My people, right or wrong? Minimal group membership disrupts preschoolers' selective trust

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ABSTRACT

When preschoolers decide to trust one speaker over another, how does group membership influence their tracking of speaker reliability? In Experiment 1, 4-year-olds were assigned to arbitrary groups of no social significance (Dunham, Baron, & Carey, 2011; Tajfel, Billig, Bundy, & Flament, 1971) and asked to endorse novel object labels provided by two ingroup members, one of whom was reliable and the second of whom was unreliable. Children selectively trusted the more reliable informant. In Experiment 2, we asked whether ingroup status or reliability would determine children's choices and found that 4-year-olds failed to trust reliable outgroup members over unreliable ingroup members (or vice versa). Experiment 3 showed that the failure of trust in Experiment 2 was not due to the mere inclusion of both ingroup and outgroup members: children presented with a control paradigm in which the ingroup members were reliable trusted reliable ingroup members over unreliable outgroup members. Children's use of reliability as an indicator of future credibility therefore appears disrupted when outgroup status and reliability are in conflict, even when group membership is arbitrary.

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Much of what children learn depends on the testimony of others, but speakers may be unintentionally inaccurate or deliberately misleading (Depaulo, Kashy, Kirkendol, Wyer, & Epstein, 1996; Fricker, 2006). Thus, children need a categorization mechanism that critically evaluates others' testimony (Faulkner, 2002). Evidence for such a mechanism exists in toddlers: 16-month-olds look longer at speakers who produce false labels (Koenig & Echols, 2003), 18-month-olds reject false claims by saying "no" (Pea, 1982), and by age three, children comprehend that an overtly deceptive speaker's verbal statements do not match that speaker's true beliefs (Lee & Cameron, 2000).

Preschoolers even track and integrate a speaker's prior instances of accuracy to appraise his or her trustworthiness, using this appraisal to guide evaluations of that speaker's future claims (Birch, Vauthier, & Bloom, 2008; Clement, Koenig, & Harris, 2004; Corriveau & Harris, 2009a, 2009b; Koenig, Clement, & Harris, 2004; Koenig & Harris, 2004, 2005; Pasquini, Corriveau, Koenig, & Harris, 2007). In typical studies, children evaluate a speaker's current testimony after the speaker establishes a record of reliability or unreliability in labeling familiar objects. Four-year-olds differentiate reliable and unreliable speakers even when the more reliable speaker makes some errors and the less reliable speaker is sometimes correct (Pasquini et al., 2007). Moreover, they reverse trust mappings when an initially reliable speaker is later determined unreliable (Scofield & Behrend, 2008) and maintain appraisals based on prior reliability over time (Corriveau & Harris, 2009a).

In addition to showing sensitivity to different characteristics of individuals, such as the reliability of individuals' testimony, very young children divide the world into categories based on social groups. Divisions may be based on meaningful characteristics (e.g., gender, age, race, language) or arbitrary ones, like shirt color (see Kinzler, Shutts, & Correll, 2010 for a review). Preschoolers often prefer those of their own gender (Fishbein & Imai, 1993; Maccoby & Jacklin, 1987) and native language or accent (Kinzler et al., 2010; Kinzler, Shutts, DeJesus, & Spelke, 2009). Moreover, preferences for specific groups can influence children's willingness to trust the testimony of one speaker over another; for example, under some conditions children trust the familiar over the unfamiliar (Corriveau & Harris, 2009b), caregivers over strangers (Corriveau, Harris, et al., 2009), adults over children (Jaswal & Neely, 2006), and native- over foreign-accented speakers (Kinzler, Corriveau, & Harris, 2011).

Some researchers have investigated the interaction between social categorization and children's use of prior reliability in bestowing trust. Children default to trusting familiar over unfamiliar teachers, but this trust is diminished by evidence of unreliability in familiar teachers in four- and five-year-olds (Corriveau & Harris, 2009b). Three- and four-year-olds prefer novel object labels provided by adults rather than peers; however, if adults have proven less reliable, reliable peers' labels are preferred (Jaswal & Neely, 2006). Thus, evidence about individual reliability can override preschoolers' pre-existing preferences for particular social groups. Further, little evidence of unreliability is necessary: Jaswal and Neely (2006) showed that children preferred child testimony after a previously trusted adult mislabeled four objects.

In the present study, we ask how individual reliability and group status interact in a context free of pre-existing social preferences. Previous work with the minimal groups paradigm, in which groups of no broader social significance are assigned in the lab (e.g. Dunham et al., 2011; Tajfel et al., 1971), suggests that children perceive ingroups and outgroups differently, even in the absence of obvious real-world relevance. Specifically, children perceive experimentally created, artificial groups having no prior association with negative stereotypes as meaningful in social evaluations. Bigler, Jones, and Lobliner (1997) found that over the course of a summer school session students assigned to different groups (marked by colored t-shirts) showed high levels of ingroup preference when membership was highlighted as socially relevant (e.g., teachers asked students from the "yellow" group to line up together).

