Preschoolers sometimes seek help from socially engaged informants over competent ones

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ABSTRACT

The current studies examine whether children can selectively seek help from more competent others to solve simple problems. Across two experiments, 4- and 5-year-old children watched two adults demonstrate using a toy: one adult appeared competent but was socially unengaged, while the other appeared incompetent but was socially engaged. Children were then able to seek help from the adults while working with their own problem-solving toys. In Experiment 1, children appeared to seek help indiscriminately between the two adults. In Experiment 2, which had a more salient competence cue, children showed a statistically significant preference for questioning the socially engaged informant. For both experiments, children were able to remember post-test which adult demonstrated which characteristic, though they did not make strong inferences regarding future behaviors. This research demonstrates that preschool-aged children sometimes prefer to seek help from socially engaged sources, even if those sources may not be competent.

1. Introduction

From very early on in life, children prefer to learn from people who seem knowledgeable over people who do not. For instance, 14- to 24-month-olds respond differently to someone who is likely to know something (e.g., has previously labeled a familiar object correctly; has looked inside a box) compared to someone who is not knowledgeable (e.g., Chow, Poulin-Dubois, & Lewis, 2008; Koenig & Woodward, 2010). Looking at slightly older children, 3- and 4-year-olds are more likely to learn object names and functions from someone who has correctly identified the objects in the past than someone who has not (e.g., Koenig, Clément, & Harris, 2004). Indeed, a number of studies have found that by age 4, children are quite successful at selectively learning from informants who are somehow *competent* (i.e., able to provide accurate information; e.g., experts on a topic, shown knowledge in the past) over those who are not (for reviews, see Mills, 2013; Sobel & Kushnir, 2013).

In a real-world context, however, competency is only one of the many characteristics that people use when evaluating whether to trust informants' claims. In order to understand whether other characteristics sometimes trump competence in trust decisions, several recent studies have pitted two informants with different characteristics against each other. Some studies have focused on contrasting competence with stable, unchangeable characteristics of informants, like age and gender. In these studies, competency typically supersedes any previous preferences shown toward the stable characteristics (Jaswal & Neely, 2006; Taylor, 2013). Other research has examined competency with other characteristics that may be more dynamic and susceptible to change, such as an informant's level of niceness or meanness. In this research, preschool-aged children frequently (but not always) prefer to learn words from a competent informant who is mean over an incompetent informant who is nice (Johnston, Mills, & Landrum, 2015). Although there

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are exceptions to this (e.g., Landrum, Mills, & Johnston, 2013), it seems that when competence and other characteristics are weighed against each other, preschool-aged children *tend* to prefer to trust based on competence.

Notably, however, much of the past selective trust research has involved experimental paradigms that focus on children responding to competing factual claims, such as determining the name of an object or deciding which expert best answered a question (e.g., Corriveau & Harris, 2009; Jaswal & Neely, 2006; Landrum et al., 2013; Brosseau-Liard & Birch, 2010; Pasquini, Corriveau, Koenig, & Harris, 2007). In everyday life, preschool children are likely to encounter other tasks that are less fact-based, such as how to complete a puzzle or how to recognize a pattern, and these problem-solving tasks can provide many opportunities for children to consult adults for help. Findings from past research indicating that children tend to prefer more competent informants over less competent ones may not apply when children are consulting adults for information in help-seeking situations. The current research investigates this issue.

Prior research examining help-seeking behaviors has focused on the circumstances under which children ask for help, whom they question, and how they ask. When it comes to deciding when to seek help, preschool-aged children most typically request help from others when they are faced with problems that they find challenging, either because of the inherent difficulty of the problems or because of weaknesses in their own skill set for those problems (Vredenburgh & Kushnir, 2015). Regarding whom they question, preschool-aged children most often seek help from parents and teachers, though they also seek help from other adults and peers (Newman, 2000; see also Boehm, 1957; Edwards & Lewis, 1979). In regards to how they ask, they tend to use a combination of nonverbal and verbal strategies (Cooper, Marquis, & Ayers-Lopez, 1982), with young children sometimes preferring nonverbal strategies (Carpenter & Nagell, 1998) and becoming more capable of using verbal strategies, like questions, as they get older (Mills, Legare, Bills, & Mejias, 2010).

Although the above research demonstrates that children do sometimes seek help from others, little research has examined the specific characteristics of others that children attend to when seeking help. One characteristic that may be important is the aforementioned competence: children may be more inclined to seek help from others who have demonstrated competence in the past than from others who have demonstrated incompetence. Indeed, research in the selective trust domain supports this idea: when children are faced only with information about competence, children prefer to learn from more competent others (for review, see Mills, 2013).

Notably, though, another characteristic that may be particularly salient to young children when they are asking for help is whether someone appears socially engaged – i.e., provides indication of an interest in interacting with others. There are several behaviors that demonstrate positive social engagement, including maintaining some level of eye contact and using language that varies in prosody. Past research has indicated that when children do not have much other information to go on, they will attend to people who demonstrate positive social engagement over people who do not. Even 14-month-olds have been shown to follow the gaze of someone who was reliable when looking for a toy over someone who was unreliable, showing how important eye gaze from others can be when learning (Chow et al., 2008). Young children also prefer to learn from someone who displays confident body cues, such as open posture or nodding one's head, over less confident ones, such as closed posture or shaking one's head (Birch, Akmal, & Frampton, 2010). Indeed, these cues may be as integral to fostering a communicative context as the information transmitted (see Csibra & Gergely, 2009).

Although we know that preschool-aged children attend to the components of social engagement, little research has examined how preschool children weigh social engagement against other characteristics when deciding whom to trust. The most closely related study examined how 2- and 3-year-old children weigh these characteristics when seeking help in a problem-solving task. This study found that when competence and social engagement were inconsistent (i.e., a competent, unengaged informant was contrasted with an incompetent, engaged informant), children did not show help-seeking behavior preferences above chance for either informant (Cluver, Heyman, & Carver, 2013). In other words, two- and three-year-olds seemed pulled in multiple directions, not knowing whom to trust when one source seemed more competent and the other source seemed more socially engaged.

Perhaps one reason that 2- and 3-year-olds did not have stronger intuitions about whom to trust is that they appear to know less about competence than older children; indeed, other research suggests that in many situations, 4- and 5-year-old children *do* have intuitions about whom to trust, and their intuitions lead them to prefer competent informants over other kinds of informants (see Mills, 2013). Moreover, we know that 5- and 6-year-olds have been found to prefer to seek information from someone who gets them to the outcome that they would like, regardless of intentions (see Liu, Vanderbilt, & Heyman, 2013). Thus, perhaps 4- and 5-year-olds will focus on gathering information from a more competent informant, who is more likely to provide information leading to a successful outcome, than a socially engaged one.

