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Children use nonverbal cues from an adult to evaluate peers

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ABSTRACT
What factors contribute to children's tendency to view individuals as having different traits and abilities? The present research tested whether young children are influenced by adults' nonverbal behaviors when making inferences about peers. In Study 1, participants (aged 5–6 years) viewed multiple videos of interactions between a "teacher" and two "students"; all individuals were unfamiliar to participants. In each clip, the students behaved similarly, but the teacher did not: She either smiled, nodded, touched, or shook her head at one student, and she looked at the other student with a neutral expression. In Study 1, children tended to infer that students who received more positive behaviors from the teacher were smarter, nicer, and stronger. Study 2 pitted differences in the teacher's behavior against differences in the students' performance. When asked who was smarter, children selected lower-performing students who received more positive nonverbal cues from the teacher rather than higher-performing students who received less positive cues. These findings indicate that an authority figure's nonverbal behaviors can influence children's inferences about others and shed light on one mechanism guiding young children's evaluations of people in their social world.

How do young children form impressions of their peers' traits and abilities? What, for example, leads a child to think that Mary is nice and Carissa is not, that Michael is smarter than Kevin, or that boys are smarter than girls? Previous research has often focused on children's capacity to observe an individual's behavior and use such information to make an inference about that particular individual's nature (e.g., Nicholls, 1978; Rholes & Ruble, 1984; Yang & Frye, 2016). For instance, a child might see that Michael usually answers questions correctly and that Kevin rarely does, and he or she might conclude that Michael is smarter than Kevin. In the present research, we considered another source of information children could use to form impressions of peers: how an authority figure—in this case, a teacher—reacts to those peers. Further, we tested whether children relied more on a teacher's nonverbal reactions than on a peer's actual behavior when making a trait inference.

Understanding sources of children's peer impressions is theoretically important, as a central question for the field concerns how young children—who can be thought of as "naïve sociologists" (Hirschfeld, 1999)—learn about and evaluate the individuals and

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Color versions of one or more of the figures in the article can be found online at www.tandfonline.com/hjcd.

Both experiments in this article earned open materials and open data for transparent practices. Materials and data for Experiment 1 and Experiment 2 are available at https://osf.io/e9mhc/.

groups who comprise their social world (Banaji & Gelman, 2013). Such research is also practically important, as children's beliefs affect how they treat their peers. For example, children use simpler speech and interact less often with peers whom they believe to be unintelligent (e.g., Miller et al., 1991; Rothlisberg, Hill, & D'Amato, 1994; see also Harris, Milich, Corbitt, Hoover, & Brady, 1992). Children's beliefs about peers can also be self-fulfilling, as indicated by research showing that children tend to encourage disruptive behaviors for low-achieving peers and discourage disruptive behaviors for high-achieving peers (Hartup, 1996). Thus, a better understanding of how children form impressions could suggest strategies for improving children's treatment of one another.

To date, much of the research on children's impression formation has focused on inferences children make based on direct observations of target individuals' behaviors (Chen, Corriveau, & Harris, 2016; Droege & Stipek, 1993; Fusaro, Corriveau, & Harris, 2011; Kurtz-Costes, McCall, Kinlaw, Wiesen, & Joyner, 2005; Nicholls, 1978; Nicholls & Miller, 1984; Rholes & Ruble, 1984; Yang & Frye, 2016). Further, many studies of children's impression formation have focused on children's thinking about others' intelligence—perhaps because such information is valuable in determining from whom to seek information or whom to trust. As early as the preschool years, children infer that individuals who are accurate or behave fluently are smarter than those who are inaccurate or disfluent (Droege & Stipek, 1993; Fusaro et al., 2011; Nicholls & Miller, 1984). Young children also trust and seek information from accurate or confident individuals rather than those who are inaccurate or unsure (Birch, Akmal, & Frampton, 2010; Corriveau & Harris, 2009; Koenig & Harris, 2005). For example, in one study (Fusaro et al., 2011), 3- to 5-year-old children heard two puppets label various familiar objects; one puppet provided correct labels and one provided incorrect labels. When asked to select the puppet that was "smart," participants selected the puppet that had been accurate. Children in this study also trusted the accurate puppet rather than the inaccurate puppet regarding the names for novel objects.

Children's sensitivity to targets' performance when making inferences about others' intelligence has been well documented. However, patterns of performance are not the only source of information available to children, nor are they always in alignment with children's peer evaluations. One prominent example of a dissociation between children's intelligence inferences and performance information comes from research documenting children's gender stereotypes. Namely, elementary school age children of both genders think that boys are more likely than girls to be "really, really smart" despite the fact that girls tend to perform better than boys in all school subjects (Bian, Leslie, & Cimpian, 2017; Hyde, Lindberg, Linn, Ellis, & Williams, 2008; Pomerantz, Altermatt, & Saxon, 2002).