Other studies suggest that children process novel information differently based on the minimal group membership of actors. For instance, Dunham et al. (2011) demonstrated that after hearing stories in which ingroup or outgroup individuals performed both positive and negative actions, children were more likely to recollect positive actions performed by their ingroup. Similarly, negative actions by minimal outgroup members can be more damaging to children's attitudes toward novel individuals than equivalent actions by the ingroup (Schug, Shusterman, Barth, & Patalano, 2013). Do arbitrary manipulations of group membership also affect how children use histories of accuracy and inaccuracy when deciding whom to trust?

We employed a minimal group manipulation in order to answer two questions. First, how do children track and use speakers' prior accuracy following the introduction of arbitrary group membership? Experiment 1 asked whether children would trust a previously reliable ingroup member over a previously unreliable ingroup member. We predicted that individual reliability would remain a salient cue to trustworthiness even when both speakers belonged to the child's ingroup, resulting in selective trust in the more accurate speaker. However, it is also possible that ingroup status (even when groups are minimal) is such an important cue to trustworthiness that it overshadows individuals' histories of reliability, in which case children might fail to selectively trust the more reliable speaker.

Second, when group membership cues conflict with individuals' histories of accuracy, how do children choose whom to trust? In Experiment 2, we introduced children to reliable outgroup members and unreliable ingroup members, asking whether they would bestow trust based on individual reliability (trusting the outgroup member), group status (trusting the ingroup member), or neither. Given previous findings that children use both types of cues when bestowing trust, all of these outcomes are possible. Experiment 3 served as a control study to guard against the possibility that the mere inclusion of both ingroup and outgroup members could disrupt children's responses. This experiment was identical to Experiment 2, except that the ingroup member was reliable and the outgroup member was unreliable.

In each experiment, we varied the relative reliability of the two informants to determine how group membership might mediate the influence of the strength of a speaker's prior reliability on trust. We used four relative-reliability ratios: 100% correct vs. 0% correct, 100% vs. 25%, 75% vs. 25%, and 75% vs. 0%. In a related study (Pasquini et al., 2007), all these conditions led to selective trust in 4-year-olds (but not 3-year-olds) when group status was not manipulated. This suggests that 4-year-olds were able to track relative reliability, trusting the more reliable informant over the unreliable even if the former was sometimes wrong and the latter sometimes right (Pasquini et al., 2007). We included multiple reliability ratios to determine whether 4-year-olds use the same "statistical monitoring" strategy when choosing between ingroup and outgroup members. A second possibility is that reliable outgroup members are held to a higher standard – for example, by engendering children's selective trust only following a history of 100% accuracy.

1. Experiment 1

In Experiment 1, we asked 4-year-olds to evaluate the relative credibility of two informants, both members of the child's ingroup, and to choose one informant from whom to learn. Group membership was assigned using a minimal group paradigm, which readily evokes intergroup bias for experimentally created groups (Brewer, 1979; Dunham et al., 2011). Neither speaker should gain a credibility advantage based on group status in this experiment. However, if group status is such an important cue to trustworthiness that it can overshadow individuals' histories of reliability, children might fail to selectively trust the more reliable speaker under these conditions. In addition to using a typical reliability manipulation in which the reliable speaker labels *all* of the familiar objects correctly and the unreliable speaker labels *all* of the familiar objects incorrectly, we varied the ratio of speakers' reliability across four conditions.

1.1. Method

1.1.1. Participants

Twenty-two 4-year-olds completed the study (13 girls; mean age 4–4, range 3–9 to 5–2). All were recruited locally and most were tested in a quiet university laboratory; others were tested at their preschools. Most participants were Caucasian.

1.1.2. Materials and design

Children watched four videos on a laptop computer; in each video they first saw four familiarization trials, then four test trials. The only difference across the four videos was the reliability-ratio condition (reliable speaker 100% correct vs. unreliable speaker 0% correct, 100% vs. 25%, 75% vs. 25%, and 75% vs. 0%) presented during the familiarization portion. The order in which children watched the four videos

was pseudo-randomly assigned, and there was a different reliable and unreliable speaker (human actor) for each video.

Each video consisted of eight short trials modeled closely after other selective trust paradigms (Clement et al., 2004; Koenig & Harris, 2005; Pasquini et al., 2007). In four familiarization trials, two speakers, seated to the left and right of a table, provided an accurate or an inaccurate label for a familiar object (e.g., a phone) on the table. In four test trials, objects were unfamiliar and speakers provided conflicting novel labels.

