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Young Children Rely on Gossip When Jointly Reasoning About Whom to Believe

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People rely on reputational information communicated via gossip when deciding about with whom to cooperate, whom to believe, and whom to trust. In two studies, we investigated whether 5- and 7-year-old children trust in gossip when determining a course of action. In Study 1, 5- and 7-year-old German-speaking peer dyads (N = 64 dyads, 32 female dyads) were presented with a collaborative problem-solving task (e.g., deciding together what a creature eats). Each child individually received conflicting information about the solution from a different informant (e.g., one proposed rocks; the other proposed sand). Each child additionally heard gossip about the informant's reputation: one informant had a good reputation; the other had a bad reputation. In the experimental condition, the reputation was relevant to the task (honesty), whereas it was irrelevant in the control condition (tidiness). Seven-year-old dyads, and 5-year-old dyads to a lesser extent, settled on the items suggested by the informant with good reputation in the experimental but not in the control condition. Only 7-year-old children explicitly referred to the information conveyed via gossip, engaging in metatalk about the reputations of the informants. In Study 2, we replicated these findings in a more controlled experiment in which 5- and 7-year-old American English-speaking children (N = 48, 27 girls) tried to convince an adult partner who proposed the item suggested by the informant with bad reputation. Thus, starting around age 5, and more reliably at age 7, children selectively rely on gossip in identifying trustworthy individuals in their collaborative reasoning with partners.

Keywords: collaborative decision-making, gossip, reasoning

Supplemental materials: https://doi.org/10.1037/dev0001066.supp

Humans gossip. Across cultures and contexts, humans show a tendency to share evaluative information about absent third parties. According to the prosocial gossip hypothesis, gossip plays a fundamental role in sustaining uniquely human forms of cooperation, which require individuals to selectively interact with and learn from trustworthy individuals and to avoid cheaters (Boehm, 2012; Dunbar, 1998). In small groups, the identification of reliable individuals can be grounded in previous first-hand experience. In larger groups, however, agents are often forced to choose among individuals with whom they had no or little prior interaction, so the transmission of information about people's reputations via gossip allows agents to identify whom to trust, whom to cooperate with, and whom to believe (Feinberg et al., 2012; Sommerfeld et al., 2007).

Children begin to understand the relevance of reputation in structuring social relations during the preschool years. Between the ages 3 and 5, children develop a concern for reputation and their behaviors show the well-known signature of self-promotional strategies: increased norm compliance in public compared with private settings (Engelmann & Rapp, 2018; Fu et al., 2016; Rapp et al., 2019; Yazdi et al., 2020; Zhao et al., 2018). Around this age, children also start to contribute to the creation and maintenance of others' reputations. They first communicate negative evaluations of others at around age 3 in the form of tattling. Tattling is mostly selfish, expressing an appeal to an authority figure to respond to a transgression on behalf of the tattler (Ingram & Bering, 2010; Vaish et al., 2011). By age 5, children start to engage in prosocial gossip by sharing evaluative information about third parties with equals. In a recent study, children played a game with a norm-conforming and a norm-violating agent and were then given the opportunity to communicate reputational information to

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Study 1 was not preregistered. Study 2 was preregistered. The preregistration of the procedure, coding, hypotheses, sample size, and statistical analyses can be found at https://aspredicted.org/ue3us.pdf. The datasets and statistical analyses are available on request from the authors.

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a peer (Engelmann et al., 2016). Five-year-old children, but not 3-year-old children, gossiped about the agents, for instance by saying, "*Play with her because she is more generous*."

Although it has been established that children start gossiping during the preschool years, little attention has been paid to the focus of the present study: whether children rely on information communicated via gossip in their decision-making. The literature on testimony suggests that starting around age 3, children do not simply place blind faith in socially communicated information, but selectively trust some informants more than others. For instance, they prefer to learn from accurate and knowledgeable rather than inaccurate and ignorant informants, rely on the opinion of the majority rather than the minority, and favor the testimony of benevolent rather than malevolent communicators (Corriveau & Harris, 2009; Einav & Robinson, 2011; Harris, 2015; Jaswal & Neely, 2006; Koenig & Harris, 2005; Mascaro & Sperber, 2009).

Most relevant to the current investigation is a study by Haux and colleagues (2017), which examined the extent to which young children trust gossip versus first-hand information in choosing a collaborative partner. 5- and 7-year-old children heard conflicting information about a potential partner: they received positive information via gossip but negative information through firsthand observation (or vice versa). Five-year-old children followed the negative information, regardless of whether they witnessed this first-hand or heard it as a gossip. Seven-year-old children, on the other hand, relied on what they witnessed first-hand. Thus, 5- and 7-year-old children did not trust gossip. However, pitting gossip against first-hand observation may not be the most diagnostic method of measuring children's selective trust in gossip because gossip is a valuable tool when the individual has no or limited first-hand knowledge, as the prosocial gossip hypothesis suggests.

In the two studies, we investigated whether and how selectively children rely on reputational information transmitted via gossip. In Study 1, 5- and 7-year-old German-speaking peer dyads engaged in a collaborative problem-solving task in which they had to make a series of joint decisions to win a prize (e.g., decide what a novel animal eats, a modification of the procedure used by Köymen & Tomasello, 2018). Prior to the task, each child within a dyad individually received conflicting information about how to solve the problem from a different informant (e.g., one informant suggested that the novel animal eats rocks; the other suggested sand). Each child was also exposed to gossip about the respective informant's reputation. In the experimental condition, the gossip was relevant to the task and was about the informant's honesty: one child was exposed to an informant with a good reputation ("I heard that she always tells the truth") and the other child to an informant with a bad reputation ("I heard that she often lies"). In the control condition the gossip was irrelevant to the task and was about the informant's tidiness (one informant was tidy; the other was messy).

