Visual Access Trumps Gender in 3- and 4-year-old Children's Endorsement of Testimony

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Keywords: Testimony Selection, Trust, Gender, Visual Access, Social Cognition

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Abstract

Several studies have investigated how preschoolers weigh social cues against epistemic cues when taking testimony into account. For instance, one study has shown that 4- and 5-year-olds preferred to endorse the testimony of an informant who had the same gender as the children; by contrast, when the gender cue conflicted with an epistemic cue—past reliability—then the latter trumped the former. None of the previous studies, however, have shown that 3-year-olds can prioritize an epistemic cue over a social cue. In Experiment 1, we offer the first demonstration that 3-year-olds favor testimony from a same-gender informant in the absence of other cues. In Experiments 2 and 3, an epistemic cue—visual access—is introduced. Three- and 4-year-olds endorsed the testimony of the informant with visual access, whether it was a same-gender informant (Experiment 3) or a different-gender informant (Experiment 2). These results demonstrate that 3-year-olds are able to give more weight to an epistemic cue than to a social cue when evaluating testimony.

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Research has uncovered a wide variety of cues young children use when evaluating testimony (e.g., Clément, 2010; Harris, 2012; Mills, 2013). Some of the cues children use make obvious epistemic sense—visual access being a good example. It has been repeatedly demonstrated that young children understand that someone who has looked in a box knows what is inside, whereas a person who has not looked does not (e.g., Pillow, 1989; Pratt & Bryant, 1990; Sodian, Thoermer, & Dietrich, 2006). It was thus shown that preschoolers (including 3-year-olds) are more likely to believe an informant who had seen what was in a box rather than a informant who had not seen what was in a box (e.g., Robinson, Champion, & Mitchell, 1999).

Other cues seem to be more social than epistemic in nature. In particular, preschoolers tend to favour—everything else equal—the testimony of an informant who is more similar to them over that of a less similar informant. This has been observed for similarity based on accent (Kinzler, Corriveau, & Harris, 2011), gender (Ma & Woolley, 2013), hair color and food preference (Reyes-Jaquez & Echols, 2013, Experiment 1) or minimal group membership (MacDonald, Schug, Chase, & Barth, 2013).

In spite of the robustness of children's tendency to believe similar informants, evidence suggests that this tendency is trumped by some epistemic cues. In several experiments, young children were more likely to endorse the testimony of a dissimilar informant over that of a similar informant, if the dissimilar informant had been accurate in the past, and the similar informant inaccurate (for accent: Corriveau, Kinzler, & Harris, 2013; for gender: Taylor, 2013; for hair color and food preference: Reyes-Jaquez & Echols, 2013; for minimal group membership: Elashi & Mills, 2014). This evidence is convergent with several other studies that have shown that for preschoolers (although sometimes only for older preschoolers), cues to past accuracy trump social cues such as familiarity (Corriveau &

Harris, 2009), age (Jaswal & Neely, 2006), and consensus (Bernard, Proust, & Clément, 2015) (for an exception in which 4-year-olds favour familiarity over past reliability, see Danovitch & Mills, 2014).

Strikingly, none of these previous studies have demonstrated a preference for epistemic cues over social cues in 3-year-olds. Some studies did not incorporate this population (Bernard *et al.*, 2015; Taylor, 2013). One study lumped 3- and 4-years-olds together, making it impossible to independently ascertain the performance of 3-years-olds (Jaswal & Neely, 2006). In some studies the 3-year-olds did take the epistemic cue into account, but they still weighed the social cue heavily, so that the children did not clearly favour the epistemic cue when the two cues were conflicting (Corriveau *et al.*, 2013; Elashi & Mills, 2014; Reyes-Jaquez & Echols, 2013). Finally, in one study the 3-year-olds favoured the social cue over the epistemic cue (Corriveau & Harris, 2009).