Given that most children are in classrooms where girls tend to outperform boys, children's belief that boys are smarter than girls must have an origin other than direct observations of others' performance. Although many sources could contribute to children's stereotypes, recent research has pointed to a source that is highly relevant to the present research: teachers. Indeed, children's endorsement of gender (and race) stereotypes has been correlated with the implicit gender (and race) biases of their teachers (Gunderson, Ramirez, Levine, & Beilock, 2012; Vezzali, Giovannini, & Capozza, 2012). This correlation, together with the research reviewed here, raises the possibility that children’s inferences about peer aptitude may be guided by authority figures’ thoughts (and corresponding behaviors).

A long tradition of research has revealed that teachers’ beliefs about students' intelligence affect their behaviors toward students. Teachers are more likely to smile, touch, nod, and make eye contact with students they think are smarter or high-achieving, and they are more likely to frown, shake their head, and purse their lips when interacting with students they think are less intelligent or low-achieving (Babad, Bernieri, & Rosenthal, 1991; Chaikin, Sigler, & Derlega, 1974; Harris & Rosenthal, 1985). Further, as demonstrated by classic studies on expectancy effects, children readily perceived and absorbed teachers’ assessments of their own abilities (e.g., Rosenthal & Jacobson, 1968). However, less is known about whether children might also use teachers’ nonverbal behaviors to guide their evaluations of peers.

Although it is unclear whether children attend to teachers’ nonverbal behaviors when making inferences about peers’ traits, controlled laboratory studies have provided evidence that children use adults’ nonverbal behaviors to guide their interactions with, evaluations of, and trust in other people from an early age (Boccia & Campos, 1989; Castelli, De Dea, & Nesdale, 2008; Fusaro & Harris, 2008). For example, in a recent study, 4- to 5-year-old children preferred and behaved more prosocially toward an adult who was on the receiving end of several positive nonverbal behaviors from another adult (vs. an adult who was on the receiving end of several negative nonverbal behaviors; Skinner, Meltzoff, & Olson, 2017). In another study, 4- to 6-year-old children’s evaluations of a stranger were more influenced by a trusted adult’s nonverbal behaviors when interacting with the stranger than the trusted adult’s verbal testimony about the stranger (Castelli et al., 2008). Taken together, these findings suggest that children are sensitive to subtle cues exhibited by adults and use them to guide their thoughts about and behavior toward those who are the target of such cues.

However, several important issues regarding children’s use of nonverbal cues remain unexplored—and are therefore the focus of the present research. One question concerns whether adults’ nonverbal behavior influences children’s inferences about *peers*—including inferences about peers’ intelligence. It is possible that in evaluative contexts, children view adults as experts about other adults, but not about other children. Alternatively, children may view adults’ behaviors as generally informative about other social agents’ traits. Distinguishing these hypotheses is critical to understanding how—and from whom—children learn about individuals and groups. A second issue concerns the range of nonverbal behaviors that children think are informative for making trait inferences as well as the range of inferences children might draw based on a teacher’s nonverbal behaviors. Previous studies have tended to show children multiple positive nonverbal cues pitted against multiple negative nonverbal cues, leaving open the question of which cues children treat as informative when evaluating other people. Further, in seeking to characterize the nature of children’s naïve thinking about other social beings, there has been a growing interest in understanding whether children’s evaluations of other people are domain-specific or global (reflecting “halo” or “pitchfork effects”; Cain, Heyman, & Walker, 1997; Koenig & Jaswal, 2011; Thorndike, 1920). Beyond the theoretical relevance of this question, understanding the boundaries of children’s evaluations in a classroom context is important given the potential negative consequences for children who are negatively evaluated at school. Finally, the present research addresses whether adults behaviors toward peers carry more weight than information about peers' actual performance in guiding children's evaluations. In doing so, we test the robustness of children's trust in adults' nonverbal behaviors and shed light on whether adults behaviors could actually lead to stereotypes about individuals' and groups' performance (even when performance information suggests otherwise).

Accordingly, in Study 1 of the present research, we tested whether teachers' nonverbal behaviors could cause children to judge target peers' traits differently when the targets had performed similarly. In Study 2, we tested whether teachers' nonverbal behaviors influenced children's peer evaluations when participants could simultaneously observe target peers' performance on an academic task. We focused on 5- to 6-year-old children, as this age is when most children begin formal schooling; this age range also overlaps with the age of participants in many studies on children's trait inferences (e.g., Cain et al., 1997; Fusaro et al., 2011) and children's sensitivity to nonverbal cues (e.g., Castelli et al., 2008; Skinner et al., 2017). Further, to ensure a pure test of the influence of teachers' behaviors on children's trait inferences, we created tightly controlled video clips of an unfamiliar "teacher" reacting to unfamiliar "students."