For each video, actors (all college students of European descent) were similar in age, gender, hair color, and ethnicity, and they maintained a neutral facial expression and tone of voice throughout. To avoid potential gender influences, boys viewed videos in which all actors were male, and girls viewed videos with all female actors. The side of the screen on which the more reliable speaker appeared (left vs. right) remained constant in a given video, but changed across conditions and participants. The actor that spoke first in each video was also counterbalanced across and within participants.

During familiarization trials in the 100% correct vs. 0% correct video, one speaker accurately named all four familiar objects (100% correct), while the other speaker named all four familiar objects incorrectly (0% correct). During familiarization trials in the 100% correct vs. 25% correct video, one speaker named all four familiar objects correctly (100% correct), while the other speaker named one of four familiar objects correctly (25% correct) such that both speakers provided the same, accurate label for one trial which varied across participants. During familiarization trials in the 75% correct vs. 0% correct video, one speaker named three of four familiar objects correctly (75% correct), while the other speaker named all four familiar objects incorrectly (0% correct). On the trial in which both speakers erred, they provided different inaccurate labels. The trial in which both speakers provided inaccurate labels varied randomly across participants. During familiarization trials in the 75% correct vs. 25% correct video, one speaker named three of four familiar objects correctly (75% correct), while the other speaker named one of four familiar objects correctly (25% correct). In this condition, speakers' correct or incorrect labels never overlapped (children never saw both speakers make errors or both speakers provide accurate labels on the same trial). The position of the trial in which the more accurate speaker erred and the less accurate speaker provided the correct label varied pseudo-randomly across participants.

1.1.3. Procedure

Children were introduced to the two groups (defined by t-shirt color: red or blue). All children were assigned to the blue group and wore a blue jersey and matching wristbands. To ensure understanding of group membership, the experimenter showed children four photographs of adults wearing blue or red t-shirts and asked, "Is she/he in your group or the other group?" Children then viewed a still image of two actors wearing blue t-shirts. The experimenter pointed to one actor and asked, "Is she/he in your group or the other group?" The same procedure was repeated for the other actor. To avoid overemphasis on the group manipulation that might bias children's responses, no other group-related questions were asked before the task.

Then the experimenter introduced the task: "I've got these two friends. See? They both have blue shirts, just like you. They're going to show you some things and tell you what they are called. I want you to listen very carefully and then I'm going to ask you some questions. Let's watch."

Next, children watched four familiarization trials, in which speakers provided accurate or inaccurate labels for familiar objects according to the four different reliability ratio conditions (100% correct vs. 0% correct, 100% vs. 25%, 75% vs. 25%, and 75% vs. 0%, with presentation order varying across children). After every trial, children were asked to provide the correct label for the familiar object.

After children completed the familiarization trials, the experimenter asked the following explicit judgment (EJ) question for each of the two actors: "Was she/he (pointed/referenced actor on computer screen) good at naming the objects or was she/he not very good at naming the objects?" The experimenter then asked, "Who was better at naming the objects: him/her (pointed) or him/her (pointed)?" The order of the actor referenced first was counterbalanced across the four conditions.

Children were then shown four test trials. Before each trial, children were asked which speaker they would want to ask about the name of the novel object ("Ask" questions). The experimenter said, "Do you know what that is called (referring to the novel object on the screen)?" Children were allowed

to reply and then were asked, "I bet one of these people knows what it is called. Which one would you like to ask?" In the rare cases in which children provided their own label for the unfamiliar object, they were told, "Actually, I don't think that's exactly what it is called. I bet one of these people knows what it is called. Which one would you like to ask?" After each test trial, children were asked which speaker's novel label they preferred ("Endorse" questions). The experimenter said, "She/he called it a _____, and she/he called it a _____. What do you think it's called, a _____ or a _____?"

After all test trials were completed, the EJ questions were repeated to determine whether responses remained stable over the test session. Finally, children were asked, "Which group do you belong to?"

1.2. Results and discussion

1.2.1. Group identification
All children readily accepted their group membership and accurately identified other individuals as members of "their" group or the "other" group. All children accurately identified which group they belonged to at the end of the task.

1.2.2. Familiarization trials
The majority of children correctly recognized and produced the accurate label for all familiar objects. One participant endorsed the label provided by the inaccurate speaker in all four conditions; this child was excluded from further analysis. Two children erred during the 75% correct vs. 0% correct condition on the single trial in which both speakers provided inaccurate labels for the familiar object. These children endorsed the incorrect label provided by the more accurate speaker (75% correct) and were included in the analysis.

