

Results and Discussion

We examined whether children's responses depended on whether the informants had complete or partial information. See Figure 2 for children's mean scores; data from both experiments and syntax from the main analyses are available at <https://osf.io/7e8ck/>.

We entered children's scores into a generalized linear model (ordinal logistic) with Information-level (complete, partial) and Age-in-months (mean-centered and entered as a covariate). The analysis only revealed a main effect of Information-level, $Wald \chi^2(1) = 13.93, p < .001$, in which children indicated greater trust for the confident informant in the complete-

information condition compared with the partial-information condition. There was no significant effect of Age-in-months, $Wald \chi^2(1) = 0.02, p = .904$, and no interaction, $Wald \chi^2(1) = 0.30, p = .582$. Collapsing by age, single-sample t -tests against the midpoint score of 3.5 revealed that children trusted the confident informant over the cautious one when both informants had complete information, $t(59) = 6.31, p < .001, d = .81$, but that children did not preferentially trust one informant when both had partial information, $t(59) = .43, p = .667$.²

Although children normally trust confident informants over cautious ones (e.g., Birch et al., 2010; Sabbagh & Baldwin, 2001; Stock et al., 2009), our results suggest that such trust is undermined when the informants have partial information. A potential concern, though, is that informants in the partial-information condition had very little information—they both tried only one flavor of ice cream at each shop. Hence, children might have felt that the informants were so under-informed that there was no reason to believe either of them. To assuage this concern, we conducted another experiment in which informants in the partial-information condition each tried half the ice cream flavors at each shop. We expected that children would readily understand this, as previous research shows that 4-year-olds understand the word “half” (Bialystok & Codd, 2000; also see Papafragou, 2002). In Experiment 2, we also tested children across a wide range of ages in a further attempt to discover developmental differences.

² In both experiments, we observed the same pattern of results in generalized linear models on children’s initial binary judgments about which store had better ice cream.

Figure 2. Scatter plots showing children's mean scores in Experiments 1 (top graph) and 2 (bottom graph). Higher scores indicate greater agreement with the confident informant; lower scores indicate greater agreement with the cautious informant.

Experiment 2

Method

Participants. We tested 112 children: 28 4-year-olds ($M = 4;7$, range = 4;0-4;11, 19 girls), 28 5-year-olds ($M = 5;6$, range = 5;0-5;11, 18 girls), 28 6-year-olds ($M = 6;7$, range = 6;0-6;11, 15 girls), and 28 7-year-olds ($M = 7;5$, range = 7;0-7;11, 18 girls). An additional 5 children were tested but excluded for failing comprehension questions even after being corrected. In this experiment, we tested 14 children per condition in each age group. Mid-way through data collection, the corresponding author graphically inspected the data and saw that a significant effects of age was unlikely. Given this, and the fact that data was being collected from children at 4 different ages (rather than 3, as in the first experiment), this author decided to reduce the number children tested at each age, while keeping the overall sample size comparable to that in the first experiment.

Procedure. This experiment used the same procedure as Experiment 1, except for a few changes (see Figure 1). Most importantly, in the partial-information condition, each adviser tried half the ice cream flavors at each shop, rather than just one flavor. The comprehension question was accordingly modified (“So what did the girls try at each shop – all of the flavors or only half the flavors?”). Also, the characters looked more similar to one another than in the first experiment, and we simplified the slides by not depicting the ice cream flavors sold at each shop.

Results and Discussion

We followed the analytic procedure from Study 1, examining whether children’s responses depended on whether the informants had complete or partial information. In this experiment, 4 children said “both” when first asked which shop has better ice cream, and therefore received the midpoint score of 3.5. One other child did not answer the follow-up question, and was therefore conservatively scored as having said “a little sure.”

A generalized linear model (ordinal logistic) with the factors Information-level (complete-information, partial-information) by Age-in-months (mean-centered and entered as a covariate) again only revealed a main effect of Information-level, $Wald \chi^2(1) = 13.21, p < .001$, in which children indicated greater trust for the confident informant in the complete-information condition compared with the partial-information condition (see Figure 2). As in the first experiment, there was no significant effect of Age-in-months, $Wald \chi^2(1) = 0.03, p = .873$, and no interaction, $Wald \chi^2(1) = 1.78, p = .182$.

Collapsing by age, single-sample t -tests against the midpoint score of 3.5 revealed that children trusted the confident informant over the cautious one when both informants had complete information, $t(55) = 7.02, p < .001, d = .94$, but did not trust one informant over the other when they each had partial information, $t(55) = .00, p > .999$.

These results again suggest that although children normally trust confident informants over cautious ones, this preference is diminished when informants have limited information. The findings show that this pattern is not limited to cases where the informants have almost no information (as occurred in Experiment 1). This said, we must acknowledge that one remaining concern is that in the partial-information condition, the informants were described as having tried “only half” of the flavors at each shop. The word “only” in this condition could have swayed children to view the informants as grossly under-informed, and so it would be helpful to eventually test if the findings replicate without this word.

General Discussion

Across two experiments, children aged 4 to 7 saw scenarios manipulating speakers’ confidence and access to information. When both informants had complete information, having

tried all ice cream flavors at both ice cream shops, children trusted the confident informant more than the cautious one. This replicates previous findings showing that children often trust confident informants over cautious ones (e.g., Birch et al., 2010; Sabbagh & Baldwin, 2001; Stock et al., 2009). Importantly, when the informants only had partial information, having tried only one flavor at each shop (Experiment 1) or half of the flavors (Experiment 2), children were as likely to agree with the cautious informant as with the confident one.