We had two research questions. We investigated whether (a) children's joint decisions (e.g., their selection of items) depended on the reputations of the informants and (b) children referred to the gossip to justify their proposals for their partners. We predicted that children would selectively rely on gossip and settle on the items suggested by the informant with a good reputation in the experimental condition but not in the control condition. Next, we predicted that children would pass on the gossip in the experimental condition, where the gossip was relevant to the task (e.g., "They say this one tells the truth"), but not in the control condition. Thus, we expected that children would not credit or discredit an informant because of any kind of gossip, but that they would be able to judge the "relevance" of the gossip presented to them, and consequently use the information transmitted via gossip only when it is relevant (see Köymen et al., 2020). Finally, we expected that the condition difference would be greater for 7-year-old children than for 5-year-old children for both predictions because although 5-year-old children start engaging in gossip (Engelmann et al., 2016), 7-year-old children have been shown to be better at providing reasons for their proposals in the form of metatalk, which involves explicit deliberation about the trustworthiness of information sources (Köymen & Tomasello, 2018).

In Study 2, we replicated the findings of Study 1 in a more controlled experiment with a new cultural and linguistic group, 5- and 7-year-old American English–speaking children.

Study 1

Method

This study was not preregistered.

Participants

Sixty-four 5-year-old children (M = 5;7, *Range* = 5;0–6;0, 32 girls) and 64 seven-year-old children (M = 7;8, *Range* = 7;2–8;3, 32 girls) in same-age and same-sex dyads participated in the study (64 dyads total). The sample size was determined prior to data collection and was based on previous studies who used a similar design (Köymen & Tomasello, 2018). Children were recruited from a database of parents, who had expressed interest for their children to participate in developmental studies. The data collection took place in schools and nurseries. The dyads consisted of children who knew each other and were formed based on their teachers' recommendations. Each dyad was randomly assigned to a condition. In each condition, there were 16 dyads from each age group. In addition to these 64 dyads, eight 5-year-old dyads were tested but could not be included in the analyses because of their incorrect responses to the memory questions (see below) and one 7-year-old dyad because of experimenter error. The children were native speakers of German with various socioeconomic backgrounds.

Materials

In the warm-up phase, there was a dollhouse with three rooms (bathroom, kitchen, bedroom), a chest of three drawers, and a bin. Each drawer had two items: one that typically belonged to a particular room (a toilet, a fridge, a cradle) and the other that did not (a lamp, a ladder, a table). From each drawer, dyads had to pick one item for a room and place the other item in the bin.

In the teaching phase, each child within a dyad individually watched a clip with five slides. In each clip, an informant (depicted by a drawing) talked about a novel animal called a "selk" and what it needs (see Appendix A for slides and their narration). One child heard the informant saying that selks eat rocks, drink blue soda, and sleep in water (Set 1 items). The other child heard the informant saying that selks eat sand, drink green soda, and sleep on flowers (Set 2 items). On the last slide, one child heard that the informant had a good reputation from the two gossipers (depicted by a drawing); the other heard that the informant had a bad reputation from

the two gossipers. In the experimental condition, the reputation of the informant was about honesty. One child watched gossipers saying, "I heard that she always tells the truth" [good reputation]; the other watched gossipers saying, "I heard that she often lies" [bad reputation]. In the control condition, the reputation of the informant was about tidiness. One child watched gossipers saying, "I heard that she is always tidy" [good reputation]; the other watched gossipers saying, "I heard that she is often messy" [bad reputation]. For each condition, four clips were created: good-reputation clip with Set 1, good-reputation clip with Set 2, bad-reputation clip with Set 1, and bad-reputation clip with Set 2.

In the testing phase, the dyads were given a three-dimensional selk figure, a piece of cloth as selk's home, three drawers containing two items each (as during warm-up), and a bin. Dyads were asked to place the correct item from each drawer in the selk's home and throw the other into the bin. The top drawer had two food items (rocks, sand). The middle drawer had two drinks (a blue soda, a green soda). The bottom drawer had two sleeping places (a lake, a meadow). Before the dyads started playing, the experimenter (E1) demonstrated the game, by choosing between a tree and the bucket, placing the tree in the selk's home, and throwing the bucket into the bin.

Procedure

The procedure of this study is approved by the research ethics committee of Max Planck Institute for Evolutionary Anthropology (Project title: "Children's reasoning about reputation," Project code: RepReason). The study took place in quiet rooms of nurseries and schools. All sessions were videotaped. In the warm-up phase, E1 asked the peer dyads to place the "correct" item from each drawer to decorate a room of the house and the "incorrect" item in the bin (e.g., to place the fridge in the kitchen and the ladder in the bin). E1 primed children to give reasons for their decisions by asking "why" for each item. If dyads did not respond, E1 provided a reason (e.g., "Because one needs a fridge in the kitchen"). Then, E1 showed a photo of correct choices and said, "You did it correctly" or "You did not pick the correct one for this room," to highlight that there are correct choices in the game.

In the teaching phase, a second experimenter (E2) invited one child, Child A (randomly chosen), to play with her outside. With Child A outside, Child B watched a clip. Then, Child B went outside, while Child A watched a clip. In both conditions, children in each dyad received conflicting information about what the selk needs. One child watched a clip with Set 1 items (rocks, blue soda, lake); the other watched a clip with Set 2 items (sand, green soda, meadow). In the experimental condition, one child heard from the honest informant, the other heard from the dishonest informant. In the control condition, one child heard from the tidy informant, the other heard from the messy informant. Each child watched their clip twice. After each clip, E1 said, "*I do not know this girl but what did they* [pointing at the gossipers on the screen] *say about her*?" to make sure children understood the reputational information. Then, E1 said, "*who said that*?" to make sure children distinguished the characters. If they did not answer the question or answered the question incorrectly, E1 gave them the correct response. The presentation order of the set of items (Set 1 vs. Set 2) and the reputation of the informant (good vs. bad) suggesting each set were counterbalanced across dyads.