1.2.3. Explicit judgment questions
For each set of three EJ questions (those asked before or after test trials), we calculated the number of questions children answered correctly. A 2 (timepoint) by 4 (reliability ratio) repeated-measures analysis of variance (ANOVA) revealed a significant effect of timepoint, $F(1,21) = 10.6821$, $p = 0.0037$. There was no effect of reliability ratio and no interaction (both $F < 1$). For further analyses, scores were collapsed across the four ratios. Performance was better than chance on both sets: for EJ questions asked directly after familiarization trials, $M = 10.91$ of 12, $SD = 1.41$, $t(21) = 16.31$, $p < 0.0001$ (two-tailed); for EJ questions asked after test trials, $M = 8.86$ of 12, $SD = 2.95$, $t(21) = 4.554$, $p = 0.0002$ (two-tailed), with better performance on the first set.

1.2.4. Ask and endorse questions
We assessed children's performance on both *ask* and *endorse* questions. For ask questions, choosing to ask the more reliable informant constituted a correct response; for endorse questions, choosing the more reliable speaker's novel label was considered correct. For neither question type did responses differ significantly across reliability ratios, $F(3,21) = 2.12$, $p = 0.107$; $F(3,21) = 1.91$, $p = 0.137$, respectively. In further analyses, scores were therefore collapsed across the four ratios. Overall, children successfully chose to ask the previously reliable speaker, with better-than-chance performance, $M = 9.9091$ of 16 total, $SD = 2.56$, $t(21) = 3.4952$, $p = 0.002$ (two-tailed). Children also successfully endorsed the previously reliable speaker's novel labels, with better-than-chance performance, $M = 10.5909$ of 16, $SD = 2.4233$, $t(21) = 5.0153$, $p < 0.0001$ (two-tailed) (Fig. 1).

1.2.5. Discussion
Four-year-olds showed selective trust in reliable speakers even when the unreliable speakers were ingroup members. Children demonstrated this selective trust both through their responses to the ask question (preferring to ask the reliable speaker what the novel object was called) and the endorse question (preferring the novel label provided by the reliable speaker). Children also successfully identified the reliable speaker on the explicit judgment questions, both directly after the familiarization period (in which both speakers labeled familiar objects correctly or incorrectly) and after test trials (in which both speakers labeled novel objects with novel words).
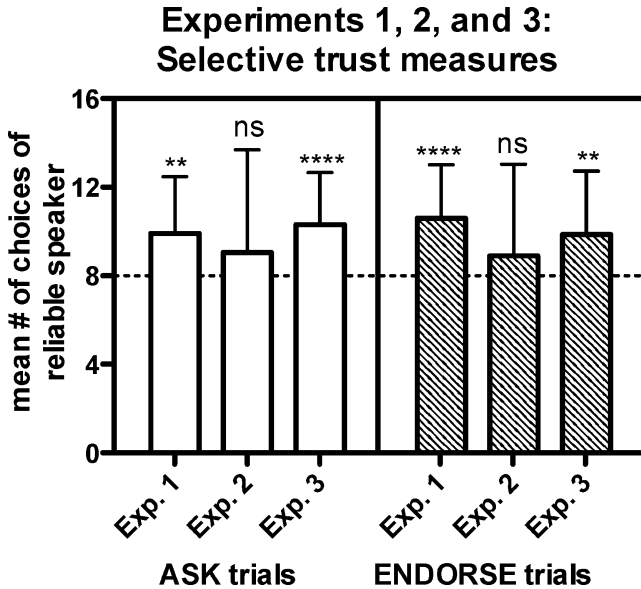
Fig. 1. Preschoolers' responses to the trust probes (ask and endorse questions) in Experiment 1 (when both the unreliable and the reliable informant were minimal ingroup members), Experiment 2 (with a reliable outgroup informant and an unreliable ingroup informant) and Experiment 3 (with a reliable ingroup informant and an unreliable outgroup informant).

Thus, children were sensitive to speakers' prior reliability and used it as an indicator of future credibility, even when a minimal group manipulation was introduced in a selective trust paradigm. Minimal ingroup status did not disrupt the ability to track and use individual reliability in this paradigm, and there was no effect of the relative reliability of the two speakers. When reliable speakers are outgroup members, however, does individual reliability continue to determine children's choices of whom to trust, or might group status override reliability? We address this question in Experiment 2.