The present research investigates how young preschoolers, including a group of 3-year-olds, combine a social cue—similarity of gender—with an epistemic cue—visual access. We chose two cues that could be expected to be strong. As a social cue, gender is a particularly salient category (Fiske, 1998), which can, for children at least, trump other categories such as age or ethnic group (Shutts, Banaji, & Spelke, 2010). Although gender has been shown to exert a strong influence on the endorsement of testimony in 4- to 6-year-olds (e.g., Ma & Woolley, 2013), the present research would be the first demonstration of such an effect in 3-year-olds. The epistemic cue chosen was visual access, a factor that has been shown to strongly influence 3-year-olds' endorsement of testimony (Pillow, 1989; Robinson *et al.*, 1999).

The three experiments relied on the same set up. Children were shown two informants standing next to a box. One informant was male, the other female. Both informants gave conflicting testimonies about the content of the box, and the children had to say what they

thought was in the box. What was manipulated was the perceptual access the informants had had to the content of the box before providing their testimony. In Experiment 1, both informants had seen the content of the box. In the absence of a differential epistemic cue, we expected children to believe the informant of the same gender. In Experiment 2, only the informant whose gender was different from the child's had seen what was in the box. In Experiment 3, only the informant whose gender was the same as the child's had seen what was in the box. Taken together, Experiments 2 and 3 allow us to test the following predictions: if children prefer to use visual access (epistemic cue) to differentiate between conflicting claims, they will choose the informant who has seen into the box, regardless of gender. In contrast, if children tend to be guided by a same-gender preference (social cue), they will choose the same-gender informant, regardless of visual access.

Experiment 1

Method

Participants. This experiment involved 88 children: forty-five 3-year-olds (20 girls, $M_{age} = 42.33$ months, $SD = 3.56$, range 36–47 months), and forty-three 4-year-olds (21 girls, $M_{age} = 53.91$ months, $SD = 3.51$, range 48–59 months). All children were recruited from five daycare centers in a Swiss French-speaking city. Most children came from middle- and upper-middle-class families. Only children whose parents had given their consent participated in the study. All children were administered the task on an individual basis in a quiet room located in their daycare center. The procedure lasted approximately ten minutes.

Materials and procedure. A Power-Point presentation including four counterbalanced stories was used. All stories were built on the same model. In the first vignette, two Playmobil characters in front view—a man and a woman—and a closed box between them were depicted. The experimenter gave the first name of the two characters (e.g., Lucie and Thomas) and checked that the child could identify both characters by name through

memory check questions: “Can you show me who is Lucie?”, “Can you show me who is Thomas?” (order counterbalanced). The experimenter explained that there was something in the box and that the two characters were going to look in the box (second vignette showing the two characters looking simultaneously into the opened box). Then each character in turn pointed to the box, which was closed again, while an animation bubble appeared. For the woman character, the experimenter said aloud, for instance, “Lucie says there is a ball into the box,” (third vignette) while for the man character, the experimenter said, for instance, “Thomas says there is a book into the box” (fourth vignette).

Finally, the fifth vignette depicted again the two Playmobil characters in front view with the closed box between them and the experimenter asked the child: “According to you, what is into the box?” After the child gave his response verbally (for instance “a ball” or “a book”), the experimenter asked a justification question: “In your opinion, why is there a [child’s response] into the box?”

The three other stories were built on the same model. The order in which the informants provided information, the informants’ first name (eight different names were used for the eight different Playmobil characters presented to children: Lucie/Thomas, Julie/Hugo, Charlotte/Julien, and Marie/Olivier), the informants’ location (right versus left), the color of the boxes, and the objects named by the informants varied across trials. The child could obtain a maximum score of 4 points, 1 point for each story in which the object’s name provided by the same-gender character was chosen.