In the testing phase, E1 said,

> *This is the home of selks* [placing the selk on the cloth]. *In each of these drawers, there is one correct item that selks need and one incorrect item. You need to place the correct item in the selks' home and the incorrect one in the bin.*

E1 demonstrated the game by choosing between a tree and a bucket. E1 said, "*These kids* [informants] *told me that selks need a tree so I choose the tree*" to model children how to solve the task and follow the items suggested by the informants they heard, rather than choosing the items randomly. She promised the children a surprise gift, if they found all the correct items and added,

> *Child A, you heard from one girl. Child B, you heard from another girl. You need to find out which girl is right. I do not know these girls, but perhaps these can help you* [pointing to the picture of the gossipers].

E1 left the room.

When children were done selecting items for the selk, E1 checked whether each dyad chose one food item, one drink, and one sleeping place. If children, for example, selected two food items, E1 asked them to choose one. Then, E1 asked children why they chose these items. If the dyads did not mention the gossip in response to E1's question, E1 individually asked each child what the gossipers had said. If the children gave no answer, E1 asked, "*Did they say that she always tells the truth or that she often lies?*" in the experimental condition; "*Did they say that she is always tidy or that she is often messy?*" in the control condition. If a child within a dyad did not respond to the last question correctly, that dyad was excluded from the analyses. This drop-out criterion was determined prior to data collection and was set to rule out the possibility that children's lack of mentioning the gossip in the testing phase would be due to their inability to recall the gossip. Such posttask memory questions have been used in other studies with similar designs as drop-out criteria (e.g., Mammen et al., 2018). At the end of the procedure, all children received stickers as gifts.

Coding

Children's peer conversations were transcribed. We coded (a) which three items were chosen; (b) whether children referred to the gossip about the informants during their peer conversations when the experimenter was outside (e.g., "They heard, she lies," "These two said she is tidy"). A second coder blind to condition, age, and predictions coded 25% of the transcripts (16 dyads: four in each age and condition) for mentioning the gossip. The agreement was $\kappa = 1.00$.

Because 5-year-old children rarely referred to the gossip, we explored how they reached decisions (this was not part of the original coding). Specifically, we coded whether individual child speakers indirectly expressed their mistrust of their informants. For each item, we coded that a child displayed "indirect uncertainty," if that child:

- let the other child decide through questions ("*Blue or green?*," "*Rocks, right?*");
- did not insist on the item they heard, did not disagree with their partner or proposed the item that their partner proposed, despite receiving the conflicting information.

We termed this kind of behavior "indirect uncertainty," because children were not explicitly stating that they were not sure, but rather relied on the indirect cues listed above. The coding scheme was inspired by previous literature suggesting that children are less likely to be persuaded by speakers who express uncertainty (Sabbagh & Baldwin, 2001; Sobel & Corriveau, 2010). The full data set was coded by a coder who was blind to condition. A second coder, also blind to condition, coded 25% of the transcripts (eight dyads: four in each condition) for indirect uncertainty. The agreement was $\kappa = .69$.

The data sets and statistical analyses are available from the authors on request.

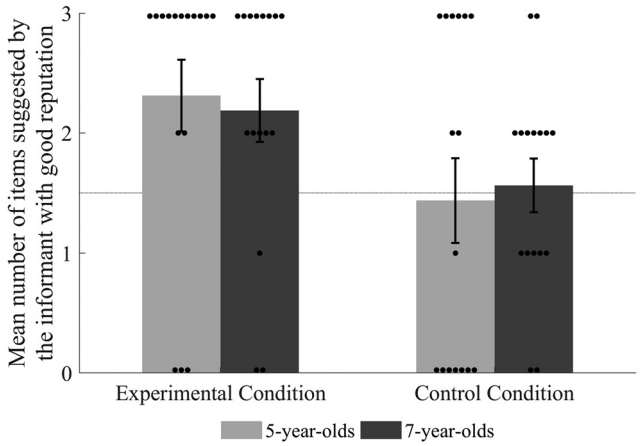
Results

All the statistical analyses were run using R (Version 4.0; R Core Team, 2020). We carried out four sets of analyses. The first concerned our first research question on children's choice of items. The second concerned our second research question on children's references to gossip. The third concerned whether references to gossip predicted children's choice of items suggested by the informant with good reputation in the experimental condition. The fourth concerned whether 5-year-old children's displays of indirect uncertainty changed across conditions.

First, we analyzed whether there was a difference in children's choice of the items across age groups and conditions by comparing the mean number of items suggested by the informant with good reputation to chance. In the experimental condition, when the reputation was about honesty, both age groups chose the items suggested by the informant with good reputation significantly above chance (5-year-old children: $t[15] = 2.72$, $p = .016$, $d = .68$; 7-year-old children: $t[15] = 2.63$, $p = .019$, $d = .66$; see Figure 1). In the control condition, when the reputation was about tidiness, both age groups' preference for the items suggested by the informant with good reputation was at chance (5-year-old children: $t[15] = -.18$, $p = .86$, $d = .04$; 7-year-old children: $t[15] = .28$, $p = .78$, $d = .07$). We compared the mean number of items suggested by the informant with good reputation between age groups, conditions, and gender, using between subjects ANOVA and found that there was a significant condition difference, $F(1, 59) = 6.68$, $p = .012$, $\eta_p^2 = .10$: Children chose the items suggested by the informant with good reputation significantly more often in the experimental condition than in the control condition.[1]

Figure 1

The Mean Number of Items That Dyads Chose Which Were Suggested by the Informant With Good Reputation in Study 1



Note. Each dyad is denoted by one circle. Vertical lines represent standard errors. The horizontal line in the middle represents chance level.