2. Experiment 2

In Experiment 2, we contrasted two indicators of speaker credibility to investigate how (and whether) reliability affects trust in the presence of conflicting cues arising from minimal group status. Preschool children were asked to choose whom to trust in a novel-word-learning paradigm involving a reliable outgroup member and an unreliable ingroup member, again using minimal groups. We asked whether children would bestow trust based on reliability (trusting the outgroup member), group status (trusting the ingroup member), or neither. We used the same four relative-reliability ratios as in Experiment 1 (with the outgroup speaker always more reliable). Four-year-olds might trust a reliable outgroup member over an unreliable ingroup member only when reliability is unambiguous (e.g. the 100% correct vs. 0% correct ratio condition), but not in other cases, despite their demonstrated ability to track and use relative reliability in a wider range of situations (Pasquini et al., 2007).

2.1. Method

2.1.1. Participants

Twenty 4-year-olds completed the study (13 girls; mean age 4–4, range 4–0 to 4–11). Testing conditions and demographic details were the same as those in Experiment 1.

2.1.2. Materials and design

Stimuli were identical to those of Experiment 1, except that children saw videos in which actors were associated with two different groups: one actor wore a blue shirt and the other wore a red shirt. For each reliability-ratio condition, outgroup members were more accurate overall than ingroup members. The same actors and the same ratios (100% correct vs. 0% correct, 100% vs. 25%, 75% vs. 25%, and 75% vs. 0%) were used as in Experiment 1. The more reliable group (red shirt vs. blue shirt) was counterbalanced across participants.

2.1.3. Procedure

The procedure was nearly identical to that of Experiment 1, except that children were initially assigned to either the blue or red group. The same measures were administered, except that at the end of the procedure children were asked, "Which group do you belong to?" and "Which group do you think was better at naming the objects during the whole game?"

2.2. Results and discussion

2.2.1. Group identification

All children readily accepted their group membership and accurately identified other individuals as members of "their" group or the "other" group. All children accurately identified which group they belonged to at the end of the task.

2.2.2. Familiarization trials

Children easily recognized the familiar objects and correctly identified the speaker who provided the accurate label. No children were confused or misled by inaccurate speakers, and no children were excluded from analyses.

2.2.3. Explicit judgment questions

For each set of explicit judgment questions (asked before or after the test trials) we calculated the number of questions that children answered correctly. A 2 (timepoint) by 4 (reliability ratio) repeated-measures ANOVA revealed a significant effect of timepoint, $F(1,19) = 12.5427$, $p = 0.0022$. There was no effect of reliability ratio and no interaction (both $F < 1.2$). For further analyses, scores were collapsed across the four ratios. Performance was better than chance on the EJ questions asked directly after familiarization trials, $M = 9.8$ of 12, $SD = 3.47$, $t(19) = 4.893$, $p = 0.0001$ (two-tailed), but not on EJ questions asked after the test trials, $M = 7.2$ of 12, $SD = 4.30$, $t(19) = 1.248$, $p = 0.2271$ (two-tailed).

2.2.4. Ask and endorse questions

Children's responses to both the ask and endorse questions did not differ significantly across reliability ratios, $F(3,19) = 0.06$, $p = 0.981$; $F(3,19) = 0.32$, $p = 0.811$, respectively. For further analyses, scores were collapsed across the four ratios. Children did not show selective trust on either ask or endorse questions when the more accurate speaker was an outgroup member (Fig. 1). On ask trials, children did not choose the reliable outgroup speaker, $M = 9.05$ of 16, $SD = 4.628$, $t(19) = 1.0146$, $p = 0.3230$ (two-tailed). On endorse trials, children did not preferentially select the more reliable speaker's novel label, $M = 8.9$ of 16, $SD = 4.1282$, $t(19) = 0.975$, $p = 0.3418$ (two-tailed). Responses did not differ from chance: children preferred neither the more reliable outgroup member nor the less reliable ingroup member. Two children showed a clear preference for reliability, choosing the more reliable outgroup member more often than predicted by chance for both ask and endorse trials. Two other children showed a preference for ingroup status, choosing the less reliable ingroup member for both trial types. Sixteen children showed no preference.

2.2.5. Group accuracy question

Children did not choose the (reliable) outgroup when asked to identify which group had been more accurate throughout the session. Fourteen of 20 chose the outgroup, binomial $p = 0.1153$ (two-tailed).

2.2.6. Discussion

Although 4-year-olds selectively trusted reliable over unreliable ingroup members in Experiment 1, they did not selectively trust reliable outgroup members over unreliable ingroup members in Experiment 2. Children did not simply ignore reliability information and choose based on group status: they preferred neither the reliable outgroup member nor the unreliable ingroup member for both ask and endorse questions. Nor did children fail to attend to the presented information about reliability: they successfully responded to the explicit judgment questions presented directly after the familiarization trials, correctly identifying the outgroup as better at answering questions (although their final explicit judgment responses did not successfully identify the outgroup members, consistent with the ask/endorse responses that preceded the final EJ question set). Thus children successfully tracked the reliability information demonstrated during the familiarization phase. These findings suggest that, under these conditions, children's ability to use reliability information to bestow trust was disrupted. Additionally, individual responses suggest that, except for a few children who showed strong preferences, this disruption occurred at the level of individual children: the failure to trust one group over another did not arise because some children chose based on reliability and others chose based on group status.

