Does First-hand Experience Improve Children's Ability to Discern Between Helpful and Tricky Informants?

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Abstract

Prior research on children's trust has typically offered children either first-hand information about an informant's intentions (e.g., they directly observe someone helping another person) or second-hand information (e.g., they are simply told someone is helpful). We tested whether receiving both kinds of information facilitates selective trust in a helpful vs. tricky informant. 3- and 4-year-olds searched for a sticker 6 times after hearing conflicting advice from two informants about the sticker's location. Children did not receive feedback during the sticker-finding task. In the second-hand condition, the researcher simply described one informant as "helpful", and the other as "tricky" before the trials began. In the combined condition, children were first asked to guess what animal was in a box after each informant offered advice: each informant gave consistently helpful or consistently deceptive advice across 3 trials. Children received feedback by peeking inside the box. The informant's intentions were then described as in the second-hand condition and the test trials followed. Additionally, children completed 3 tasks from the NIH Toolbox Kit that measured vocabulary and executive functioning. Parents were given a short questionnaire regarding their demographics, the Children's Social Understanding Scale (CSUS) and the BRIEF (Behavior Rating Inventory of Executive Function) that measures executive functioning impairments. Our results suggest that four-year-olds are more selective and trust the reliable informant over the unreliable informant more often than three-year-olds, regardless of the type of information received. Further, we found a weak, positive relationship between parent report measures of theory of mind and children's trust score and children's executive function score and trust score.

Keywords: Selective trust, executive function, theory of mind

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Does First-hand Experience Improve Children's Ability to Discern Between Helpful and Tricky Informants?

Selective trust testimony refers to young children's ability to reason about informants' knowledge, honesty, and competency (Vanderbilt, Liu, & Heyman, 2011). Previous research has found that young children (four- and five-year-olds) are not overly credulous and prefer to trust informants who have been previously reliable compared to an informant who has been previously unreliable (Koenig & Harris, 2005). These trust tasks have often been conducted using a word-learning paradigm (Koenig & Harris, 2005) and more recently using a sticker-finding task (Vanderbilt, Heyman, & Liu, 2014). However, minimal research has examined the effect of first-hand versus second-hand information in young children's trust decisions. Additionally, few studies have examined individual differences in cognitive functioning in relation to children's ability to selectively trust a reliable informant over an unreliable informant.

In a previous study we examined preschool-age children's ability to reason about the relative knowledge or honesty of two sources presented together. We found that four- and five-year-olds trusted the reliable informant over the unreliable informant. Three-year-olds were not selective in their trust of the reliable informant, even though 50% of the children said that the reliable informant was better to listen to. It is possible, however, that when children have first-hand experience with informants' traits, the traits will become more salient and therefore have a stronger influence on children's trust decisions.

The purpose of the current study was to examine whether children are better at selectively trusting reliable informants over unreliable informants when they must infer each informant's traits, by experiencing them first-hand, rather than receiving second-hand information from an experimenter. A secondary aim was to look at preschool-age children's cognitive abilities in relation to their ability to selectively trust reliable informants over unreliable informants.

Methods

We report our sample size, all data exclusions (if any), all manipulations, and all measures in the study.

Participants

This project was pre-registered at the Open Science Framework with a designated sample of 100 children and their respective parent. Children and parents were recruited by the Developing Mind Laboratory at the Psychology Department at the University of Oregon. One-hundred three- ($M = 40.08$ months) and four-year-old children ($M = 53.69$ months) participated (54 females, 46 males) and were randomly assigned to either the first-hand ($N = 52$) or second-hand condition ($N = 48$).

Material

In order to assess children's trust in sources, children were presented with paired sources that differ in their intentions to help or deceive. Children in the first-hand condition were first tricked and helped by separate puppets in a warm-up task and then a researcher described each puppet's trait before continuing to the sticker-finding task. Children in the second-hand condition only heard the researcher's description of the puppets and then continued to the task. On each of six trials, children watched as the two puppets provided conflicting advice about the location of a hidden sticker, and then children were asked where they would like to search for the sticker. After children completed six trials they were asked a series of questions to test their understanding of the puppets' intentions and knowledge.