Second, we analyzed whether children's reference to the gossip about the informant's reputations varied across conditions and age groups. Three 5-year-old dyads and nine 7-year-old dyads in the experimental condition and one 7-year-old dyad in the control condition mentioned the gossip about the informants (see Figure 2). We ran a generalized linear model (GLM) with a binomial error distribution. The unit of analysis was each dyad. The response variable was the binary measure of whether a dyad mention the gossip. The full model included age (5, 7), condition (experimental, control), their interaction, and gender. When compared with the null model, which included gender, the full model improved the fit ($\chi^2 = 19.79$, $df = 3$, $p < .001$). The interaction between age and condition was not significant ($\chi^2 = .33$, $df = 1$, $p = .566$). The reduced model[2-3] Fn2-Fn3 without the interaction term revealed significant mains effects of age ($\chi^2 = 6.07$, $df = 1$, $p = .014$) and condition ($\chi^2 = 14.51$, $df = 1$, $p < .001$). Seven-year-old dyads were significantly more likely to mention the gossip than 5-year-old dyads. Both age groups were significantly more likely to mention the gossip in the experimental condition than in the control condition, although the condition difference was mostly driven by the 7-year-old dyads.

Third, we analyzed whether 7-year-old children's mention of gossip predicted choosing items suggested by the informant with good reputation in the experimental condition (because children did not show a preference for the items suggested by either informant in the control condition and only three 5-year-old dyads mentioned gossip). Those 7-year-old dyads who mentioned the gossip chose items endorsed by the informant with a good reputation significantly more often than those who did not mention the gossip, $t(14) = -3.29$, $p = .005$, $d = 1.66$ ($M = 2.78$, $SD = .44$ vs. $M = 1.43$, $SD = 1.13$).

Finally, as an exploratory analysis, to understand how 5-year-old dyads reached decisions without mentioning the gossip, we investigated whether the child speaker's display of indirect uncertainty changed depending on the reputation of the informant they heard (good or bad) and condition. The indirect uncertainty measure included two kinds of strategies: asking their partner questions (letting them decide) and not disagreeing with their partner (43.6%, 56.4% respectively). The response variable was the number of items for which the speaker displayed indirect uncertainty (range 0–3). We first compared the children who heard the bad reputation in the two conditions. Children in the experimental condition, who heard that the informant was dishonest, displayed indirect uncertainty for significantly more items than did the children

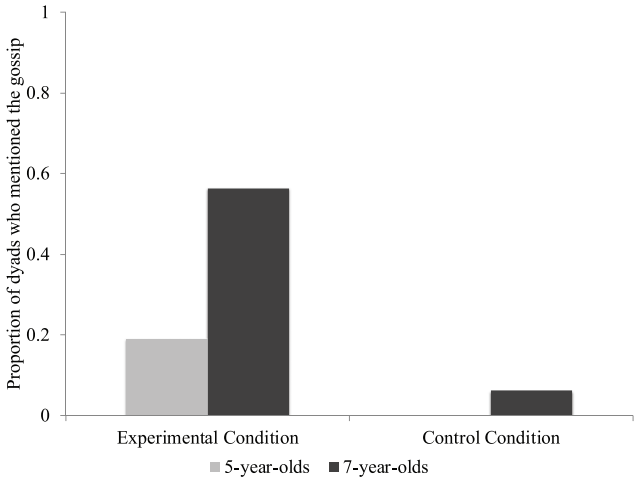
[1] In a more fine-tuned analysis, we also analyzed children's choice of items using a generalized linear mixed model (GLMM). We found the same condition difference. Please see this analysis and the model summary of this GLMM in Supplemental Materials 1.

[2] Please see the model summary of this GLM in Supplemental Materials 2.

[3] We reran all the three main analyses with the dataset including the dropouts (the eight 5-year-old dyads). These results are reported in Supplemental Materials 3.

Figure 2

The Proportion of Dyads Who Mentioned the Reputation of the Informant by Referring to the Gossip in Study 1



in the control condition, who heard that the informant was untidy, $t(30) = -2.24$, $p = .033$, $d = .79$ (see Figure 3). Next, we compared the children who heard the good reputation in the two conditions. Children in the experimental condition, who heard that the informant was honest, and the children in the control condition, who heard that the informant was tidy, did not differ in the number of items for which they displayed indirect uncertainty, $t(30) = .47$, $p = .644$, $d = .17$.

Discussion

Our results suggest that both 5- and 7-year-olds used information transmitted via gossip in their joint-decision making. Children of both age groups settled on the items suggested by the informant with good reputation in the experimental condition, when the gossip was relevant (about honesty), but not in the control condition, when the gossip was irrelevant (about tidiness). Moreover, children, especially 7-year-olds, referred to the gossip—to justify their claims to their peer partners—more often in the experimental condition than in the control condition.

We observed some age differences. One interesting finding was that although 5-year-old children did not refer to gossip as often as 7-year-old children in the experimental condition, they were almost on par with the 7-year-old children in terms of their choice of the items suggested by the informant with good reputation. Our exploratory analyses suggested that five-year-old children in the experimental condition who heard the dishonest informant expressed indirect uncertainty about their proposals for the items more often than the children in the control condition who heard the untidy informant. They indirectly expressed their lack of trust in their informants through asking for their partner's opinion or letting their partner make the decisions. Nonetheless, 5-year-old children did have some difficulty with the task, as we had many 5-year-old children who did not answer the memory questions correctly and therefore could not be included in the analyses.