We considered that children's cognitive resources might have been taxed by the inclusion of four reliability ratios and the need to track multiple groups in one test session. Sessions were brief and comparable to previous studies (Pasquini et al., 2007), but the present study did include an additional group manipulation. The very presence of the two groups, rather than the outgroup status of the reliable speaker in particular, could have affected children's performance.

To investigate this possibility, we analyzed performance on ask and endorse question on the first trial block only (the first test video each child saw, collapsing across the four reliability ratios). When the outgroup member was always more reliable (in Experiment 2), children did not trust the more reliable speaker significantly more often than chance for either the ask or endorse questions, even in the first block: for ask questions, $t(19) = -0.57$, $p > 0.05$; for endorse questions, $t(19) = 0.00$, $p > 05$. This first block failure occurred immediately after children successfully identified the reliable outgroup members as being better at naming familiar objects (during the initial set of explicit judgment questions).

In Experiment 1, in contrast, when both speakers were ingroup members, children did trust the more reliable speaker in the first block: for ask questions, $t(21) = 3.80$, $p = 0.001$; for endorse questions, $t(21) = 6.97$, $p < 0.001$. Responses on the first block were significantly different for Experiment 1 vs. Experiment 2 for both ask and endorse questions: for ask questions, $t(40) = 3.08$, $p < 0.005$; for endorse questions, $t(40) = 3.45$, $p = 0.001$. Because Experiments 1 and 2 were of the same length and both included all four reliability ratios, the lack of selective trust in Experiment 2 likely did not arise from fatigue or cognitive overload due to inclusion of all four trial types.

Because the outgroup speaker was always reliable throughout Experiment 2, children could have become more sensitive to this unambiguous correlation over the course of the task. If so, we would expect performance to improve as children were exposed to more examples of outgroup reliability. We therefore compared children's performance on ask and endorse questions during the first and second halves of the experiment. These did not differ for either measure: for ask questions, $t(19) = -1.82$, $p > 0.05$; for endorse questions, $t(19) = 0.65$, $p > 0.05$. Therefore, children likely did not become more responsive over time to the correspondence between prior reliability and outgroup status.

It is still possible that the inclusion of two different groups disrupted children's ability to track reliability. If children simply cannot use reliability as a guide when informants include both ingroup and outgroup members, we cannot yet conclude that children do not choose to trust reliable outgroup members over unreliable ingroup members in the context of word learning. We controlled for this possibility in Experiment 3.

3. Experiment 3

In Experiment 3, we asked whether children would selectively trust a reliable ingroup member over an unreliable outgroup member, or whether the presence of both ingroup and outgroup informants disrupts children's ability to respond based on informant reliability. We asked children to

choose whether to learn a novel word from a previously reliable ingroup member or from a previously unreliable outgroup member, in the same minimal groups paradigm. We used the same four relative-reliability ratios as in Experiments 1 and 2, but in Experiment 3 the ingroup speaker was always more reliable. A general failure of selective trust in this case (as there was in Experiment 2) would suggest that the presence of both outgroup and ingroup members disrupted children's ability to use reliability information when bestowing trust. If, however, children do display selective trust in Experiment 3, the lack of selective trust in Experiment 2 cannot be attributed to the mere presence of both ingroup and outgroup informants.

3.1. Method

3.1.1. Participants

Thirty-two four-year-olds participated in the study (15 girls; mean age 4–5, range 4–0 to 4–11). Testing conditions and demographic details were as in Experiments 1 and 2. Children were excluded for mislabeling a familiar object ($n = 5$), not completing the study ($n = 4$), or experimenter error ($n = 1$). Twenty-two participants were included in data analyses (10 girls; mean age 4–6, range 4–0 to 4–11).

3.1.2. Materials and design

Stimuli were identical to those of Experiment 2.

3.1.3. Procedure

The procedure was identical to that of Experiment 2, except that ingroup informants were more accurate than the outgroup informants.

3.2. Results and discussion

3.2.1. Group identification

All children readily accepted their group membership and accurately identified others as members of "their" group or the "other" group. All children accurately identified which group they belonged to at the end of the task.

3.2.2. Familiarization trials

All children in the final sample correctly identified who provided the accurate label, except for two participants who mislabeled the familiar object on the familiarization trial in which each actor provided a different incorrect label.