Results

All children correctly remembered the first names of all eight characters (memory check questions) in each story. A 2-way ANOVA with Age Group (3, 4), and Gender (Girl, Boy) as between-subjects variables was performed for the proportion of times (with an arcsin transformation) children endorsed the testimony of the same-gender character. This revealed

no significant main or interaction effects between these two factors. The choice of the same-gender character's testimony was significantly above chance, both for the children as a whole (64.2%, $M = 2.57$, $SD = 1.09$, $t(87) = 4.88$, $p < .001$), and within each age group (3-year-olds: 64.4%, $M = 2.58$, $SD = 1.11$, $t(44) = 3.47$, $p < .01$; 4-year-olds: 63.9%, $M = 2.56$, $SD = 1.07$, $t(42) = 3.40$, $p < .01$) (see Figure 1).

Figure 1. Percentage of choices linked to the same-gender characters in each experiment

Regarding the justification question, very few gender based explanations have been produced after a same-gender response (for instance, when a boy said: “because boys are stronger than girls.”): in 1.7% of the trials for the 3-year-olds ($N = 3$), and 4.1% for the 4-year-olds ($N = 7$).

Experiment 2

Experiment 1 demonstrated that when 3- and 4-year-olds had to choose between the testimony of a same-gender character and that of a different-gender character, they tended to

endorse the testimony of the same-gender character. Although this tendency was far from ceiling, it was similar to that observed in previous experiments with 4-year-olds (e.g., Taylor, 2013). The main goal of Experiment 1 was to establish a baseline preference for the same-gender informant. Experiments 2 and 3 test the weight given to this evidence when it is opposed to (Experiment 2) or combined with (Experiment 3) an epistemic cue. The epistemic cue used is visual access: only one of the two informants sees what is in the box. In Experiment 2 it is the different-gender informant who has had visual access. If the epistemic cue trumps the social cue, children should believe the different-gender informant who has had visual access.

Method

Participants. This experiment involved 85 children: forty-one 3-year-olds (20 girls, $M_{age} = 41.92$ months, $SD = 3.65$, range 36–47 months), and forty-four 4-year-olds (22 girls, $M_{age} = 53.54$ months, $SD = 3.55$, range 48–59 months). The demographics and procedure were similar to those of Experiment 1.

Materials and procedure. The materials and procedure used in this experiment were the same as those used in Experiment 1, except for two modifications: (1) a wall was introduced between the same-gender character and the box; (2) the same-gender character turned her or his back on the box when the different-gender character was looking in the box. These modifications were introduced to ensure that the child understood that the same-gender character could not have any perceptual access to the content of the box. Moreover, during the procedure, the presence of the wall and the fact that the same-gender character did not look in the box were emphasised by the experimenter. In the first vignette, the experimenter said: “You see here [the experimenter points to the wall], there is a wall between X and the box.” At the second vignette, the experimenter said: “Y looks in the box but X does not.”

Results

All children correctly remembered the first names of all eight characters. A 2-way ANOVA with Age Group (3, 4), and Gender (Girl, Boy) as between-subjects variables was performed for the proportion of times (with an arcsin transformation) children endorsed the testimony of the same-gender character with no perceptual access. This revealed no significant main or interaction effects between these two factors. The choice of the testimony provided by the same-gender character with no perceptual access was significantly below chance, both for the children as a whole (20.8%, $M = .83$, $SD = 1.16$, $t(84) = -9.23$, $p < .001$), and within each age group (3-year-olds: 20.7%, $M = .82$, $SD = 1.09$, $t(40) = -6.86$, $p < .001$; 4-year-olds: 21%, $M = .84$, $SD = 1.24$, $t(43) = -6.21$, $p < .001$) (Figure 1).

Regarding the justification question, 3- and 4-year-old children did not produce any gender based explanation after a same-gender response. After the choice of a character with visual access, justifications based on the visual access of the informant (saying, for instance: “because she/he saw into the box”) were given in 13.4% of the trials for the 3-year-olds ($N = 22$), and 45.4% for the 4-year-olds ($N = 80$).