Lastly, children completed tasks on an iPad with an experimenter that measured executive functioning and children's mental state understanding. These tasks included:

Flanker Inhibitory Control Task (measures children's attention by having them focus on one aspect of a scene while there is an abundance of environmental stimuli), Picture Sequence Task (examines children's episodic memory by playing a memory game in which children must place a set of pictures in order to match the story they heard), Picture Vocabulary Task (children are asked to point to the picture that represents that word said by the experimenter), Dimensional Change Card Task (measures children's executive functioning and attention by asking children to sort a set of cards by one dimension (e.g., shape) and then by different dimension (e.g., color)), and the List Sorting Working Memory Task (after hearing a list of foods and animals children are asked to repeat the list back by the size of the animal/food).

Parents were given a short questionnaire regarding their demographics, the Children's Social Understanding Scale (CSUS) (Tahiroglu, Moses, Carlson, Mahy, Olofson, & Sabbagh, 2014), and the BRIEF (Behavior Rating Inventory of Executive Function) that measures executive functioning impairments.

Procedure

Children and parents were recruited by the Developing Mind Laboratory at the Psychology Department at the University of Oregon. During the visit parents were first asked to sign a copy of the consent form and were be given a second copy to keep for their records. Once we received consent from the parent and assent from the child, two trained research assistants administered tasks that assessed children's trust in informants, mental state understanding, and executive functioning. These sessions were videotaped and used for later coding. In a neighboring room, parents were asked to fill out a short demographic questionnaire, a brief questionnaire regarding their children's mental state understanding and had access through a television monitor to see and hear the tasks their child were completing. The selective trust task took about 10 to 15 minutes. The tasks that measured

executive functioning took about five minutes each. The whole session took about 45-60 minutes. Parents spent no more than 15 minutes filling out the two questionnaires. Parents received $10 for time and travel and children received six stickers and a small toy for participation.

Data analysis

A between-subjects analysis of variance was used to examine the effect of age and condition on children's trust scores. Children's trust scores were operationalized as the number of times children chose to take the advice of the helpful informant over the tricky informant across the six trials of the sticker-finding task. Trust scores ranged from 0-6. A correlation was conducted in order to examine the relationship between parent report measures on their child's theory of mind ability, measured by the CSUS, and the children's trust score. A second correlation was conducted to examine the relationship between executive functioning and children's trust scores. We made a composite measure of executive function by averaging children's raw score on the Dimensional Change Card Sort Task and the Flanker Inhibitory Control Task.

We used R (Version 3.5.0; R Core Team, 2018) and the R-packages *bindrcpp* (Version 0.2.2; Müller, 2018), *dplyr* (Version 0.7.8; Wickham, François, Henry, & Müller, 2018), *forcats* (Version 0.3.0; Wickham, 2018a), *ggplot2* (Version 3.1.0.9000; Wickham, 2016), *here* (Version 0.1; Müller, 2017), *janitor* (Version 1.1.1; Firke, 2018), *kableExtra* (Version 0.9.0; Zhu, 2018), *knitr* (Version 1.20; Xie, 2015), *magrittr* (Version 1.5; Bache & Wickham, 2014), *papaja* (Version 0.1.0.9842; Aust & Barth, 2018), *purrr* (Version 0.2.5; Henry & Wickham, 2018), *readr* (Version 1.1.1; Wickham, Hester, & Francois, 2017), *rio* (Version 0.5.16; C.-h. Chan, Chan, Leeper, & Becker, 2018), *stringr* (Version 1.3.1; Wickham, 2018b), *tibble* (Version 1.4.2; Müller & Wickham, 2018), *tidyr* (Version 0.8.2; Wickham & Henry, 2018), and *tidyverse* (Version 1.2.1; Wickham, 2017) for all our analyses.

Results

A 2 (Condition: first-hand or second-hand information) x 2 (Age-group: three or four-year-olds) between-subjects ANOVA predicting children's average trust scores was conducted. The main effect of age-group was significant, ($F(1, 96) = 12.56$, $MSE = 1.86$, $p = .001$, $\hat{\eta}^2_G = .116$). As can be seen in *Figure 1*, four-year-olds demonstrated higher average trust ($M = 3.37$, $SD = 1.12$) than three-year-olds ($M = 4.33$, $SD = 1.6$). The main effect of condition ($F(1, 96) = 2.50$, $MSE = 1.86$, $p = .117$, $\hat{\eta}^2_G = .025$) as well as the interaction were not significant ($F(1, 96) = 0.68$, $MSE = 1.86$, $p = .410$, $\hat{\eta}^2_G = .007$).