Study 1

Overview

Participants viewed video clips of a "teacher" and two "students." In each clip, both students read a short passage of text equally well, but the teacher responded differently to each student: She displayed a neutral expression toward one student in the pair; for the other student, she either smiled, nodded, touched the student's shoulder, or shook her head. Smiling, nodding, and touching are behaviors that teachers typically direct toward students whom they perceive to be smart or high in ability, while headshaking is a cue that teachers typically direct toward students whom they perceive to be less intelligent or low in ability (e.g., Babad, 1992; Babad et al., 1991; Feldman & Orchowsky, 1979; Harris & Rosenthal, 1985).

We were primarily interested in children's use of teachers' nonverbal behaviors to form judgments about unfamiliar children's intelligence, given the relevance of intelligence in academic contexts as well as research showing that teachers' nonverbal behaviors are often directly related to their assessments of students' intelligence. Thus, children in one condition of Study 1 were asked to point to the student who was smarter on each trial. However, nonverbal behaviors are inherently ambiguous: Positive nonverbal behaviors might be evoked by someone's intelligence or by any number of other positive traits. To test the specificity of children's inferences based on teachers' nonverbal cues, we included two other between-subjects conditions: one in which children were asked to point to the student who was nicer on every trial and one where they were asked to point to the student who was stronger on every trial. If children interpret teachers' nonverbal behaviors narrowly (i.e., as only being relevant for inferences about intelligence), then participants would perform at chance when asked which student is nice or who is strong. If children interpret teachers' nonverbal behaviors broadly (i.e., as generally denoting that one person has more positive or negative qualities than another), then nonverbal cues might guide 'halo effects' (Thorndike, 1920) where children use teachers' cues to make inferences about others' intelligence, kindness, and physical strength.

Method

Participants. The participants were 96 5- to 6-year-old children (32 per condition, M_{age} = 5;11, range = 5;0–6;10, 48 boys, 88% White) living in the Midwestern region of the United States. We were able to obtain information about current school level for 91 participants; of these participants, 26% were in preschool or 4-year-old kindergarten, 69% were in kindergarten, and 4% were in first grade. Additional children participated but were excluded from analyses due to experimenter error (N = 1) or not finishing the session (N = 4). We predetermined a stopping rule of 32 participants per condition based on previous studies examining children's understanding of nonverbal behaviors (Brey & Shutts, 2015).

Materials. On each trial, participants viewed a 25-s video clip featuring an interaction between a female teacher (played by an actress) and a pair of students (two photographs) who matched the gender of the participant. The teacher and the students were unfamiliar to participants. Throughout each video, the teacher faced the students and the participant; the participant could only see the backs of the students' heads.

Figure 1 presents an example of a trial display. At the outset of each trial, the teacher faced forward (i.e., toward the participant; 3 s). She then turned to face the student on the left while that student read a short (7 s) passage. Next, there was a brief (3 s) transition while the teacher turned to face the student on the right and that student read the same passage (7 s). The teacher then faced forward (toward the participant) at the end of each trial (5 s). The teacher's nonverbal reaction to a given student occurred only while that student read. Within a given trial, the sound clips of the two students reading were the same, with minor adjustments made to tone and pitch so that the voices sounded like two different people. Different trials featured different passages (see Appendix).

On smile-neutral trials, the teacher smiled at one student while he or she read and looked at the other student with a neutral expression while he or she read. On nod-neutral trials, the teacher nodded at one student (while displaying a neutral expression) while he or she read and looked at the other student with a neutral expression while he or she read. On touch-neutral trials, the teacher leaned forward and touched one student on the shoulder (while displaying a neutral expression) while he or she read and looked at the other student with a neutral expression (while standing straight) while he or she read. On neutral-headshake trials, the teacher shook her head at one student (while displaying a neutral expression) while he or she read and looked at the other student with a neutral expression while he or she read.

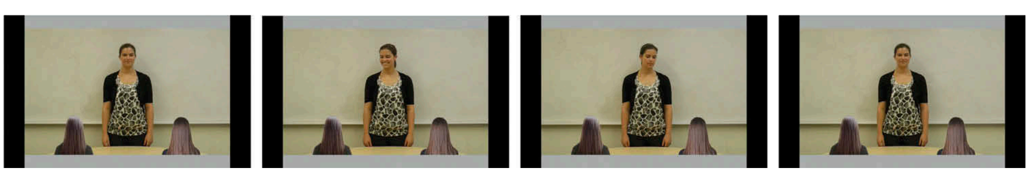

Figure 1. Example smile-neutral trial. The teacher looks straight ahead, then smiles at the student on the left while she reads, then has a neutral expression for the student on the right while she reads, and then looks straight ahead during the test question.