The two experiments presented here varied the levels of competence and social engagement to better understand what matters most for preschool-aged children when seeking help for problem-solving. When confederates display competence and social engagement inconsistently (high levels of one with low levels of the other), we hypothesized that four- and five-year-old children will weigh competence as more salient, as indicated by a greater likelihood of seeking help from the confederate that displays high levels of competence and low levels of social engagement. We also hypothesized that children will show explicit recognition of these two informant characteristics, measured in this study with post-test questions.

2. Experiment 1

2.1. Method

2.1.1. Participants

Twenty-nine preschool children were recruited. Because three children did not receive permission to be videotaped, the total
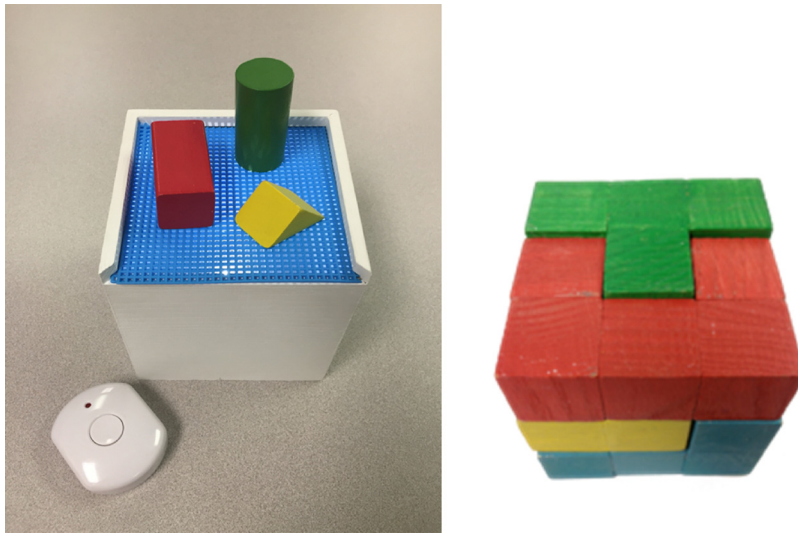
Fig. 1. Picture of blicket detector (left) and 3D puzzle (right).

number of children included for analyses was 26. Ages ranged between 4 and 5 ($M = 4.88$, $SD = .400$), with a gender distribution of 54% male and 46% female. Children were recruited from preschools in North Dallas, Richardson, and Plano.

2.1.2. Materials

The first apparatus for testing was a "blicket detector box" (modeled after Gopnik & Sobel, 2000; Legare, Gelman, & Wellman, 2010), which is a box with the top made of semi-opaque plastic. There were four different colored tops that could be exchanged out of sight of the child to make it look like there were four distinct detector boxes. An LED light was placed inside the box underneath the plastic layer, so that if turned on, the top of the box would light up. A remote was used to turn the light on and off, thus granting an experimenter the ability to control the light. Each blicket detector box was paired with a small set of blocks, such as a green triangle or a long red rectangle. The conceit of the box was that it would light up when the correct block configuration was placed on top, though this was simply controlled by the experimenter. The second apparatus for testing was a 3D puzzle. Images of both apparatuses can be seen in Fig. 1. These two apparatuses were chosen because two tasks were needed that fit specific criteria: the apparatuses needed to have the flexibility to be difficult enough for children to spontaneously seek help and yet easy enough for children to complete them with assistance; it needed to be clear if children made incorrect moves in order for them to recognize they needed help without having someone else tell them; and it needed to be obvious when the apparatuses had been completed. Two small squares of paper were also used for children to touch to nonverbally request help. Headshots of the two female actors were also taken so that when children were answering post-test questions about the actors, they would be able to point to the picture of the person (see

Fig. 2. Headshots of the actors from Experiment 1.

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2.1.3. Procedure

Following a similar methodology to Cluver, Heyman, and Carver (2013), each participant was brought into the designated testing area by an experimenter and sat at a table in the middle of the room. Two female "actors" sat on either side of the table near the child.

Before any testing procedures began, the experimenter led the child through a brief "getting to know you" activity, where the experimenter asked the child a few casual questions to get the child comfortable talking in front of the actors. The child was then told that he or she would see two people demonstrate how to use two of the detector boxes and then the child would get to play with different versions of the toy themselves.

For the *first demonstration phase,* children watched two actors attempt to demonstrate how to make two different blicket detector boxes successfully light up. One actor displayed high levels of competence (i.e., successfully making the blicket detector box light up) and low levels of social engagement. Low social engagement was operationalized as making poor eye contact (e.g., looking at the task but not at the child), not smiling, sitting with a slouched posture, and speaking with a monotone prosody. The other actor displayed low levels of competence (i.e., not making the blicket detector light up) and high levels of social engagement. High social engagement was operationalized as making good eye contact (e.g., looking between the child and the task), smiling, sitting with a straight, open posture, and speaking with a dynamic prosody. Which actor presented which characteristics, as well as the order in which participants saw them, were counterbalanced. Independent raters, who were unaware of which characteristics the actors were assigned, reviewed 20% of the videos to verify that the level of social engagement being demonstrated matched what each actor was assigned. To determine this for each actor in each video, raters used a 3-point scale to indicate the degree to which the actor exhibited behaviors associated with social engagement (i.e., level of eye contact, smiling, sitting with a straight, open posture, and exhibiting dynamic prosody). The ratings confirmed that overall, our actors demonstrated the qualities that we intended them to during the actual testing trials. The socially engaged actors were generally rated as displaying all of the social engagement behaviors and no signs of being socially unengaged, whereas the socially unengaged actors were generally rated as displaying no social engagement (e.g., no eye contact, not smiling, closed posture) and no signs of being socially engaged. The only exception to this is that occasionally (for three out of the 10 actor samples), an actor was rated as falling at the midpoint for one behavior, but the rest of the four behaviors were rated in accordance to the assigned characteristics (e.g., if eye contact was rated on the midpoint of the scale for the socially engaged actor, the other three behaviors were rated as being socially engaging).