We also wanted to examine the relationship between children's trust scores and their parents' CSUS responses. As can be seen in *Figure 2*, the relation between these two variables is positive, though weak, suggesting that higher parent's CSUS scores are related to higher children's trust scores, ($r = 0.30$, $p = 0.02$).

Further, we examined the relationship between children's trust scores and their executive function. As demonstrated in *Figure 3*, the relation between these two variables is positive, though weak to moderate, suggesting that higher children's executive functioning is related to higher trust scores, ($r = 0.36$, $p < .001$).

Discussion

We set out to examine whether children are better at selectively trusting reliable informants over unreliable informants when they must infer the informant's traits, by experiencing them first-hand, rather than receiving second-hand information from an experimenter. Additionally, we examined whether this relationship depended upon the age of the participant (e.g., three or four-years-old). We also examined whether children's average trust scores of an informant were correlated with their parent's perception of their child's theory of mind (i.e., CSUS) and social understanding as well as the children's

executive function.

Surprisingly, whether children are provided first-hand or second-hand information about the informant did not have an effect on their selective trust scores nor did this interact with the age of the participants. However, age of the children did significantly predict children's selective trust scores on their own, with four-year-olds demonstrating higher trust of the reliable informant in comparison to three-year-olds.

Moreover, we also found a positive relationship between parent's report on their child's theory of mind (i.e., CSUS) and the child's trust score, which might suggest that theory of mind is a relevant factor in selectively trusting a reliable informant. A similar result was obtained for the relation between children's executive function and trust score, indicating that more devolped executive functioning may be important when children discriminate between informants.

Our results are consistent with prior research (Harris & Corriveau, 2011; Vanderbilt et al., 2011) suggesting that older children are better at selectivity trusting a reliable informant over an unreliable informant when the informants are providing conflicting information. It is possible that children who received first-hand information didn't transfer their experience from one task to the other and therefore didn't benefit from the additional information. Our next step will be to examine how children preformed during the training trials in the first-hand condition and whether that predicts their trust in the sticker-finding task. It's plausible that only children that did well in the training trials benefitted from the first-hand information. Furthermore, individual differences were related to children's performance on the sticker-finding task. Taken together these results may suggest that children with higher executive functioning may be better able to discriminate between reliable and unreliable sources and may allow children to make more informed decisions about the trustworthiness of informants.

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Table 1

Means of selective trust by age-group and condition.