One limitation of Study 1 is that our instructions perhaps made the task too easy for the children. That is, the experimenter explicitly mentioned the informants ("You need to find out which girl is right") and the gossipers ("I don't know these girls, but perhaps these can help you"). A second limitation was that the finding that five-year-old children did not refer to the gossip could be because they simply talked less and did not give each other enough prompts, such as asking why they should trust one informant. Thus, we ran a second study, in which we removed this extra scaffolding in our instructions and paired children with an adult partner to standardize the prompts that each child received for referring to the gossip. Moreover, owing to changes in the authors' employment location, we ran this second study with a new linguistic and cultural group: 5- and 7-year-old American English–speaking children.

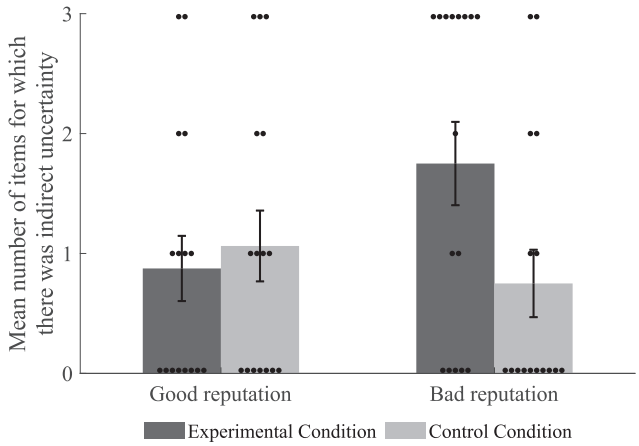
Study 2

In Study 2, we paired 5- and 7-year-old American English–speaking children with an adult partner, instead of a peer partner, and presented them with a similar collaborative problem-solving task. Pairing children with an adult partner increased our experimental control because children received an equal degree of resistance from their adult partner when choosing an item and received an equal number of prompts from their adult partner to refer to the gossip. To make it easier for children to challenge the view of the adults, we modified the task in a way that the child was more knowledgeable than the adult partner so that the children would justify their claims to "inform" the adults, rather than "challenge" them (see Köymen et al., 2016; Mammen et al., 2019).

The child and the adult partner were instructed to prepare a lunch box for a novel creature. The experimenter did not specifically mention the informants or the gossipers in the instructions and only said, "Now you will hear people talking about a strange pretend creature, called a selk." In the absence of the adult partner, the child heard both informants giving conflicting information (e.g., one suggesting rocks, the other suggesting sand as a food item) and the reputation for each informant (e.g., one had a good reputation; the other had a bad reputation). In the experimental condition, the

Figure 3

The Mean Number of Items for Which the Child Speakers Displayed Indirect Uncertainty Across Conditions in the 5-Year-Old Children



Note. Each speaker is denoted by one circle. Vertical lines represent standard errors in Study 1.

reputation was relevant to the task (honesty), whereas it was irrelevant in the control condition (tidiness). Then the adult partner pretended to have seen only the informant with bad reputation and suggested to choose the item suggested by this informant. We investigated whether children would (a) correct the adult partner and to choose the item suggested by the informant with good reputation and (b) refer to the gossip about the informant to convince the adult partner. We predicted that children would correct their partner and choose the items suggested by the informant with good reputation and refer to the gossip about the informants' reputations more often in the experimental condition than in the control condition. We also predicted that the condition difference would be greater for 7-year-old children than for 5-year-old children, as in Study 1.

Method

The preregistration of the procedure, coding, hypotheses, sample size, and statistical analyses can be found at https://aspredicted.org/ue3us.pdf (Köymen & Engelmann, 2021).

Participants

Twenty-four 5-year-old children (M = 5;5, *Range* = 5;0–5;11, 13 girls) and 24 seven-year-old children (M = 7;5, *Range* = 7;0–7;11, 14 girls) participated in both conditions (one trial in each condition). Children were recruited from a database of parents, who had expressed interest for their children to participate in developmental studies. The children were native speakers of English with various socioeconomic backgrounds.

Materials

The first warm-up phase included three PowerPoint slides. The child saw two objects on each slide and was asked questions about the objects (e.g., color of the objects) by the first experimenter (E1). The second warm-up phase included a hide-and-seek game with a second experimenter (E2) and children were asked to find out in which of the two houses a toy was hiding.

In the first test trial, the child saw four slides. Slide 1 introduced the two informants, each making a conflicting proposal about what the selks eat (one suggested they eat rocks; the other suggested sand). On Slide 2, two gossipers gossiped about the first informant; on Slide 3, they gossiped about the other informant. One informant always had a good reputation; the other always had a bad reputation (please see Appendix B for slides and their narration). If the first test trial was the experimental condition, the reputation of the informant was about honesty. About one informant, the child watched gossipers saying, "I heard that she always tells the truth" [good reputation]. About the other informant, the child watched gossipers saying, "I heard that she often lies" [bad reputation]. If the first test trial was the control condition, the reputation of the informant was about tidiness. About one informant, the child watched gossipers saying, "I heard that she is always tidy" [good reputation]. About the other informant, the child watched gossipers saying, "I heard that she is often messy" [bad reputation]. Slide 4 showed the two informants and the two gossipers on the screen so the child and E2 can refer to them during decision-making.

In the second test trial, the child saw four slides, following the same structure with new characters. Two new informants talked about what selks drink (one suggested they drink blue soda; the other suggested green soda) and two new gossipers gossiped about each informant. If the first test trial was the experimental condition, then the second test trial was the control condition, and vice versa.