Notably, a number of steps were taken to minimize the possibility that children's help-seeking behaviors might be influenced by confounding characteristics of the actors. First, the two actors were recruited from a larger pool of research assistants and applicants based on their similarity in appearance (e.g., similar in ethnicity, hair color, and attractiveness). Second, the actors went through extensive training such that both actors could play either role during the study (i.e., either competent and socially unengaged or incompetent and socially engaged). Third, several research assistants not on the project initially reviewed the actors' behaviors to determine that they were behaving according to their role. Fourth, during the study itself, the actors dressed in a similar way (e.g., hair in a ponytail, jeans), with the only difference being the color of their shirts (one wore orange, the other wore green). Finally, which actor presented which characteristics, as well as the order in which participants saw them, were counterbalanced.

One at a time, each actor left the room while the other provided demonstrations of two of the blicket detector boxes. This was done by placing 3D blocks in specific configurations on top of each box while providing scripted commentary of their actions (e.g., "First, I place the blue square here…"). The box would light up once the competent/unengaged actor placed the items on the box (i.e., after providing the correct configuration), but would remain unlit after the incompetent/engaged placed the items. For each of the two sets of blocks, the actors demonstrated each designated combination twice to reinforce what the actor had just done.

For the *first testing* phase, the child had the opportunity to interact with the third and fourth detector box. The child sat at the head of the table while the two actors sat diagonally from the child on the left and right sides of the table, which was counterbalanced between subjects. Between each actor and the child, a yellow square of paper was taped to the table as a "button" the child could touch as a nonverbal indication that they wanted help from that actor. This nonverbal option was included after piloting indicated that some children were hesitant to verbally request help. A camera was also set up facing the child to view the child's reactions.

During the testing phase, the child was told that his or her goal was to make the blicket detector box light up by placing the shapes to figure out the correct configuration, and that they could ask the actors for help either verbally (i.e., asking questions) or nonverbally (i.e., touching the button in front of that actor). The experimenter then left the room to let the child interact with the apparatus and the two actors as he or she wished. While testing occurred, each actor sat quietly doing a minimally distracting task of Sudoku so that they were not simply sitting and staring at the child throughout (and thus providing the child with continuous feedback on their social engagement).

If a help seeking behavior was directed at an actor, she provided a scripted response for the next step in the task (e.g., the competent actor provided the correct shape configuration, and the incompetent actor provided an incorrect configuration). The main experimenter returned to the room either when the child successfully made the box light up or after 5 minutes had passed. After the trial with the first detector box, the children repeated the procedure with the second detector box.

The *second testing phase* was conducted identically to the first testing phase, except with the child working to complete two 3D puzzles. There was no demonstration phase before the puzzles, as we wanted to see if children would carry over the previously demonstrated characteristics into a similar, but distinct, problem-solving task.

Finally, for the *post-test* phase, children were asked a number of questions (based on questions used in Liu et al., 2013). Children were first asked two *explicit judgment* questions: one related to competence ("Which of these people made the blicket detector box light up?") and one related to social engagement ("Which of these people looked at and smiled at you more often?"). These questions

Table 1
Distal Inference Questions for Experiment 1 and 2.

Competence	1. Which person do you think could fix a broken bike?
	2. Which person knows what kind of plant is used to make crayons?
	3. Which person would forget how to get to the grocery store?[a]
	4. Which person would get a lot of questions wrong on her homework?[a]
Engagement	5. Which person would share her toy with someone who didn't have one?
	6. Which person would you rather have read you a story?
	7. Which person would ignore her mom when asked to clean her room?[b]
	8. Which person would be more likely to steal presents from her friends?[b]

[a] Children were expected to choose the *in*competent adult.
[b] Children were expected to choose the *un*engaged adult.

allowed us to determine whether children explicitly recognized which actor demonstrated which characteristics.

Then, children answered eight *distal inference* questions: four related to competence and four to social engagement. The distal inference questions assessed what attributions children made about the actor's potential behavior in the future. The purpose of these questions was to gather information on the inferences children were making based on the characteristics of the informants. Within each of these two subcategories, four of the questions had the "correct" answer be the competent/unengaged actor (e.g., competence: "Which person do you think could fix a broken bike?"; socially unengaged: "Which person would ignore her mom when asked to clean her room?"), while the other four had the "correct" answer be the incompetent/engaged actor (e.g., incompetence: "Which person would forget how to get to the grocery store?"; social engagement: "Which person would share her toys with someone who didn't have one?"; some questions modified from Johnston et al., 2015). Note that the questions were categorized based on adults' intuitions regarding which of the two actors best addressed the question. These questions were exploratory, given past research finding "halo effects" in how children make inferences about others (Cain, Heyman, & Walker, 1997; Heyman, Gee, & Giles, 2003). For a full list of stimuli, see Table 1.

2.1.4. Coding

To determine how much and what manner of help-seeking occurred, several help-seeking behaviors were coded. We recorded each time children asked a direct question related to help-seeking (e.g., "What piece goes next?", "How do I do this?") and each nonverbal request for help (e.g., touching a button in front of the actors). We also recorded which actor the children directed help-seeking behaviors towards first for each trial, as well as how many displays of help-seeking were made and to whom (e.g., how many to each actor, both actors, or not directed at anyone). Any verbal or nonverbal behaviors made that were not related to help seeking (e.g., "This is fun!" or clapping their hands) were not coded.

To distinguish between one help-seeking behavior and two if multiple occurred in a short span of time, a time gap method was used (as seen in Thompson, Cothran, & McCall, 2012). If two distinct verbal or nonverbal requests for help occurred within a two second span of each other, this counted as one help-seeking instance. However, if the second independent utterance occurred more than two seconds after the cessation of the first utterance, this was considered two distinct help-seeking instances.

2.1.5. Preliminary study

As a preliminary exploration of preschool children's selective trust of competence and social engagement, we conducted a pilot study with 12 children to examine whether 4- and 5-year-olds, like younger children, preferred to seek help from a competent, socially engaged informant over an incompetent, socially unengaged informant. Given that over 80% of 3-year-olds in Cluver et al.'s (2013) study preferred the competent, socially engaged informant over the incompetent, socially unengaged one, and given that this study was comprised of an age range more typically used in these kinds of selective trust studies, we expected 4- and 5-year-olds to also show a strong preference for the competent, socially engaged informant. Thus, this study served mostly as a check that when both characteristics were positive, children would prefer to seek help from that individual. The methodology was the same as described above for the main task, except that one of the actors was both competent and socially engaged, and the other actor was incompetent and not socially engaged.