	Condition	
Age Group	First-Hand	Second-Hand
3	3.46	3.25
4	4.67	4.00

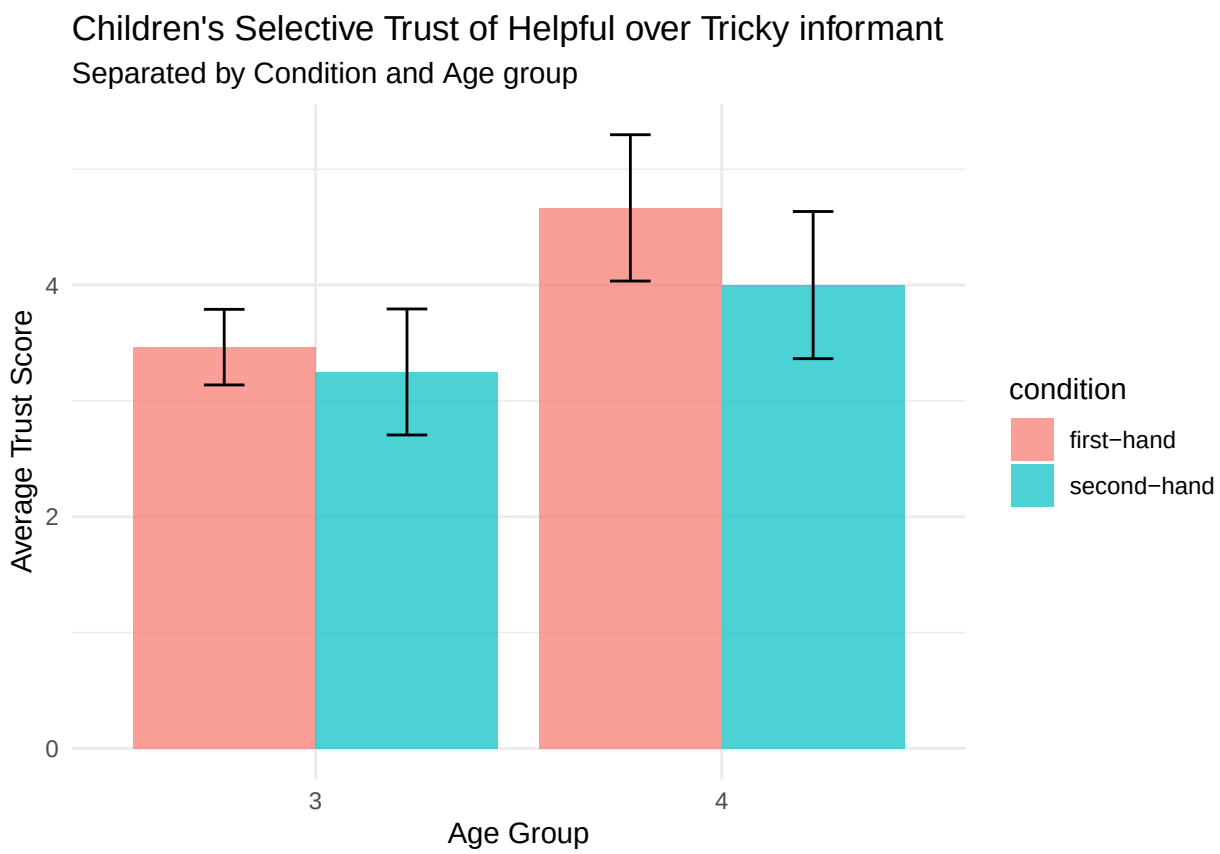

Figure 1. Average trust predicted by age-group, with four-year-olds showing higher trust than three-year-olds, but not condition.