Eight versions of the PowerPoint slides were created, with the order of condition, presentation order of good versus bad reputation in each condition, and items suggested by the informant with good versus bad reputation counterbalanced.

Procedure

The procedure of this study was approved by the research ethics committee of University of California, Berkeley (Project title: "Cooperation and Social Reasoning in Children," Project Id: 2019-10-12605). The study took place online through Zoom calls. All sessions were videorecorded.

The first warm-up phase ensured that children could properly see E1's screen. On slide 1, children were asked to follow the moving objects on the screen (e.g., a blue circle moved from the middle to the right) so that we could understand what was left and right from the participant's view. On slides 2–3, children were asked to name the color of an object on the screen (e.g., "what color is the square?").

In the second warm-up phase, the children teamed up with E2 to solve problems. The purpose of this warm-up was to show children that E2 was sometimes right and sometimes wrong. E1 first introduced E2 to the child and stated that they would form a team (E2 and the child) to solve puzzles. E2 chatted with the child for familiarization (e.g., "how old are you?"). Then E1 presented a hide-and-seek game and asked the child and E2 to find out in which of the two houses a toy was hiding (a white house and a black house). In the first round, one house had the footprints of a duck leading to it. However, E1 asked them to find out in which house *a doll* is hiding. 77% of the children (37 of 48) suggested to choose the house with the footprints. Then, E2 proposed the house without the footprints (the correct house), "because these footprints look like they belong to a duck and not a doll." Then E1 revealed the correct house and stated, "Oh the doll was hiding in the black house so [E2] was right." In the second round, the child and E2 had to find out in which house a dog was hiding. This time, one house had the pawprints of a dog leading to it. 85% of the children (41 of 48) proposed to choose the house with the footprints and E2 proposed to choose the house without the footprints (the incorrect house) without giving a reason. Then E1 revealed the correct house and stated, "Oh the dog was hiding in the black house so this time [E2] was wrong." The third round was the same as the second round, in which 92% of the children (44 of 48) chose the correct house with the footprints and E2 chose the incorrect house. E1 said, "Sometimes, [E2], you were right; sometimes [child], you, were right. You two will make a great team for the next game."

Then the two test trials began. E1 said, "Now you will hear people talking about a strange pretend creature, called a selk, and prepare a lunch box for the selk. You will get a surprise only if you choose the right items. First, you will decide on its food." E1 stated that the child would watch his or her video with E1, while E2 would leave and watch her video alone. E2 turned off her video and sound so that she would be blind to condition (whether the child heard the gossip about honesty or the tidiness). If the first test trial was the experimental condition, the child heard the two informants making conflicting proposals about selks' food (rocks vs. sand) and two gossipers saying, "I heard she often lies" for one

informant; "I heard she always tells the truth" for the other informant. E1 asked, "What did these two say about this girl?" to make sure that the child heard the gossipers said about each informant. Children never answered these questions incorrectly. If children did not respond, E1 repeated the information for those. Then E2 was invited back and E1 left. E2 and the child saw a slide on the screen which showed all four characters (the two informants holding their suggested items and the two gossipers). E2 always went first and said, "I only saw this girl with sand [the one with the bad reputation], should we choose sand?" Then the child either agreed or disagreed with her.

- If the child agreed with her, E2 reiterated, "Because in my video this girl said it was sand. But are you sure it is sand? We really need to get this right." Once the child selected an item, E2 asked, "Why are we choosing sand/rocks?"
- If the child disagreed with her, E2 reiterated, "But in my video this girl said it was sand. Are you sure it is rocks? We really need to get this right." Once the child selected an item, E2 asked, "Why are we choosing sand/rocks?"

The number of prompts E2 provided for the child to give a reason for his or her choices matched regardless of whether the child agreed or disagreed with E2. Then they invited E1 back and E1 said she would check if their choice was correct later.

Next, E1 introduced the second test trial in which the child and E2 had to decide on the selk's drink. If the second test trial was the control condition, the procedure was the same as the experimental trial. The only difference was that the child heard the two new informants making conflicting proposals about the selk's drink (blue soda vs. green soda) and two new gossipers saying, "I heard she is often messy" about one informant; "I heard she is always tidy" about the other informant. At the end, E1 told the child and E2 that they did a great job. The whole procedure lasted about 20 minutes. E1 was the same throughout, there were two different female experimenters in the role of E2.

Coding

We first coded (a) which item was chosen in each condition and (b) whether children referred to what the gossipers said about the informants' reputation, following the same coding scheme of study 1 (e.g., "Because the ones on top said, the one with sand always tells the truth"; "they said he is often tidy"). A second coder blind to predictions coded all the transcripts for mentioning the gossip. The agreement was $\kappa = .90$.

The data sets and statistical analyses are available upon request from the authors.

Results

For our first research question on children's choice of items, we ran four binomial tests—one for each condition and age group—to test whether the number of children who chose the item suggested by the informant with good reputation differed from chance. In the experimental condition, the number of 7-year-old children who chose the item suggested by the informant with good reputation (by correcting E2) was significantly higher than the number of 7-year-olds who did not ($N = 24$, $p < .001$); for 5-year-olds, this was marginally significant ($N = 24$, $p = .064$; see Figure 4). In the control condition, the number of 5- and 7-year-old children who chose the item suggested by the informant with good reputation did not differ from the number of children who did not (five-year-old children: $N = 24$, $p = .308$; 7-year-old children: $N = 24$, $p = .152$).