2.2. Results

2.2.1. Preliminary study

Overall, children asked the competent, engaged informant for approximately 75% of their total number of help-seeking requests, and on a trial-by-trial basis, 85% of the children had their first help-seeking request toward the competent, engaged informant over the incompetent, unengaged informant. Children performed near ceiling on questions regarding explicit recall regarding which informant was competent and socially engaged (competence: 92%; social engagement: 92%, $ps < .01$). They also trended towards making inferences for future behavior based on the behaviors presented in training ($M = 5.00$ of 8, $SD = .1.81$, 95% CI [−0.15, 2.15]), $t(11) = 1.92$, $p = .08$, $d = .55$). Thus, the pilot data suggests that children understood the behaviors they were observing, at least when each informant had either consistently positive or consistently negative characteristics.

Table 2

Descriptive Information for Children Who Asked for Help in Experiment 1[a,b].

# Times asked for help overall	# Trials help sought (of 4)	Percentage asked competent/ unengaged actor first	Percentage asked competent/ unengaged actor total
1	1	100	100
1	1	0	0
2	1	0	0
3	3	66	66
3	3	0	0
3	2	1	66
4	3	0	0
4	3	100	25
7	4	0	0
8	4	25	36
12	3	100	83
13	4	100	100
14	3	0	43
14	4	100	100
14	4	25	57
18	4	50	72
20	4	0	35
21	4	25	48
23	4	0	43
29	4	25	38

[a] Each row represents the descriptive information for a single participant.
[b] An additional 6 children never asked for help.

2.2.2. Did children seek help?

Twenty out of 26 children sought help on at least one of the four trials (6 children did not ask for help at all). Overall, greater than 60% of children asked for help on three or more trials. Notably, though, there was significant variability in how frequently children sought help: the number of times each child asked for help spanned from 0 times to 29 times across the four trials ($M = 8.23$, $SD = 8.61$). See Table 2 for additional descriptive information. The number of times children sought help for each trial was not normally distributed, and thus we ran non-parametric analyses to assess whether there were differences by both trial and task type. We first ran a Friedman test on the number of times children asked for help for each trial, and found no statistically significant difference between trials, $X^2(3) = 5.38$, $p = .15$. We then conducted a Wilcoxon signed-rank test to see if there were differences in the amount of help-seeking for the detector boxes (trials 1 and 2) and the puzzles (trials 3 and 4). Results showed that children sought help more for the puzzles than for the detector boxes, $Z = -2.82$, $p < .01$. To note, the detector boxes took three pieces to complete while the puzzles took five pieces to complete, and thus the puzzles, by nature, would require more help-seeking requests to be completed. All analyses presented below were planned unless otherwise indicated.

2.2.3. Did children prefer to seek help from one actor over the other?

In order to look at children's preferences among the actors, the analyses presented here are focused on the children that sought help from either actor at least one time. Children who did not seek help, and thus did not show a preference toward either actor, are excluded from these analyses. In doing this, we are able to examine the preferences and patterns among all children that solicited help-seeking behavior.

Overall, children sought help from the competent, unengaged actor ($M = 45.77\%$, $SD = 34.87\%$) about as frequently as from the incompetent, engaged actor ($M = 54.23\%$, $SD = 34.87\%$), $t(19) = .54$, $p = .59$, $d = -0.24$. In reviewing patterns of responses, contrary to our hypothesis, it appeared that children were slightly *less* likely to question the competent, unengaged actor. Approximately 40% of children asked the competent, unengaged actor for half or less of their help-seeking requests, and 25% *never* asked the competent, unengaged actor for help. Notably, there were enormous individual differences in patterns of responses, with children sometimes switching back and forth between the informants (see Table 2). Because the number of times children sought help from the competent, unengaged actor was not normally distributed (Shapiro-Wilk test of normality: $S\text{-}W = .86$, $df = 20$, $p = .009$), non-parametric analyses were conducted.

For each trial, we examined from whom children requested help first. Theoretically, children should first seek help from the actor they would prefer to learn from. Therefore, we planned to conduct binomial tests for each of the four trials to assess whether children selected either actor first at levels significantly different from chance. For each binomial test, the number of participants was limited to the number of children that asked for help during that trial. For Trial 1, fifteen children asked for help. The binomial test indicated that the percentage of children that first chose the competent, socially unengaged actor was 47%, which was not statistically different from chance (50%), $p = 1.00$. For Trial 2, sixteen children asked for help, with 19% first asking for help from the competent, socially unengaged actor; this pattern was significantly different from chance levels, $p = .02$. For both Trials 3 and 4, sixteen children asked for help, with 38% of them first asking the competent, socially unengaged actor for help, which was not significantly different than chance, $p = .45$. Inspecting the data across the trials, it appears that, if anything, children showed a slight preference *against* seeking help from the competent, socially unengaged actor.
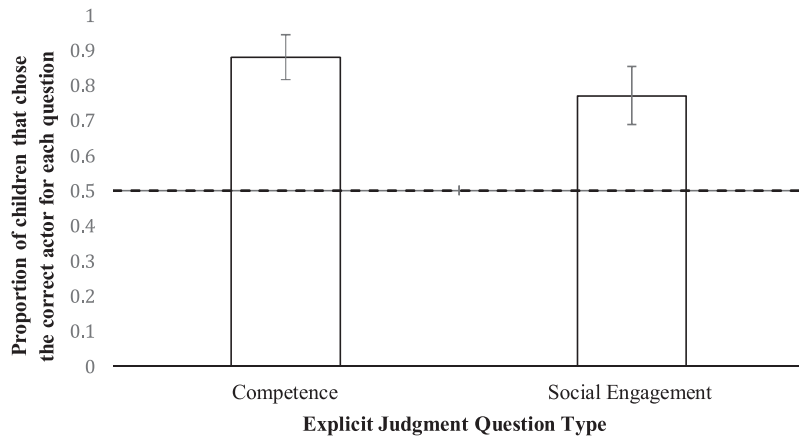
Fig. 3. The proportion of children in Experiment 1 that selected the competent/unengaged actor for the competence explicit judgment question and the incompetent/engaged actor for the social engagement explicit judgment question out of the total number of children. Error bars represent standard errors.