Experiment 3

Experiment 2 demonstrated that when there is a conflict between an epistemic cue (visual access) and a social cue (same gender), 3- and 4-year-olds tend to put more weight on the epistemic cue in their endorsement of testimony. The goal of Experiment 3 was to test the behaviour of children from the same age groups when the two cues are consistent. If the social and the epistemic cues are additive, children should be more likely to believe the same-gender informant who had visual access than the different-gender informant who had visual access in Experiment 2.

Method

Participants. This experiment involved 53 children: twenty-six 3-year-olds (13 girls, $M_{age} = 41.19$ months, $SD = 3.49$, range 36–47 months), and twenty-seven 4-year-olds (13

girls, $M_{age} = 52.70$ months, $SD = 3.76$, range 48–59 months). The demographics and procedure were similar to those of Experiments 1 and 2.

Materials and procedure. The materials and procedure used in this experiment were the same as those used in Experiment 2, but the presentations used with the girls in Experiment 2 were presented to the boys (and the reverse pattern for the boys). Thus, in this experiment the same-gender character had perceptual access to the content of the box while the different-gender character did not.

Results

All children correctly remembered the first names of all eight characters. A 2-way ANOVA with Age Group (3, 4), and Gender (Girl, Boy) as between-subjects variables was performed for the proportion of times (with an arcsin transformation) children endorsed the testimony of the same-gender character with perceptual access. This revealed no significant main or interaction effects between these two factors. The choice of the testimony provided by the same-gender character with perceptual access was significantly above chance, both for the children as a whole (82.1%, $M = 3.28$, $SD = 1.17$, $t(52) = 8.01$, $p < .001$), and within each age group (3-year-olds: 76.9%, $M = 3.08$, $SD = 1.35$, $t(25) = 4.05$, $p < .001$; 4-year-olds: 87%, $M = 3.48$, $SD = .93$, $t(26) = 8.23$, $p < .001$) (Figure 1).

After the choice of a same-gender character with visual access, the justifications based on the visual access of the informant were given in 14.4% of the trials for the 3-year-olds ($N = 15$), and 51.8% for the 4-year-olds ($N = 56$). After the same choice, 3- and 4-year-olds did not produce any justification based on gender.

To analyse the differences between the experiments, a 3-way ANOVA with Age Group (3, 4), Gender (Girl, Boy), and Experiment (1, 2, 3) as between-subjects variables was performed for the proportion of times (with an arcsin transformation) children endorsed the testimony of the same-gender character. This revealed only a significant main effect of

Experiment, $F(2,214) = 72.53$, $p < .001$, $\eta^2 = .40$. Children chose the object linked to the same-gender characters significantly more often in Experiment 3 (82.1%, $M = 3.28$, $SD = 1.17$) than in Experiment 1 (64.2%, $M = 2.57$, $SD = 1.09$, $p < .001$) and Experiment 2 (20.8%, $M = .83$, $SD = 1.16$, $p < .001$). Children chose the object linked to the same-gender characters significantly more often in Experiment 1 than in Experiment 2 ($p < .001$).

Finally, if the social and the epistemic cues are additive, children should be more prone to follow the same-gender informant who had visual access (Experiment 3) than the different-gender informant who had visual access (Experiment 2). A 3-way ANOVA with Age Group (3, 4), Gender (Girl, Boy), and Experiment (2, 3) as between-subjects variables was performed for the proportion of times (with an arcsin transformation) children endorsed the testimony of the character who had had visual access to the content of the box. This revealed no significant main or interaction effects between these three factors. Still, there was a non-significant difference in the expected direction (mean number of choices linked to the character who had visual access in Experiment 2: 3.16; in Experiment 3: 3.28). This lack of significant difference between the experiments might be due to a ceiling effect, given the high performance of the children in Experiment 2 (in which approximately 80% of the children endorsed the testimony of the informant with visual access). Improvements beyond this level of performance is difficult to observe in this population, given that it is difficult to avoid noisy answers due to lapses of attention in very young children.