Procedure. Participants were tested individually in the lab or at their school. Participants sat facing a computer monitor next to an experimenter who sat at an angle such that she could not see what was on the screen during the presentation of video clips on each trial. The experimenter was therefore never aware of the trial type, nor could she see which students received each teacher behavior. However, she was able to determine whether participants pointed to the student on the left or right side of the screen to score participants' selections.

At the start of the session, participants were told they would be watching videos of students at school and that the students were reading. They were asked to figure out which kids were smarter, nicer, or stronger (depending on condition). We defined smart as "someone who is good at learning," defined nice as "someone who is good at being friendly," and defined strong as "someone who is good at lifting heavy stuff."

Participants then saw 5 smile-neutral trials, 5 nod-neutral trials, 5 touch-neutral trials, and 5 neutral-headshake trials. Each trial showed a different pair of students. At the end of each video, participants were either asked, "Who is smarter?"; "Who is nicer?"; or "Who is stronger?" Participants indicated their responses by pointing and never received feedback on their choices.[1] To maintain their interest through the session, participants received a short break after 5 trials, 10 trials, and 15 trials; during each break, they completed a connect-the-dots activity.

Design. Participants were randomly assigned to the smart, nice, or strong condition. The order of different trial types (smile-neutral, nod-neutral, touch-neutral, or neutral-headshake) within a condition varied across participants. Across participants, we also varied which student pairs and which passages appeared in each trial type and which student within each pair received a specific behavior versus a neutral expression.

Scoring and data analysis plan. During the study, the experimenter indicated on a coding form whether the child had pointed to the left or to the right. Later, these coding sheets were aligned with information about trial order and lateral positions on each trial (which differed across participants), so that data could be entered in accordance with what kind of target the child had selected on each trial. Prior to performing data analyses, a second coder then checked both the alignment process and data entry for every participant in these studies to ensure that the final data files were correct.

Selecting the student who received the more positive cue was scored as 1, while selecting the student who received the less positive cue was scored as 0. Thus, on neutral-headshake trials, selecting the student who received the neutral expression was scored as 1 and selecting the student who received the headshake was scored as 0. On remaining trials, selecting the student who received the smile, nod, or touch was scored as 1 and selecting the student who received the neutral expression was scored as 0.

For each participant, we created a score for each trial type by summing across the responses and then dividing by the total number of completed trials (five in most cases, except for one child who failed to give a response on two trials and one child who failed to

[1] Participants were also asked whether each student they selected was "a lot [smarter/nicer/stronger] or a little [smarter/nicer/stronger]." These data are not reported because the results did not differ from the results for the first question (i.e., "Who is smarter/nicer/stronger?").

give a response on one trial). A preliminary analysis of variance (ANOVA) to test for effects of gender and age (in days) on responses across cue types and conditions revealed no significant main effects of gender or age or interactions with cue type or condition, so these variables were not considered in further analyses.

Results

Comparisons to chance. In the smart condition, one-sample *t* tests revealed that participants selected the student who received the more positive cue at levels that exceeded chance (.5) on smile-neutral, nod-neutral, and neutral-headshake trials (all $ps < .001$); however, participants' selections on touch-neutral trials did not differ from chance ($p = .628$). In the nice condition, participants selected the student who received the more positive cue at levels that exceeded chance on all four trial types (all $ps < .018$). In the strong condition, participants selected the student who received the more positive cue at levels that exceeded chance on smile-neutral, nod-neutral, and neutral-headshake trials ($ps < .039$); selections on touch-neutral trials did not differ from chance ($p = .714$). See Figure 2.

Comparisons across condition and cue. To determine whether children's selections differed by condition or trial type, we conducted a 3 (condition: smart, nice, strong) × 4 (trial: smile, nod, touch, headshake) mixed-model ANOVA. This analysis revealed a main effect of condition, $F(2, 93) = 4.16$, $p = .018$, $\eta^2_p = .082$, and a main effect of cue type, $F(2.28, 212.18) = 20.39$, $p < .001$, $\eta^2_p = .180$ (Greenhouse-Geisser corrected for nonsphericity), but there was no interaction between the factors ($p = .084$, $\eta^2_p = .042$). Tukey's honest significant difference post-hoc tests of participants' responses across the conditions indicated that participants in the smart condition selected the student receiving the more positive cue more often than did participants in the strong condition ($p = .016$, $d = 0.70$). Participants' scores did not differ between the smart versus nice conditions or between the nice versus strong conditions ($ps > .144$).