2.2.4. How frequently did children complete the puzzles?

We were then interested in whether and how often children completed any of the puzzles. This can help tell us whether children are engaging in help-seeking behaviors in ways that are effectively helping them solve the tasks. Indeed, if children ask the competent actor for help, their accurate feedback may increase children's likelihood to complete the tasks. Importantly, we found that children rarely finished any of the trials to completion. Only seven children completed at least one of the four trials, which include trials where the child asked the competent actor for every piece. Of those seven children, only one child completed a single trial with no help from the actors, and three children were able to put only the last piece correctly after asking for help on the rest. Overall, most completed trials were due to asking the competent actor frequently enough to solve the problem. Thus, only a small portion of the sample used an effective help-seeking strategy. The remainder of the children were using help-seeking strategies that did not help them solve the problems.

2.2.5. Post-test questions

We conducted analyses on both the explicit judgment questions and inference questions. For the explicit judgment questions, we examined the two question types separately with binomial tests. As expected, for both the competence and the social engagement explicit judgment question, children chose the correct actor at greater than chance levels (competence: 88%, $p < .001$; social engagement: 77%, $p = .011$) (See Fig. 3). We then examined whether there was any relationship between children's performance on the explicit judgment questions and their selection of actors during the trial (for both frequency and proportion), but no significant correlations emerged, all $rs(18) < .32$, all $ps > .14$. This suggests that explicit recognition of which informant was most competent or which one was most socially engaged did not lead to greater help seeking from that informant.

For the distal inference questions, we summed the number of times children chose the correct informant for the competence and social engagement questions. To analyze children's performance on the overall distal inference question set, the competence subset, and the social engagement subset, three single-sample t tests with Bonferroni adjusted alpha levels of .017 were conducted. First, a single-sample *t*-test was conducted to compare performance on the full set of questions against chance (4 out of 8 questions). We found that, contrary to expectation, children did not make inferences overall about the characteristics at above chance levels ($M = 4.38$ of 8, $SD = .85$, 95% CI [.04, .73]), $t(25) = 2.30$, $p = .030$, $d = .45$). Children also did not make inferences when looking at the competence distal inference questions ($M = 2$ of 4, $SD = .75$, 95% CI [-.30, .30]), $t(25) = .00$, $p = 1.00$, $d = 0$, or the social engagement distal questions ($M = 2.38$ of 4, $SD = 1.10$, 95% CI [-.06, .83]), $t(25) = 1.79$, $p = .086$, $d = .35$). In other words, although children did not seem to make inferences regarding the actors' future behavior.

2.3. Discussion

Our findings for this experiment did not support the hypothesis that preschool children would show a preference for a competent, unengaged informant when seeking help during a problem-solving task. Indeed, children did not show a strong overall preference for one informant more than another, either for whom the child selected to seek help from first, or for the number of help-seeking behaviors toward each informant. When children did have a preference (Trial 2), they leaned towards selecting the incompetent, engaged adult.

The lack of a strong preference for the competent, unengaged informant does not appear to be due to children forgetting which informant displayed which characteristics. In the post-test questions, children explicitly recognized which actor was the most competent and which was the most socially engaged at greater than chance levels. That said, children did not transfer the actors' behavior that related to a specific characteristic onto new, but similar, situations, as children's performance on the inference question was not statistically significant. Importantly, however, children were not simply showing a bias toward selecting only one of the

informants for the post-test questions.

These findings are consistent with research with 2- and 3-year-olds (Cluver et al., 2013). That said, another possible explanation for our findings with 4- and 5-year-old children is a methodological one. Perhaps children did not show consistent selection patterns in this study because they were not provided with real-time feedback to indicate whether an adult was actually providing helpful or correct information. Indeed, once the study began, children could not tell if the adult gave them correct or incorrect information unless they asked for help on every piece. Therefore, children may have vacillated between the actors because they were unable to tell which adult, if either, was helping them effectively. With more consistent feedback on whether the actor had provided helpful information, children would be able to see the outcomes of their actor selections more clearly throughout each step of a trial, regardless of whether they were able to complete the trial. Thus, children might be more likely to prefer the competent informant. Experiment 2 seeks to address this issue.

3. Experiment 2

3.1. Method

3.1.1. Participants

Thirty-eight preschool children were recruited; an additional child was tested but excluded from data analysis due to procedural error. Ages ranged between 4 and 5 ($M = 4.86$, $SD = .45$), with a gender distribution of 58% male and 42% female. Children were recruited from preschools in North Dallas, Richardson, and Plano.

3.1.2. Materials

A blicket detector box was used. It was similar to the one used in Experiment 1, but was now made to look like it was connected via a wire to an electronic candle placed outside of the box. The wire was used to simulate that the candle and box were electronically connected, though the candle was actually controlled by a handheld remote. The candle was placed outside of the box to make it more obvious when the light changed. The light had four color options to represent how many pieces were placed correctly: a default yellow, red for one piece correct, blue for two pieces correct, and green for all three pieces correct. To help children keep track of the color meanings, a laminated sheet of paper with a stoplight pattern was created; a red circle with a "1" was centered in the bottom, a blue circle with a "2" above that, and a green circle with a "3" was at the top (see Fig. 4).

Like Experiment 1, the detector box had four different colored tops (two for the demonstration phase, two for the test phase) and a set of 3D shapes to go with each top. The nonverbal button option was changed from two yellow pieces of paper (Experiment 1) to flat wood circles: one painted green and one orange to match the shirt colors of the actors. Headshots of the two different female experimenters were taken to use during the post-test question phase.

3.1.3. Procedure

Experiment 2 followed a similar procedure to Experiment 1, with a few changes. First, the *demonstration phase* reflected the updates to the detector box. Before the actors gave their demonstration, the experimenter first explained to the child how the box worked. Children were shown 3D shapes were told that when the correct pieces were placed on top of the box in specific places, the light would change color. Children were told that each detector box came with six shapes, though only three were needed to make the light change colors. The experimenter then familiarized the child with the laminated stoplight, which rested on an easel-like picture holder so the child could see it throughout the experiment. She explained that the light would turn red when one piece was placed correctly on top of the box, the light would turn blue when two pieces were placed correctly, and the light would turn green if all three pieces were placed correctly. Children were encouraged to look to the stoplight picture if they needed to remember what each of the colors meant. The two actors then performed their demonstrations as in Experiment 1. Independent raters coded 20% of the videos to make sure the actors were displaying their social engagement behaviors in accordance with what they were assigned. Like in Experiment 1, each actor overall displayed all of their behaviors (or lack of behaviors; e.g., eye contact, smiling, prosody, body language) appropriately for each participant.