General Discussion

The goal of the present experiments was to investigate how 3- and 4-year-olds weigh social and epistemic cues when evaluating testimony. In all three experiments, the children had to choose between the testimony of an informant who had the same gender as them (same-gender informant) and one who did not (different-gender informant). Both pieces of testimony bore on the content of a box. In Experiment 1, there were no discriminating

epistemic cue: both informants had seen what was in the box. Children from both age groups relied on the social cue: they were more likely to follow the same-gender informant.

Experiment 1 extends previous results in three ways: first, by showing that 3-year-olds also display a preference for testimony by a same-gender informant; second, by showing that this preference for 3- and 4-year-olds extends to an episodic knowledge task (what can be into a box) by contrast with labelization tasks or tool use tasks (Ma & Woolley, 2013; Taylor, 2013); third, by showing that a different method of presentation (Playmobil figures instead of movies of actual people as, for instance, in Taylor, 2013) can elicit preference for same-gender informants.

In Experiment 2, the social and the epistemic cues conflicted: only the different-gender informant had seen what was in the box. Children from both age groups relied on the epistemic cue: they were more likely to follow the different-gender informant who had had visual access. In Experiment 3, the social and the epistemic cues were concordant: only the same-gender informant had seen what was in the box. Results indicate that the cues were not significantly additive: the children did not follow the informant who had visual access more when she or he was a same-gender informant (Experiment 3) than when she or he was a different-gender informant (Experiment 2). This lack of significance in spite of a difference in the expected direction might be due to a ceiling effect.

The finding that, in 3-year-olds, an epistemic cue can trump a social cue is novel and runs against previous findings which had shown either that 3-year-olds did not clearly favour the epistemic cue (Corriveau *et al.*, 2013; Elashi & Mills, 2014; Reyes-Jaquez & Echols, 2013), or that they favoured the social cue (Corriveau & Harris, 2009). This discrepancy might stem from a difference in the epistemic cues used in these various experiments. In the current set of experiments, the epistemic cue was visual access, whereas in the experiments cited above, it was prior accuracy: when having to name a familiar object, one informant had

provided consistently accurate labels while the other had provided consistently inaccurate labels. Our results thus suggest that visual access is a stronger epistemic cue than prior accuracy—at least when learning the identity of hidden objects (see Brosseau-Liard & Birch, 2011).

On this basis, we interpret our results as providing a lower bound on the tendency of very young children to favour epistemic over social cues. They show that at least one epistemic cue is able to trump what could be deemed, on the basis of previous results, a strong social cue. It would be interesting to see if a social cue could be designed that would be so strong as to trump visual access. One possibility could be a social cue that would suggest that one informant might be lying, in which case visual access would not entail reliable testimony—although 3-year-olds might find it difficult to understand the informational consequences of an informant's desire to lie (see, e.g., Mascaro & Sperber, 2009).

Regarding the justifications, 3-year-olds proved to be largely unable to adequately justify why they had chosen the testimony of the same-gender informant (Experiment 1) or of the informant who had visual access (Experiments 2 and 3). This result is consistent with past findings (for gender, see, Shutts *et al.*, 2010, for visual access, see, Pillow, 1989). While the 4-year-olds provided very few gender-based justifications for their choices in Experiment 1, approximately half of those who had believed the informant with visual access in Experiments 2 and 3 were able to appropriately justify this choice. The development of the ability to justify the choice of the informant with visual access might be related to the development of explicit theory of mind skills. Although infants have been shown to possess implicit theory of mind skills (e.g., Onishi & Baillargeon, 2005; Scott, Baillargeon, Song, & Leslie, 2010), the ability to explicitly process mental states develops later, with important milestones being reached between 3 and 4 years of age (Wellman, Cross, & Watson, 2001). This increased ability to explicitly process mental states might explain both why 4-year-olds are better able than 3-

year-olds to justify the choice of the informant with visual access, and also why they are still unable to justify the choice of the same-gender informant (a choice that does not rest on mental states attribution).

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