Post-hoc comparisons across the four cue types (using Sidak corrections) indicated that children's scores on neutral-headshake trials exceeded their scores on all other trial types

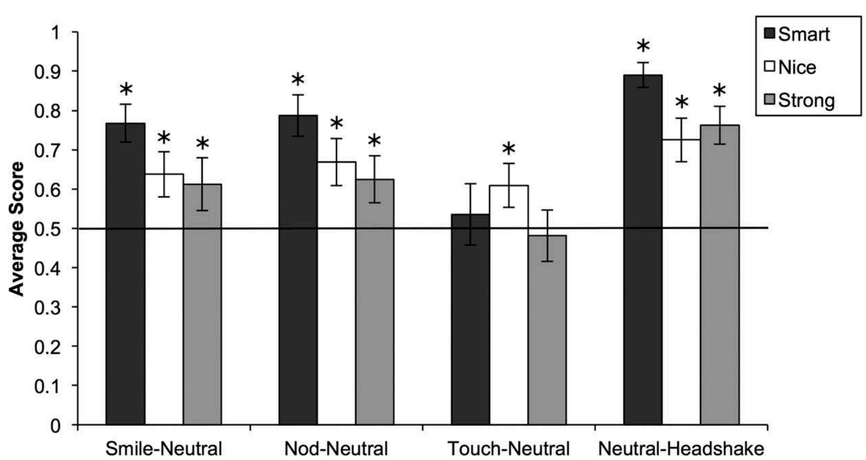

Figure 2. Average scores for each trial type in the three conditions of Study 1. Asterisks indicate scores that are significantly different from chance. Error bars represent standard errors of means.

(neutral-headshake vs. smile-neutral, $p < .001$, $d = 0.48$; neutral-headshake vs. nod-neutral, $p = .001$, $d = 0.39$; neutral-headshake vs. touch-neutral, $p < .001$, $d = 0.92$). In other words, children's tendency to select the student receiving the neutral expression on neutral-headshake trials was greater than their tendency to the select the student receiving the nod, smile, or touch on remaining trials. Children's scores on smile-neutral and nod-neutral trials exceeded their scores on touch-neutral trials ($p = .006$, $d = 0.46$, and $p = .001$, $d = 0.53$, respectively). Children's scores on smile-neutral and nod-neutral trials did not differ ($p = .980$), however.

Discussion

Participants' selections in Study 1 provide evidence that children will use a teacher's nonverbal behaviors to guide their evaluations of students: The teacher's smiles, nods, and headshakes influenced children's inferences about unfamiliar students' intelligence, kindness, and strength. Participants' above-chance performance in all conditions supports a "halo effect" account of children's use of teachers' nonverbal cues whereby children form a globally positive impression of peers' traits across different domains (i.e., intelligence, kindness, and physical strength; see also Cain et al., 1997; Koenig & Jaswal, 2011; Stipek & Daniels, 1990). However, it is worth noting that children's inferences were more reliable in the smart condition than in the strong condition, indicating that children may view teachers as better sources of information about intelligence than physical strength or that the classroom context or reading task was most relevant to judgments about students' intelligence.

Participants' scores also varied across the four trial types. First, children were sensitive to the valence of cues. On smile-neutral and nod-neutral trials, children selected the student who received the smile or nod (vs. the neutral expression), but on neutral-headshake trials, children chose the student who received the neutral expression. Thus, children did not simply select students who received specific (vs. neutral) nonverbal behaviors, nor did they uniformly avoid students who received neutral reactions. In fact, children avoided students who received headshakes more often than they chose students who received nods and smiles, suggesting that children may be particularly sensitive to teachers' negative behaviors when considering peers' traits (see also Doebel & Koenig, 2013; Vaish, Grossmann, & Woodward, 2008). Indeed, as noted by Doebel and Koenig (2013), a "negativity bias" has been documented in a number of studies with children, possibly because negative information is less common in children's environments (and thus more salient) or because it is more physiologically arousing. Second, children's scores exceeded chance for all trial types except touch-neutral trials. Although teachers typically demonstrate more leaning and touching when interacting with students whom they believe to be smart or high-achieving (Chaikin et al., 1974; Harris & Rosenthal, 1985), it is possible that participants in the present studies perceived physical contact as a cue to extra support, and thus, inferred that the student who received the cue was not smart or high in ability.

The findings from Study 1 indicate that children will use a teacher's behaviors to guide their consideration of other students when such behaviors are the only information available. However, Study 1 left open the question of whether children will attend to teachers' behaviors if children have direct access to information about students' performance on an academic task. Accordingly, Study 2 presented both differences in a teacher's nonverbal behaviors and differences in students' performance.