The *test phase* procedure remained similar to Experiment 1, with two trials instead of four. Children completed both trials with the
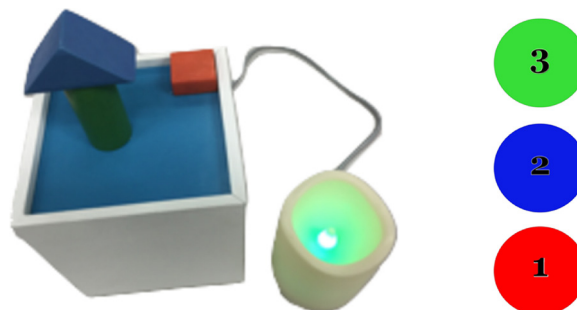

Fig. 4. Picture of a blicket detector (left) and stoplight pattern (right) from Experiment 2.

Table 3
Proximal Inference Questions for Experiment 2.

Competence	1. If you were working on a hard puzzle and had to ask someone how to solve it, which person would you ask?
	2. If you didn't know the answer to a question, which person would you ask?
	3. If you couldn't get a toy to start working, who would you go to to fix it?
	4. If you needed help correctly building a birdhouse, which person would you have help you?
Engagement	5. If you wanted to play with someone who is fun, which person would you want to play with?
	6. If you wanted to tell someone a funny joke, which person would you tell it to?
	7. If you wanted someone to listen as you talked about your day, which person would you talk to?
	8. If you were giving a puppet show, which person would you want to watch it?

detector box. We chose to focus on the detector boxes because of our increased emphasis on tracking children's accuracy during the trials. The addition of the spotlight method to indicate the number of correct pieces was much easier to implement for the detector boxes than it was with the more complex 3D puzzles. Thus, the puzzle trials were omitted. The remote-controlled light also worked in the same way as Experiment 1, except that it would change color every time a correct piece was placed, as opposed to only if the trial was completed. After the second trial, if children did not complete the detector box, the main experimenter asked the child explicitly whom they would like to see complete the detector box. To avoid biasing children on any of the trials, this was only asked after the last trial.

The *post-test* phase was also very similar to Experiment 1. The same explicit judgment and distal inference questions were used. Moreover, because children did not make strong inferences based on the distal inference questions provided in Experiment 1, the new set of proximal inference questions was included to evaluate whether children would be more likely to attribute inferences when the actor's behavior would directly impact them. The *proximal* inference questions involved 8 questions that were directly related to the child (e.g., competence: "If you couldn't get a toy to start working, who would you go to to fix it?"; social engagement: "If you wanted someone to listen as you talked about your day, which person would you talk to?") (See Table 3).

3.1.4. Coding

Coding was conducted identically to Experiment 1.

3.2. Results

3.2.1. Did children seek help?

Twenty-eight of 38 children sought help on at least one of the trials. Overall, more than 50% of children asked for help three or more times. Of the children that asked for help, approximately two-thirds of them asked for help on both trials. Much like Experiment 1, there was significant variability in the number of times each child asked for help (range: 0–18, $M = 4.5$, $SD = 4.68$; see Table 4 for additional descriptive information). We then ran a Wilcoxon signed-rank test to determine whether there was a difference in the amount of children's help-seeking overall between trial 1 and trial 2. We found that children sought significantly more help for trial 2 than for trial 1, $Z = -2.14$, $p = .03$.

3.2.2. Did children prefer to seek help from one actor over the other?

Contrary to expectation, children sought help from the competent, unengaged actor ($M = 34.66\%$, $SD = 28.74\%$) significantly *less* frequently than the incompetent, engaged actor ($M = 65.37\%$, $SD = 28.74\%$), $t(27) = 2.82$, $p = .009$, $d = 1.07$. When looking at the pattern of responses, children were less likely to question the competent, unengaged actor. Only approximately 40% of children that asked for help asked the competent, unengaged actor for more than half of their help-seeking requests, with 4% of children asked her every time. This was in contrast to help-seeking requests toward the incompetent, socially engaged actor, with almost 29% of children asking her for help every time.

We then ran binomial tests on the children that asked for help to see who children asked for help from *first* when they asked for help. For Trial 1, twenty-one children asked for help. The binomial test showed that 19% of children first chose the competent, socially unengaged actor, which was statistically different from chance levels (50%), $p = .007$. For Trial 2, twenty-six children asked for help. The binomial test indicated that 35% of children first asked for help from the competent, socially unengaged actor, which was not statistically different from chance levels, $p = .17$. This shows that children displayed a preference for seeking help from the incompetent, socially engaged actor first during Trial 1, though they shifted to showing no preference for whom to ask first in Trial 2.

For the children that did not determine the correct combination of blocks for Trial 2 before the time ran out ($n = 27$), they were asked to choose one actor to watch complete it. A binomial test was run to determine whether children overall showed a preference for one actor over the other when asked to explicitly select one to watch. Results indicated that children did not choose either actor at above chance level (50%), $p = 1.00$.

3.2.3. How frequently did children complete the puzzles?

Only eight children completed any of the trials. Four children completed one of the two trials, while another four children were able to complete both trials. For each completed trial, the child asked the competent actor frequently enough for her to place every piece.

Table 4

Descriptive Information for Children Who Asked for Help in Experiment 2[a,b].

| # Times asked for help overall	# Trials help sought (of 2)	Percentage asked competent/ unengaged actor first	Percentage asked competent/ unengaged actor total
1	1	0	0
1	1	0	0
1	1	0	0
1	1	0	0
1	1	0	0
1	1	100	100
2	2	0	0
2	2	50	50
3	2	0	33
3	1	0	33
3	1	100	67
4	1	0	0
5	2	0	20
5	2	50	60
6	2	50	67
7	2	50	57
7	2	0	29
7	2	0	29
9	2	50	67
10	2	50	60
10	2	0	10
10	2	100	60
10	2	100	60
10	2	0	60
11	2	0	27
11	2	50	55
12	2	0	0
18	2	0	28

[a] Each row represents the descriptive information for a single participant.

[b] An additional 10 children never asked for help.

3.2.4. Post-test questions

We examined each explicit judgment question with a binomial test. For both explicit judgment questions, children selected the correct actor at greater than chance levels (competence: 79%; social engagement: 89%, $p < .001$) (See Fig. 5). We then examined whether there was any relationship between children's performance on the explicit judgment questions and their selection of actors during the trial (for both frequency and proportion), but no significant correlations emerged, all $rs(26) < .32$, all $ps > .10$. This suggests that explicit recognition of which informant was most competent or which one was most socially engaged did not lead to greater help seeking from that informant.