3.2.3. Explicit judgment questions

A 2 (timepoint) by 4 (reliability ratio) repeated-measures ANOVA revealed no main effects of timepoint, $F(1,21) = 2.883$, $p = 0.1043$, or ratio, $F(3,63) = 1.500$, and no interaction ($F < 1$). For further analyses, scores were collapsed across the four ratios. Performance was better than chance on both sets: for EJ questions asked directly after familiarization trials, $M = 10.68$ out of 12, $SD = 2.29$, $t(21) = 13.598$, $p < 0.0001$ (two-tailed); for EJ questions asked after test trials, $M = 9.86$ out of 12, $SD = 2.95$, $t(21) = 7.896$, $p < 0.0001$ (two-tailed).

3.2.4. Ask and endorse questions

Children's responses for both the ask and endorse measures did not differ significantly across reliability ratios, $F(3,21) = 1.29$, $p = 0.286$; $F(3,21) = 0.63$, $p = 0.598$, respectively. For further analyses, scores were collapsed across the four ratios. Children showed selective trust in the more reliable ingroup member for both ask and endorse questions. On ask questions, children chose the more reliable ingroup speaker, $M = 10.3182$, $SD = 2.3378$, $t(21) = 4.6513$, $p = 0.0001$ (two-tailed). On endorse questions, children selected the more reliable speaker's novel label, $M = 9.8636$, $SD = 2.8668$, $t(21) = 3.0491$, $p = 0.0062$ (two-tailed) (Fig. 1).

3.2.5. Group accuracy question

Children chose the (more reliable) ingroup when asked to identify which group had been more accurate throughout the session: 18 of 22 chose the ingroup, binomial $p = 0.0043$ (two-tailed).

3.2.6. Discussion

Children thus selectively trusted a reliable ingroup informant over an unreliable outgroup informant, showing that the lack of selective trust in the reliable outgroup in Experiment 2 did not arise from the mere presence of ingroup and outgroup informants. Children's success in answering the explicit judgment questions (before and after test trials) further demonstrates that the complexity of the study did not disrupt their ability to track reliability information. Experiment 3 thus supports the idea that children's lack of selective trust in reliable outgroup members during Experiment 2 occurred because their ability to use reliability information was disrupted.

4. General discussion

Three experiments examined preschoolers' use of speaker reliability and group status when deciding whom to trust in a novel-word-learning situation. Children were assigned to minimal groups (wearing a red or blue t-shirt) before participating in a selective trust in testimony task. When the child and both speakers belonged to the same group (Experiment 1), 4-year-olds successfully used speakers' histories of accuracy to guide selective trust. In Experiment 2, children did not selectively choose to learn from a reliable minimal-outgroup member over an unreliable minimal-ingroup member or vice versa, showing no overall preference for either informant. In Experiment 3, children selectively trusted a more reliable ingroup member over a less reliable outgroup member, showing that the absence of selective trust in Experiment 2 did not result from the mere inclusion of both ingroup and outgroup members. Finally, no effects of the relative reliabilities of the two informants were apparent in any of the three experiments. These findings suggest that minimal group categorization interacts with 4-year-olds' demonstrated ability to selectively trust previously reliable speakers, disrupting the ability to use reliability information to bestow trust when the two cues conflict.

Could children simply have ignored informants' reliability status, leading to their failure to trust the more reliable outgroup members in Experiment 2? Children's successful responses to the initial explicit judgment questions (in all three experiments) and to the final explicit judgment questions (in Experiments 1 and 3) show that they did attend to accuracy/inaccuracy information and could respond to questions about speakers' prior reliability. Children's lack of selective trust in the unreliable ingroup members in Experiment 2 also suggests that reliability status was not simply ignored: ingroup members were not preferred, as one might expect if children ignored or failed to successfully track speaker accuracy.

Might children simply have been overwhelmed by information, resulting in the lack of selective trust in the reliable outgroup member in Experiment 2? To rule out the possibility that children's cognitive resources were simply overtaxed by the inclusion of four reliability conditions within subjects, we looked at responses for the first-presented trial block only (the first video each child saw), collapsing across all four reliability ratios. Even in the first-presented block alone, children failed to show selective trust in the more reliable speaker in Experiment 2, when the outgroup member was always more reliable. (This occurred very shortly after children explicitly identified the outgroup members as being good at naming the objects.) In contrast, when both speakers were ingroup members (Experiment 1), children did trust the more reliable speaker in the first-presented block, and first-block responses to the selective trust questions differed significantly between Experiments 1 and 2. Thus, children's lack of selective trust in Experiment 2 cannot be explained by fatigue or other sources of difficulty that built over the course of the test session. Also mitigating this concern is children's success in Experiment 3, which was identical to Experiment 2 except that ingroup informants were reliable and outgroup informants were unreliable.