Study 2

Overview

After each trial in Study 2, participants selected which student was "smarter." We focused on children's inferences about intelligence because such inferences were the most robust in Study 1. On critical trials, one student read a passage fluently (and received the less positive cue from the teacher), and the other student read the same passage with pauses in between each word (and received the more positive teacher cue). To test whether children would use the students' relative fluency to guide their inferences in the absence of teacher cues, we also included a trial ("neutral-neutral") where the teacher directed a neutral expression toward both students, one of whom read fluently and one of whom read disfluently. This trial allowed us to separate the influence of reading fluency and teacher cues in children's judgments of the students' relative intelligence. Based on piloting, we predicted that children would indicate that the fluent reader was smarter on neutral-neutral trials.

Method

Participants. The participants were 32 5- to 6-year-old children (M_{age} = 6;0, range = 5;0–6;9, 16 boys, 83.33% White). We were able to obtain information about current school level for 31 children; of these children, 9.7% were in preschool or 4-year-old kindergarten, 80.6% were in kindergarten, and 9.7% were in first grade. One additional child was excluded from analyses for failing to complete the session.

Materials. On each of four test trials, participants viewed a 25-s video featuring an interaction between a teacher and a pair of students who matched the gender of the participant. The videos were the same as in Study 1, with the exception of the students' reading: On every trial, one student read a short (7 s) passage fluently with no pauses ("fluent reader") and the other student read the same passage with a short pause after each word (12 s; "disfluent reader"). Additionally, the opening and closing portions of the video (where the teacher faced forward) and the middle transition were all shortened (to 2 s) so that the videos in Study 2 were the same length as the videos in Study 1.

For the smile-neutral trial, the teacher smiled at the disfluent reader and looked at the fluent reader with a neutral expression. For the nod-neutral trial, the teacher nodded at the disfluent reader and looked at the fluent reader with a neutral expression. For the neutral-headshake trial, the teacher looked at the disfluent reader with a neutral expression and shook her head at the fluent reader. For the neutral-neutral trial, the teacher looked at both the fluent reader and disfluent reader with a neutral expression while they read. We did not include a touch-neutral trial because children did not use this cue to guide their inferences about intelligence in Study 1.

Procedure. The testing conditions were the same as in Study 1. In Study 2, participants saw one trial of each type to prevent them from learning that there was a correlation between the teacher's nonverbal behaviors and students' reading levels (e.g., that the teacher always smiled at the disfluent reader). As in Study 1, the experimenter sat so that she could not see the images on the screen and thus was unaware of trial type. The four test trials were preceded by familiarization trials that displayed each teacher behavior and reading level in isolation to decrease the novelty of this information on the test trials; the experimenter neither provided information to nor requested information from participants during familiarization (see Appendix).

During the test phase, participants saw one neutral-neutral, one smile-neutral, one nod-neutral, and one neutral-headshake trial. Each trial featured a different pair of students (none that had appeared in the familiarization). At the end of each trial, participants were asked, "Who is smarter?" ("smarter" was defined as "someone who is good at learning"). Participants responded by pointing and never received feedback on their choices.

Design. Across participants, we varied the order of trial types, which students appeared in the familiarization versus test trials, which student within each pair was associated with fluent or disfluent reading (and therefore which student received a nonverbal cue vs. a neutral expression), and whether the fluent or disfluent reader spoke first.

Results and discussion

Data were scored, entered, and checked as in Study 1. Because participants completed one trial of each type, we conducted analyses on the proportion of participants (out of 32) who selected the fluent reader on each trial. On the neutral-neutral trial, participants selected the fluent reader at levels that exceeded chance (chance = .5; proportion = .688, sign test, $p = .050$, $g = .188$). Thus, the difference in reading fluency was perceptible and meaningful to participants. Sign tests revealed that participants selected the fluent reader at levels below chance on the smile-neutral (proportion = .156, $g = .344$), nod-neutral (proportion = .125, g = .375), and neutral-headshake (proportion = .125, $g = .375$) trials, however (all $ps < .001$).

We tested whether the proportion of participants selecting the fluent reader differed by trial type. A Cochran's Q test revealed a significant effect, Cochran's $Q(30) = 33.94$, $p < .001$, $\eta^2_Q = .354$. Six McNemar tests (Bonferroni-corrected) comparing proportions across the four trial types indicated that children selected the fluent reader more often on neutral-neutral trials than any other trial types: neutral-neutral versus smile-neutral, $X^2(1, N = 32) = 4.57$, $p < .001$, OR = 0.105; neutral-neutral versus nod-neutral, $X^2(1, N = 32) = 4.84$, $p < .001$, OR = 0.100; neutral-neutral versus neutral-headshake, $X^2(1, N = 32) = 4.84$, $p < .001$, OR = 0.100. No other trial comparisons were significant (Figure 3).