We then looked at the distal and proximal inference question sets. Like Experiment 1, we first summed the number of times children selected the correct informant and analyzed the total with single-sample t-tests against chance. We then ran seven single sample t-tests on the inference questions using Bonferroni adjusted alpha levels of .007. First, collapsing across the two question sets,
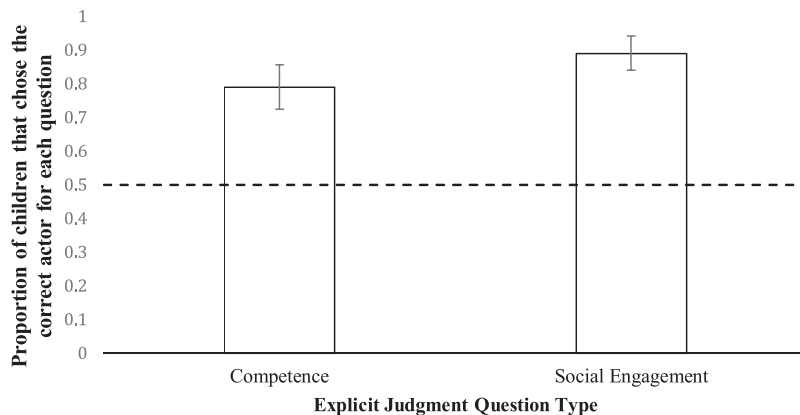
Fig. 5. The proportion of children in Experiment 2 that selected the competent/unengaged actor for the competence explicit judgment question and the incompetent/engaged actor for the social engagement explicit judgment question out of the total number of children. Error bars represent standard errors.

children, contrary to expectation, did not make inferences about the characteristics at greater than chance levels (8 of 16 questions), $M = 8.71$, $SD = 1.84$, 95% CI [.10, 1.32]), $t(37) = 2.38$, $p = .023$, $d = .39$). Also contrary to expectation, when looking at the separate question sets, children did not make inferences about the characteristics above chance for either the proximal inference questions, ($M = 4.42$ of 8, $SD = 1.48$, 95% CI [-.07, .91]), $t(37) = 1.75$, $p = .09$, $d = .28$) or the distal inference questions, ($M = 4.29$ of 8, $SD = 1.27$, 95% CI [-.13, .71]), $t(37) = 1.40$, $p = .17$, $d = .23$).

We then looked within each question set at the competence inference questions and the social engagement inference questions. The distal social engagement inference subset (2 of 4 questions), ($M = 2.29$, $SD = .77$, 95% CI [.04, .54]), $t(37) = 2.32$, $p = .03$, $d = .38$, the distal competence inference subset, ($M = 2.0$, $SD = .87$, 95% CI [-.29, .29]), $t(37) = .00$, $p = 1.00$, $d = 0$, the proximal competence inference subset, ($M = 2.21$, $SD = 1.26$, 95% CI [-.20, .62]), $t(37) = 1.03$, $p = .31$, $d = .17$, and the proximal social engagement inference subset, ($M = 2.21$, $SD = 1.36$, 95% CI [-.24, .66]), $t(37) = .96$, $p = .35$, $d = .16$, were all not statistically significant. Thus, contrary to our expectation, children did not seem to make inferences regarding the actors' future behavior.

3.3. Discussion

The goal of Experiment 2 was to determine whether children would show a selection preference during a problem-solving task between a competent, socially unengaged actor and an incompetent, socially engaged actor if provided with a more salient and continuous competence cue. Crucially, despite providing more competence feedback, which should have theoretically drawn children's attention to the competence status of the actors, children showed a significant preference to ask for help from the *incompetent,* socially engaged actor, both in terms of the number of times they asked her for help as well as the proportion of trials they asked her first.

This was not because children did not recognize which characteristic each actor displayed; like in Experiment 1, children correctly answered the explicit judgment questions. But they did not draw strong inferences regarding actor behavior in the future; for the four different kinds of inference questions, children did not make statistically significant inferences regarding the any of the inference question subsets. Thus, overall, children did not draw strong inferences regarding actor future behavior, and they did not tend to favor one actor over the other in their responses.

When looking at children's selection patterns, there were a number of different strategies that children seemed to use. Some children never asked for help (10 children); anecdotally, we speculate that this was for different reasons (e.g., shyness, confidence that they would get the problems right on their own). Some children asked for help only once (6 children), and those children tended to prefer to ask the socially engaged informant (5 children). The majority who did ask for help more than once seemed to vacillate between asking the two actors (11 children), perhaps indicating that they were unsure of which actor would be the most effective person to seek help from. Some of the children who asked for help more than once seemed to almost exclusively favor selecting the more engaged actor with little to no interaction with the more competent actor (5 children), which may indicate that these children valued the interaction quality more than reaching the end goal. Importantly, a few of the children did more consistently request help from the competent informant, and those who did were more likely to get a correct solution (3 children).

4. General discussion

This project examined how 4- and 5-year-old children weigh two relevant characteristics – competence (i.e., how well someone is able to do something) and social engagement (i.e., how invested someone appears to be) – when seeking help for a problem-solving task. In our pilot study, we replicated past research that had been conducted with 2- and 3-year-old children (Cluver et al., 2013); 4- and 5-year-olds, like 2- and 3-year-olds, were more likely to seek help from an adult that had demonstrated both competence and social engagement than an adult that had demonstrated incompetence and no social engagement. In our main experiments, we examined how children would seek help from adults that displayed varying levels of competence and social engagement. Although several children did not seek help from either actor (6 children in Experiment 1 and 10 children in Experiment 2), of the ones that did, we predicted that children would prefer to seek help based on competence and not social engagement. The results were inconsistent with that prediction. In Experiment 1, although we found that children did not show an overall selection preference between the two actors, when they *did* have a preference, they preferred to seek help from the incompetent, socially engaged actor. In Experiment 2, of the children that asked for help, children showed a stronger preference for selecting the incompetent, socially engaged actor. Thus, it seems that when preschool children *are* showing a preference, they tend to prefer others that display social engagement over those that display competence during a difficult problem-solving task.

The preference for the socially engaged actor cannot be due to children not recognizing what characteristics were being demonstrated, since across both experiments, we found that children explicitly remembered which actor was more competent and which was more socially engaged at above chance levels. Thus, children are clearly able to recognize both characteristics in others, even when these characteristics were presented in conflict with each other. It also does not appear to be because children felt uncomfortable interacting with the actor who was socially unengaged; in both studies, children still frequently requested help from that actor, and they do not appear to infer that the socially unengaged actor is somehow "mean" (i.e., performance on the inference questions does not indicate that children thought the socially unengaged actor was more likely to behave poorly in the future than the other actor).