A potential explanation for children's failure to trust reliable outgroup speakers comes from research on word learning. Children can use multiple cues (social, attentional, and linguistic) to learn new words, and making these cues consistent (e.g., a speaker labels a novel object while directing her eye-gaze toward it) bolsters word learning (Baldwin et al., 1996; Hollich et al., 2000). We

manipulated two cues (group membership and prior reliability) in a simplified word learning scenario so that cues were either consistent (Experiments 1 and 3) or in conflict (Experiment 2). Children were more successful when the two cues were consistent. Perhaps the lack of ambiguity in the "consistent cues" scenario highlighted the optimal learning strategy (based on reliability), whereas, in the "conflicting cues" scenario, children were unsure of how to integrate the importance of the two cues, resulting in a lack of a preference for either speaker. It would be interesting to see whether older children would succeed despite the presence of conflicting cues by giving more weight to prior reliability. This is possible; Corriveau and Harris (2009b) found that older preschoolers are willing to ignore initial trust mappings based on familiarity in favor of mappings based on reliability.

It is also possible that ingroup members enjoy an initial trust bias. For example, lacking any prior reliability information, children prefer to trust speakers with accents like their own (Kinzler et al., 2011). Even when groups are minimal and arbitrary, perhaps outgroup members must provide overwhelming evidence of reliability – more than the four instances in Experiment 2 – to reverse children's initial group-based trust mappings. It is also possible that children's difficulty using reliability information over group status was influenced by other benefits that accrue to ingroups. Children attribute positive traits to all members of their ingroup (Bigler et al., 1997), and they are more likely to recall positive behaviors performed by their ingroup (Dunham et al., 2011). Possibly, because our design always presented children with at least one example of a reliable ingroup member (even in Experiment 2, when the outgroup member was more reliable), they assumed that other ingroup members would be reliable as well, even in the face of ingroup speakers' mistakes. Such a tendency, however, did not appear in children's successful explicit judgments of speaker accuracy, which were assessed directly after familiarization trials in Experiment 2.

A third interpretation is that children did not make a dispositional attribution of ingroup members' behavior (Hamilton & Trolier, 1986). Corriveau and Harris (2009b) found that children were more likely to explain familiar speakers' mistakes as "pretending," while unfamiliar speakers' mistakes were often attributed to "ignorance." If our participants thought that ingroup members were feigning ignorance, there might be less reason to distrust their future statements. Furthermore, if outgroup members' mistakes were interpreted as instances of ignorance, outgroup members could still be deemed untrustworthy even in conditions in which they were relatively more reliable but erred at least once. This would be consistent with children's established unwillingness to trust ignorant speakers (Koenig & Harris, 2005; Lucas & Lewis, 2010). Our data do not speak to these points directly, but future work may be able to address the possibility.

Another explanation for children's inability to trust the reliable outgroup is that children had difficulty using observed behavior (accuracy during familiarization) to predict future behavior (accuracy during test trials) (Liu, Gelman, & Wellman, 2007). In Experiment 2, children's successful identification of the outgroup speaker as more reliable immediately after familiarization trials showed that they did attend to reliability information and could recall it. Yet immediately afterward, during test trials, they failed to trust the reliable outgroup member, whom they had just identified as good at answering questions. Directly after test trials (in which the ask and endorse questions were presented), children performed at chance levels when asked which speaker had been better at answering questions, consistent with their ask and endorse responses. This successful identification of accurate informants followed by a failure to trust those informants is consistent with past work investigating the interaction of prior reliability and familiarity (Corriveau & Harris, 2009b). In previous work, preschool children showed selective trust in familiar vs. unfamiliar teachers. Following this, information about teachers' accuracy (in labeling objects and presenting their functions) was introduced. Older preschoolers were more likely than younger preschoolers to alter their initial preferences based on accuracy information. Younger preschoolers were less likely to take accuracy into account when deciding whom to trust, even when they had successfully judged the relative accuracy of the two informants. Thus, there is prior evidence of a disconnection between the ability to identify accurate informants and the tendency to use that information when bestowing trust.

Trusting those who have been reliable in the past is a sensible strategy for efficient learning, and preschoolers use this strategy in the absence of conflicting cues. The present study, however, demonstrates that when minimal group information is introduced, children's ability to use prior reliability is altered. In this case, minimal outgroup status attenuated the effects of prior reliability when children

decided whom to trust. Our future work will address whether these effects arise from enhanced trust in ingroup members, reduced trust in outgroup members, or both, and will explore the conditions under which a clearly defined outgroup is trusted.

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