These findings suggest that children consider how well-informed a speaker is when judging whether the speaker's confidence is warranted and whether the speaker's current claims should be trusted. It is important to note that although our manipulation reduced children's trust in the confident informant, it did not cause children to mistrust this speaker (i.e., children did not express greater trust in the cautious speaker). This shows that children do not feel that claims made with unwarranted confidence should be actively disbelieved and assumed false. Such responses might have occurred if children believed that overconfidence is a character flaw that *taints* information, or if they believed that overconfidence should be censured with active disbelief. So our findings provide no evidence that children hold such beliefs.

Children's judgments might stem, though, from assessments of each speakers' level of knowledge. Children may conclude that an informant who has tried only a few ice cream flavors at a shop *knows* too little about the shop to form a confident opinion about it. But this alone should not lead children to place greater trust in the cautious informant. After all, the cautious informant also lacks substantial knowledge. If this "knowledge-based" account is correct, we might expect that children's greater trust in confident advisors might return if both speakers had close-to-complete information (e.g., if they had tried almost all of the flavors at each shop). Further evidence for this account could also be sought by asking children to separately rate their trust in each speaker. If the knowledge-based account is correct, then children should have little trust in each informant when they have little information (i.e., as opposed to having relatively high trust in both).

The "knowledge-based" account may also explain why our findings differ from those in a study where young children did not show reduced trust in informants displaying unwarranted confidence. In that study, 5- and 6-year-olds preferentially trusted confident claims made by a speaker with a history of making confident but inaccurate claims (Tenney et al., 2011). The knowledge-based account posits that children conclude that a speaker who is under-informed knows too little to form confident opinions. But children may nonetheless assume that a person who was previously incorrect could still know enough about present matters to be confident. In contrast with learning that a speaker is under-informed, only learning the speaker was previously inaccurate does not tell us about how far the speaker's inaccuracy may extend, nor about why the speaker is inaccurate.

However, the account does not explain findings from another study, in which informants were asked for unknowable facts (e.g., the number of leaves on all trees in the world; Kominsky et al., 2016). Children aged 5 and 6 were more likely to ascribe expertise to confident speakers who gave precise answers than to cautious speakers who admitted that they did not know. This finding does not fit with the knowledge-based account. If children ask themselves whether a speaker knows enough to be confident, they should mistrust speakers who give precise answers to unknowable questions. However, children in the study might have been biased against the cautious speaker because this speaker did not offer any information; some finding suggest that children may be more trusting of speakers who have been inaccurate than those who have been merely ignorant (Koenig & Harris, 2005; Mills, Legare, Grant, & Landrum, 2011; but see

Kushnir & Koenig, 2017). So perhaps children in Kominsky et al. would have ascribed expertise to both speakers equally if both had provided some information (and only differed in their confidence).

Future Directions

Our findings suggest that simply reminding children that informants are unlikely to have complete information could help counter their tendency to trust overstated confidence. However, further research is needed to test whether such reminders would be effective in daily life as some aspects of our tasks might not always be present. Most notably, in our studies two informants made conflicting claims. However, marketing that targets children is unlikely to incorporate dissenting opinions, and previous findings suggest that when children are exposed to a single informant, they typically trust the informant's claims (e.g., Vanderbilt, Heyman, & Liu, 2014; also see Jaswal & Kondrad, 2016) unless children have strong evidence that the informant should not be trusted (Kim, Paulus, & Kalish, 2017; Krogh-Jespersen & Echols, 2018; Kushnir & Koenig, 2017). Hence, our findings leave open the possibility that children will believe the claims of a lone confident informant, even if they know the informant is only partially informed.

Also, our studies only concerned claims with a potentially subjective component (i.e., the relative quality of ice cream shops). It would be useful to know if the findings extend to purely objective facts, which were the subject of previous studies on children's inflated trust in confident informants (Kominsky et al., 2016; Tenney et al., 2011). We know that young children view opinions and facts differently. For example, they often affirm that two people with opposing preferences can both be correct, but deny this for people with opposing factual beliefs (e.g., Heiphetz, Spelke, Harris, & Banaji, 2013; Heiphetz & Young, 2017; also see Mills & Grant, 2009). Children might be more sensitive to how informed a speaker is for facts than opinions, as children show greater deference to experts in matters of fact than opinion (Banerjee et al., 2007). Investigating children's judgments about objective truths might also provide a window into children's awareness of the difference between knowledge and conjecture (i.e., plausible but unconfirmed speculation; see Chu & Schulz, 2018).

A further issue for future investigation is children's understanding of epistemic or intellectual humility – a hallmark of wisdom (Ryan, 2018). People show intellectual humility when they hold beliefs with confidence merited by the available evidence, and adequately recognize the limits of their knowledge (Grossmann, 2017). Although intellectual humility has been studied in adults (e.g., Roberts & Wood, 2003; Samuelson et al., 2014), little research has examined it in children (but see Danovitch, Fisher, Schroder, Hambrick, & Moser, *in press*). Our findings fall short of showing that young children are sensitive to intellectual humility because children showed no greater trust in the speaker whose caution fit with his limited knowledge than in the overly-confident speaker. However, this sensitivity might be revealed if children were asked to justify or explain their decisions about who they chose to trust, or might be revealed if children's were asked to make assessments of each speaker's character.

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