So why might children prefer to seek help from someone who is socially engaged over someone who is competent during this kind of problem-solving task? One significant possibility is that preschool-aged children may prefer to interact with informants who seem likely to *want* to help answer their questions, even if those informants have shown a tendency to be inaccurate in the past. Indeed, it

has been suggested that children may sometimes rely on social goals (i.e., forming relationships with others), rather than epistemic ones (i.e., obtaining accurate and relevant knowledge), to guide their behavior (Jaswal & Kondrad, 2016). For instance, when children hear testimony from a previously inaccurate in-group member and a previously accurate out-group member, 4- and 5-year-olds either do not show a preference between the two or favor the inaccurate in-group member (Elashi & Mills, 2014; MacDonald, Schug, Chase, & Barth, 2013). In these cases, children's desire to trust an in-group member (i.e., a social goal) seems to conflict with what they know about their accuracy (i.e., an epistemic goal). In the current research, it is possible that children were motivated by social goals instead of epistemic ones. Their first goal when seeking help may have been to talk to someone who appears to be friendly and engaged with them (although there are likely individual differences in this, as we discuss below). At least in the current studies, accuracy did not seem to be the primary goal, as children rarely accurately solved the problems.

A second possible explanation for why preschool-aged children prefer to seek help from someone who is socially engaged is that children of this age may link helpfulness more closely with prosocial characteristics than with competence. For instance, past research found that kindergarteners were much more likely to list global traits, such as niceness or kindness, than traits like competence when asked what characteristics make a good helper (Barnett, Darcie, Holland, & Kobasigawa, 1982). Another study found that when preschool-aged children had to decide on someone to be a helper, they reported making decisions based on prosocial characteristics (Nelson-Le Gall & Gumerman, 1984). Indeed, children's perceptions of prosocial characteristics even affect judgments of competence: a recent study found that preschoolers attributed more knowledge to nice informants than mean informants, even if both were described as having the same level of expertise (Landrum, Pflaum, & Mills, 2016). In this way, children in our task may have favored seeking help from the socially engaged actor because they were more accustomed to associating engagement with helpfulness. Similarly, children may have interpreted the cues displayed by the socially engaged actor (e.g., eye contact, interested prosody) as the actor wanting to engage in pedagogical interaction, and thus may have assumed that actor would be more willing to help. That being said, children's performance on the inference questions suggests that they did not have a strong sense of which of the informants would behave in certain ways in the future. Here, children may have felt as if both actors would behave positively, and thus choosing an actor came down to chance. Future research should examine children's inferences regarding these characteristics outside of a forced choice paradigm, as this may illuminate whether children do indeed believe that both actors would behave positively for each future behavior, and if so, whether these inferences are held to a similar strength.

Both of the above explanations focus on the idea that there are times when children may prefer to seek help from informants who are not the most competent informant in the room. We would be remiss, however, to discuss these possibilities without noting the significant variability in help-seeking behaviors across children. In our studies, there were several children who seemed to focus on competence, and at least a few of the children asked enough questions to the competent actor to solve the problems correctly. However, many children instead focused more on social engagement or flip-flopped between the actors, perhaps because they were pulled in multiple directions when trying to seek information. Although it is possible that the variability in children's responding patterns is unsystematic, it is more probable that systematic individual differences play a large role in how children seek help from others.

Little past research has examined the role of individual differences in selective trust, although there is evidence that both social cognitive skills (e.g., interpretive theory of mind with older children; Mills & Elashi, 2014) and inhibitory control skills (e.g., Jaswal et al., 2014) help children better reject claims that are inaccurate or biased. We speculate that children's propensity to seek help from others may also vary as a function of their temperament. It has been found that toddlers' temperament relates to their stranger sociability (i.e., their willingness to engage with and the quality of their interactions with unfamiliar others; Thompson & Lamb, 1982). Perhaps children who are generally more willing to approach novel stimuli would also be more open to approach an unfamiliar adult, in this case seeking help from them. In contrast, children with a tendency to avoid novel situations may also be more likely to avoid seeking help, or they may prefer to seek help only from adults who seem likely to respond positively (in this case, the socially engaged actor). Indeed, it has been found that higher levels of affect/extraversion are related to performance success on selective trust tasks – at least in young children between the ages of about 2 and 3 (Canfield, Saudino, & Ganea, 2015). For our tasks, there was great variability in how children approached the task, with some seeming eager to try to complete the puzzles, while others seemed frustrated or hesitant to ask for help. And although we did not explicitly code children's demeanor as they approached the tasks, we do know that many of the children who rarely asked for help overall (i.e., asking once or twice for help) favored asking the socially engaged actor, perhaps because they thought she was more likely to respond positively. That said, no children spontaneously commented during the trials on why they were requesting help from either actor, so we are not able to know exactly why this pattern emerged.

Other individual differences that were outside of the scope of this study could also play a role in how children seek help from others. Although our participant population was not particularly diverse, cultural differences may influence children's help-seeking behavior, as individuals from different cultures have been found to sometimes hold different attitudes regarding help-seeking. For instance, those of Mexican-American descent have been found to be less likely to want to interrupt others to ask for help as compared to European American children (Ruvalcaba, Rogoff, López, Correa-Chávez, & Gutiérrez, 2015). Socioeconomic status (SES) may also play a role: children from low-SES families have been found to ask fewer questions than children from mid-SES families (Kurkul & Corriveau, 2018), which could potentially extend to low-SES children being less likely to ask for help. Thus, additional research is needed to better understand how individual differences, such as temperament or culturally-driven attitudes toward help-seeking, may influence how preschool children seek help from others.

Overall, our research supports that preschool-aged children will seek help from an informant who is both competent and socially engaged over someone who is neither, but when informants become more complicated, children's preferences change. In fact, in our help-seeking task, 4- and 5-year-olds sometimes show a preference toward seeking help from someone who appears socially engaged

over someone who has been more competent in the past. These results indicate that in order to better characterize the development of selective trust, it will be crucial for future research to consider the reasons underlying children's information-seeking behavior. A greater understanding of the role of children's individual differences, as well as the nature of children's evaluations of informant characteristics across different situations, will help to provide a more concrete understanding of what causes children to seek – or to refrain from seeking – help from others across situations.

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