In the absence of distinguishing cues from the teacher (i.e., on the neutral-neutral trial), children inferred that the fluent reader was smarter; however, when the teacher directed a more positive cue to the disfluent reader, children inferred that the disfluent reader was smarter. Children's performance on the neutral-neutral trial suggests that they considered both students' reading ability and the teacher's cues in their judgments of students' intelligence. Additionally, the difference in children's performance on the neutral neutral

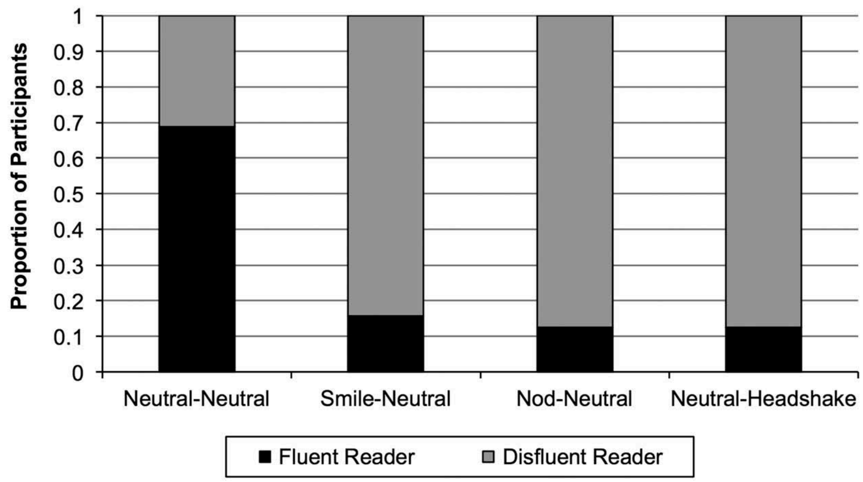

Figure 3. Proportion of participants who selected the fluent versus disfluent reader for each trial type in Study 2.

trial versus the other trials eliminates the concern that children's choices were guided by the students' speaking time or the amount of attention they received from the teacher: Although children selected the student who spoke and received the teacher's attention for a longer period of time (12 s) on the smile-neutral, nod-neutral, and neutral-headshake trials, children chose the reader who spoke and received the teacher's attention for a shorter period of time (7 s) on the neutral-neutral trial.

General discussion

The findings from the present research provide evidence that children will use a teacher's nonverbal behaviors to guide their thinking about peers. After watching very brief interactions between teachers and students, children relied on the teacher's nonverbal reactions when evaluating the target students' traits—including their intelligence, kindness, and physical strength. Children also used the teacher's nonverbal behaviors to make inferences about students' intelligence even when the students' actual performance was in conflict with the teacher's cues.

Extant research has shown that children form impressions of their peers in their environment from an early age (e.g., Stipek & Tannatt, 1984). These impressions can come from bottom-up assessments of peers (e.g., noticing that a particular child has trouble with class assignments; Nicholls, 1978). However, the present research suggests children can attend to another source of information when evaluating their peers—namely, teachers. In fact, the findings from Study 2 suggest that children may weigh teachers' opinions more heavily than their own observations.

Although the present studies provide evidence for children's use of teacher nonverbal cues in their peer evaluations, it is important to note a few limitations of the current design. First, children only saw one teacher throughout the study. This goal of this strategy was to shorten and simplify the procedure (which was already quite long for Study 1) and to support the premise that participants were learning about a class of students. However, in future studies, it would be important to assess whether children understand nonverbal cues from a number of different adults. An additional limitation to note is that every participant saw every type of cue but was only asked one question about the students (i.e., smart, nice, or strong). We manipulated nonverbal cue as a within-subject variable to directly compare children's use of the nonverbal cues, and both cue type and question type could not be manipulated within participants due to time constraints. However, it is possible that asking each participant to make different types of inferences (i.e., some questions about intelligence, some about kindness, and some about strength) would have accentuated differences between the question types and reduced the "halo effect" found here.