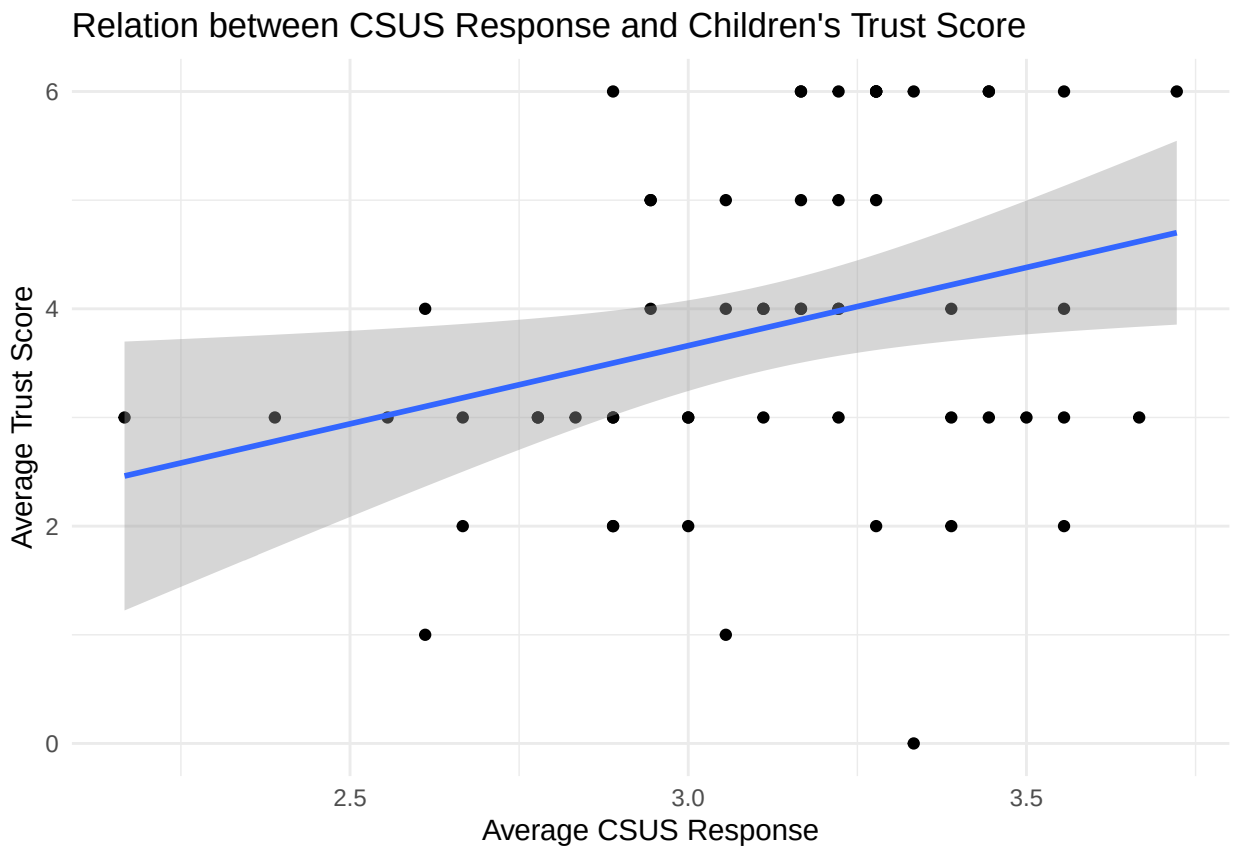

Figure 2. Correlation between Average CSUS repsonse and Average Trust. CSUS Response is parent's response on their Children's Theory of Mind.

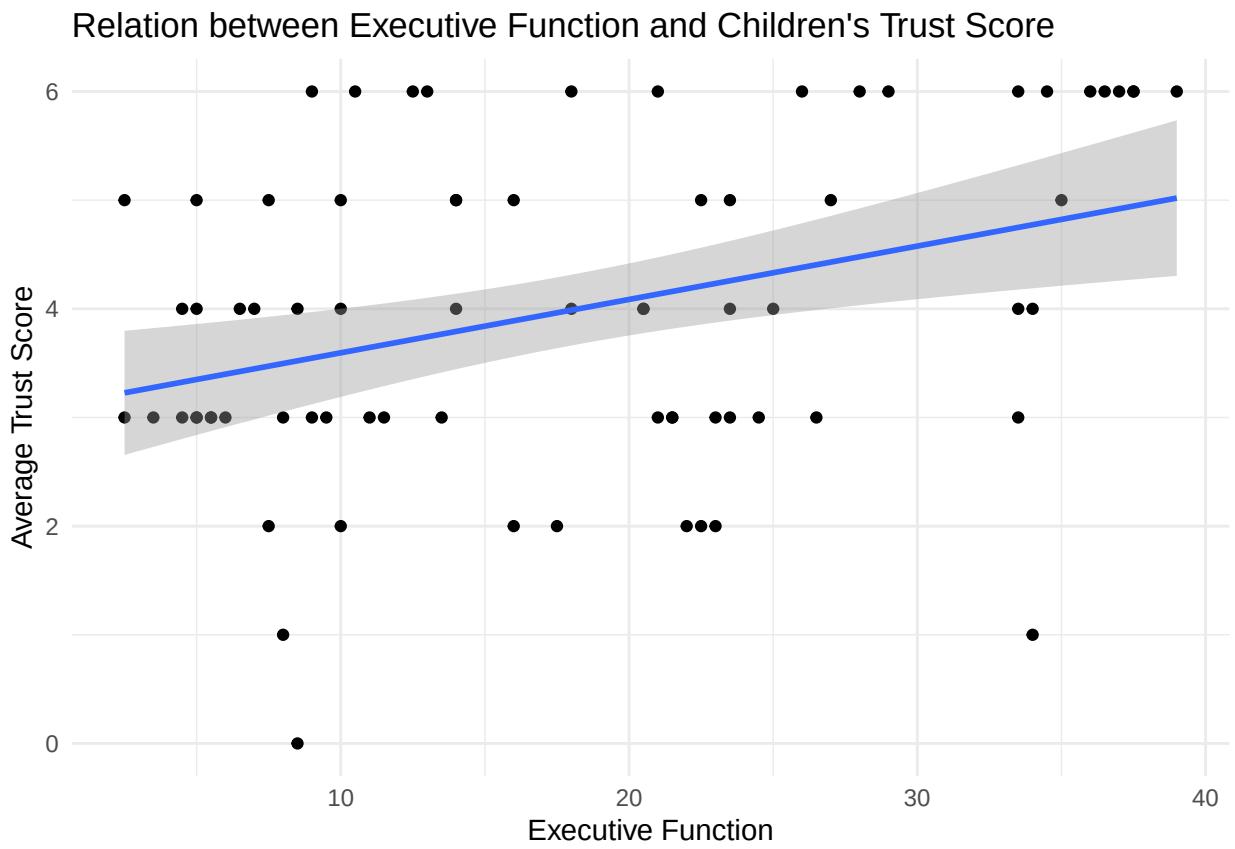

Figure 3. Correlation between Executive Function and Average Trust