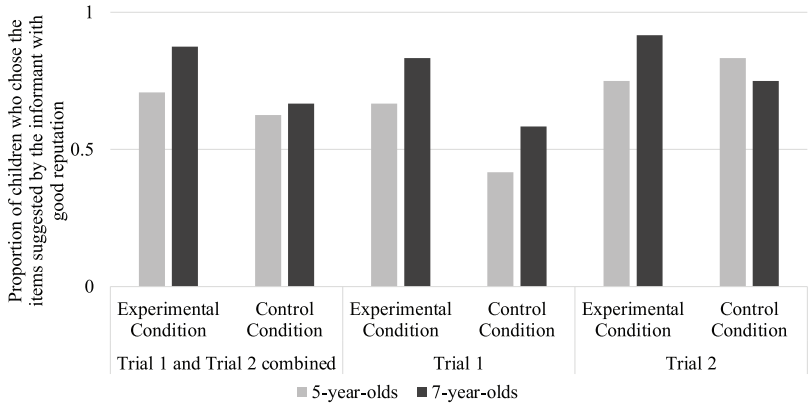
We also analyzed whether children's choice of the items suggested by the informant with good reputation differed across conditions and age groups, using a GLMM with statistics package lme4 in R (Bates et al., 2015). The unit of analysis was each condition. The response variable was a binary measure of whether children chose the item suggested by the informant with good reputation or not. The full model included the predictors of condition (experimental, control), age group (5, 7), condition order (trial 1, trial 2), their three-way interaction, gender, and the random factor of child id (because we observed each child in both conditions). The null model included gender and the random factor. The full model did not improve the fit ($\chi^2 = 11.54$, $df = 7$, $p = .117$),[4] suggesting that children's choice of the items did not vary across conditions or age groups. Although binomial tests suggest that significantly more children compared with chance in the experimental condition chose the items suggested by the informant with good reputation, the condition difference in GLMM was not significant. This was likely because children in the control condition still chose the items suggested by the informant with good reputation more than 50% of the time but this was not significantly different from chance (see Figure 4).

For our second research question on children's references to gossip, we ran the same GLMM as above, except that the response variable was a binary measure of whether children referred to gossip about the informant's reputation or not in each condition. The full model improved the fit of the null model ($\chi^2 = 19.19$, $df = 7$, $p = .008$). However, the three-way interaction was not significant ($\chi^2 = 1.98$, $df = 1$, $p = .159$). The reduced model without the three-way interaction suggested that the interaction terms involving age were not significant (age and condition: $\chi^2 = .03$, $df = 1$, $p = .859$, age and order: $\chi^2 = .33$, $df = 1$, $p = .566$) but the interaction between condition and order was significant ($\chi^2 = 8.78$, $df = 1$, $p = .003$). To get an interpretable main effect of age we dropped the interaction terms involving age, so the final reduced model included the predictors condition (experimental, control), age group (5, 7), condition order (trial 1, trial 2), the interaction between condition and condition order, gender, and the random factor of child id. This reduced model revealed a main effect of age ($\chi^2 = 8.58$, $df = 1$, $p = .003$) and a significant interaction between condition and order ($\chi^2 = 8.68$, $df = 1$, $p = .003$). To unpack this interaction, we ran the same analysis for each trial (trial 1 and trial 2). For trial 1, there were significant main effects of condition ($\chi^2 = 5.36$, $df = 1$, $p = .021$) and age ($\chi^2 = 6.02$, $df = 1$, $p = .014$), replicating the findings of Study 1. The children were more likely to mention the gossip in the experimental condition than in the control condition. Seven-year-old children were more likely to mention the gossip than 5-year-old children. For trial 2, there was a significant main effect of condition ($\chi^2 = 4.29$, $df = 1$, $p = .038$) and a marginally significant effect of age ($\chi^2 = 3.82$, $df = 1$, $p = .051$). The condition effect, however, was reversed: the children were more likely to mention the gossip in the control condition than in the experimental condition in trial 2 (see Figure 5). The age effect was the same: 7-year-old children were more likely to mention the gossip than did 5-year-old children.

[4] Please see all the model summaries of the GLMMs of Study 2 in Supplemental Materials 4.

Figure 4

The Proportion of Children Who Chose the Items Suggested by the Informant With Good Reputation in Study 2



Note. The horizontal line in the middle represents chance level.

Discussion

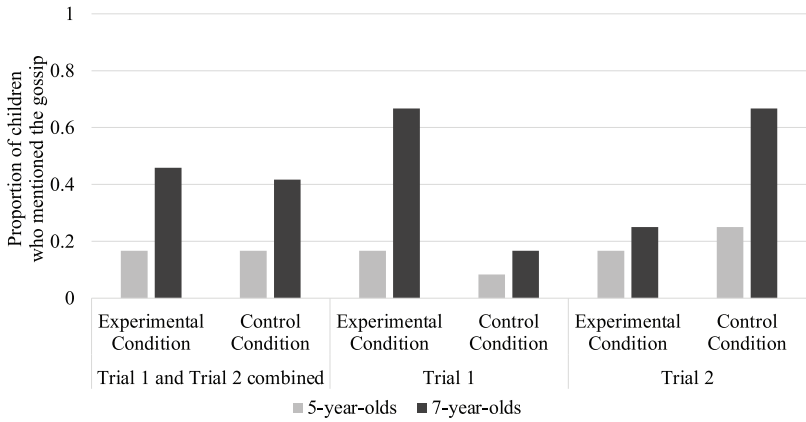
In Study 2, we replicated the findings of Study 1 in a more controlled experimental setting in which children interacted with an adult partner (and received the same prompts) and received less scaffolding in the instructions. That is, 7-year-old children, and 5-year-old children to a lesser extent, relied on gossip and favored the items suggested by the informant with good reputation in the experimental condition but not in the control condition. Moreover, especially in trial 1, both age groups shared the gossip (e.g., "These two said that she always tells the truth") to justify their proposals more often in the experimental condition than in the control condition and 7-year-old children did so more often than 5-year-old children.