The present research demonstrates the potential power of teachers' nonverbal behaviors in guiding children's thinking about their peers, but several important questions remain for future research. First, the present studies employed a tightly controlled method to isolate each nonverbal cue and test its impact on children's inferences about unfamiliar students. In real classrooms, of course, children have access to many sources of information (e.g., verbal feedback from the teacher, their own interactions with peers, etc.), and they view teachers interacting with many students. In future research, it would therefore be useful to test whether teachers' nonverbal reactions guide children's thinking about and children's behavior toward (e.g., Skinner et al., 2017) familiar children in more naturalistic settings with numerous cues and many students. Second, the present research focused solely on cues from a "teacher" in a classroom context because nonverbal cues in educational settings have been well documented (e.g., Babad et al., 1991; Harris & Rosenthal, 1985) and because teachers are a trusted information source for children (Lutz & Keil, 2002). However, additional studies could test whether children view teachers as particularly powerful sources of information about their peers or whether similar nonverbal behaviors from an adult in a nonteaching role, from a parent, or from a child would similarly influence children's impression formation. Particularly in the case of Study 2, where children privileged the teacher's behavior over their own observations, future studies could identify whether children might trust their own judgments when interacting with adults who are authority figures in other domains (e.g., coaches, band conductors), in contexts where children have greater expertise (e.g., interacting with toys) or firsthand evidence (e.g., hearing a peer say, "I don't want to share my toys"), and in interactions with individuals who are not authority figures (e.g., peers).

Future research might also include a broader age range to shed light on whether children learn to attend to and interpret teachers' nonverbal behaviors through experience in school or whether children enter school with intuitions about the utility and meaning of adults' nonverbal reactions. Similarly, research with older children is necessary to test whether children become more or less reliant on teachers' reactions with more experience in school. Particularly with regard to children's performance in Study 2, it would be important to examine whether older children would think differently about a teacher's positive behavior toward a disfluent reader and thus make a different inference about the target student (e.g., that a teacher is smiling at a disfluent reader to be encouraging, not because the teacher thinks the student is reading well). Similarly, children's experience with inclusive learning environments or tracked classrooms may also influence how they interpret teacher cues that conflict with student ability.

Another important future direction concerns how teachers' behaviors might influence children's group-level attitudes. The present research focused on children's reactions to individual students directly after they received positive, negative, or neutral cues from a teacher. However, to understand how teacher behaviors might contribute to children's stereotypes about different social groups (e.g., that boys are better at math than girls; Cvencek, Meltzoff, & Greenwald, 2011), future studies could examine whether children generalize the impressions they form about an individual to other members of that individuals' group. Previous research has shown that after viewing interactions in which adults directed negative (compared with positive) nonverbal behaviors toward individuals from the same group (i.e., Black people), children's own attitudes toward new group members were also more negative (Castelli et al., 2008). Would children infer that boys are better at a particular academic subject if they observed their teacher smiling more often at boys (or frowning more often at girls) during a lesson for that subject?

The present research contributes to the field's growing interest in understanding how children come to distinguish and evaluate other people, including the role of social cues in guiding children's thinking (Banaji & Gelman, 2013). Understanding how teachers influence children's judgments is especially important given that most children spend a significant portion of their day with a teacher and view teachers as experts (Lutz & Keil, 2002). Because teachers themselves may unwittingly transmit their own biases (e.g., Babad, Bernieri, & Rosenthal, 1989; Wolfe & Spencer, 1996), research of the sort presented here is also relevant to understanding how children learn stereotypes about social groups, including stereotypes about academic aptitude (see Bigler & Liben, 2007; Gunderson et al., 2012; Quintana & Mahgoub, 2016).

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Appendix

Examples passages used in Study 1 (Ollie Bollie Books, 2012a, 2012b, 2012c, 2012d):

"The birds were singing a tune, the butterflies were zigging this way and that, and lady bugs were crawling happily along."
"I had a great day at the circus. I got five colorful balloons and ate ice cream and popcorn!"
"There were friendly seagulls looking for a meal, and funny crabs that walked sideways. We ran away so they wouldn't pinch our toes."
"We saw lots of friendly farm animals. Cows, sheep, pigs, ducks, and chickens all came out to say hello."

Familiarization phase in Study 2:

At the start of the session, participants were told they would be watching videos of different students at school and that day the students were doing math and reading. They were shown a picture of a classroom and were told that their job was to watch the class during the math lesson and then watch the class during the reading lesson.
During the math lesson (familiarization), participants viewed eight videos. In four videos, they saw examples of the teacher smiling, nodding, shaking her head, and demonstrating a neutral expression toward students while the students worked on a math problem. In four videos, participants heard students read their answers to a math problem either fluently or disfluently (with no teacher present). Participants were never asked any questions about the videos and never received feedback on their spontaneous comments; they just watched and listened.

Example passages used in Study 2:

"The store has 15 different kinds of soup and the labels are yellow."
"There are five trees and two benches in the park next to the slide."
"The giraffe at the zoo is taller than the kangaroo and the elephant."
"The pool has two diving boards and a waterslide at the deep end."