When we compared children's choice of items suggested by the informant with good reputation across conditions and age groups using GLMM (as opposed to comparing each group to chance using binomial tests), we found that children's choice of items did not vary across age groups and conditions. We believe that this was an artifact of the within-subjects design. In the absence of any other cues about the correct answer in the control condition, and especially if the experimental condition was experienced first, children were primed to solve the task by following the gossip and ended up choosing the items suggested by the informant with good reputation in the control condition often (see Figure 4). This might have reduced the condition difference. Nonetheless, the binomial tests suggest that children's overall choices in the control condition did not differ from chance.

Another interesting finding concerned the mention of gossip. In trial 1, in line with our predictions and with the findings of Study 1, children referred to gossip significantly more often in the experimental condition, when the gossip was relevant (about honesty) than in the control condition, when the gossip was irrelevant (about tidiness). However, in trial 2, this pattern was reversed: they referred to the gossip significantly more often in the control condition than in the experimental condition. We believe that this was again a result of using a within-subjects design. We preregistered this interaction in our analyses between condition and condition order in our analyses. Those who had the experimental condition first were primed to mention the gos-

Figure 5

The Proportion of Children Who Mentioned the Reputation of the Informant by Referring to the Gossip in Study 2



sip in the control condition. In fact, some 7-year-old children pointed out that the reputation was irrelevant after they mentioned the gossip in the control condition (e.g., "I'm still not sure because if he's messy, that doesn't give me a lot of clues," "but I still do not know what it has to do with the drinks").

General Discussion

Our results suggest that starting around age 5, and more reliably at age 7, children rely on reputational information transmitted via gossip in determining whom to believe. Children in the current studies considered the respective reputations of the informants and settled on the items suggested by the informant with good reputation. Importantly, such reliance was selective: children did not simply consider any gossip about someone's reputation (as in the control condition, where the gossip was about the informant's tidiness), but instead considered the gossip only when it was relevant to the task (as in the experimental condition, where the gossip was about the informant's honesty). To our knowledge, this is the first study to demonstrate how young children rely on gossip to identify trustworthy and untrustworthy individuals, in line with the prosocial gossip hypothesis (Feinberg et al., 2012).

Most previous research has foregrounded direct interaction and observation as the two main routes through which infants and children identify trustworthy individuals (Hamlin et al., 2007; Herrmann et al., 2013). Our study suggests that young children also rely on information from a third source: gossip. Gossip allows young children to assign trust or mistrust to different people with whom they have no prior experience and enables them to reliably identify benevolent cooperative individuals. Thus, in contrast to previous work, which revealed that children do not trust gossip (Haux et al., 2017), our first main finding is that children flexibly and selectively make use of reputational information transmitted via gossip in their collaborative decisions.

Our second main finding is that we observed an age difference in the way children expressed their trust in the informants. Seven-year-old dyads, more often than 5-year-old dyads, referred to the gossip to justify their proposals to their peers in the form of meta-talk in the experimental condition when the reputation was relevant to the task, but not in the control condition when it was irrelevant. Children moved beyond the content of the information (they did not just talk about choosing rocks or sand), but instead explicitly deliberated about the reliability of the informants (they talked about the informants' reputation as indicator of trustworthiness; see also Köymen & Tomasello, 2018).

These results extend earlier findings on learning via trait-based information. Previous research showed that children did not trust informants that are introduced as liars, "The frog is a big liar," reporting first-hand observation (Mascaro & Sperber, 2009). In our study, the informants were not simply introduced as liars but rather gossipers conveyed the gossip they heard, "*I heard* that this girl often lies," highlighting this is not a first-hand observation. Moreover, previous research showed that children's gossip only involved trait information "*Play with her because she is more generous*" (Engelmann et al., 2016), which again involves the report of first-hand information. In our studies, children's gossip did not only include references to the informants' traits, for example, "*she is a liar*." Instead, their gossip was always in the form of embedded sentences that were prefaced by "they-said" or "they-heard" clauses, such as "*They* [the gossipers] *said/heard that this girl* [the informant] *always tells the truth*." Children thus explicitly marked the source of their information and clarified that it is not first-hand information. This is important because it suggests that children understood the gossip *as gossip* and not simply as a trait evaluation. Because in both studies, it was predominantly the 7-year-old children who referred to gossip, our findings suggest that 5-year-olds might still treat gossip as a trait evaluation, but by age 7, children differentiate the distinction between trait evaluation and gossip.

Our findings highlight that having a disagreement or conflicting perspectives in the context of collaborative problem-solving is crucial for prompting children to provide reasons for their claims (Köymen & Tomasello, 2018, 2020) and refer to gossip in our studies. Children and their partners received conflicting information in both conditions, but we manipulated the "relevance" of the gossip across the two conditions. Thus, our study goes beyond previous findings in the literature and suggests that it is not just any disagreement that triggers reason-giving about gossip but children, especially 7-year-olds, are selective in their trust in gossip which guides their decision-making.

The findings of our Study 1 and Study 2 point to the same conclusion and demonstrate the same developmental trajectory in two different linguistic and cultural samples: at age 5 and more reliably at age 7, children trust gossip selectively (they rely on it only when it is relevant to the task at hand). Germany and the United States are both considered WEIRD cultures (Henrich et al., 2010). Moreover, English and German are structurally similar languages especially when it comes to formulating embedded sentences or complement clause constructions used in gossip such as "They said she is always tidy." Both English- and German-speaking children start comprehending and producing these sentences around the age of 4 and 5 (Brandt et al., 2010; Diessel & Tomasello, 2001). Thus, our studies suggest that our findings are generalizable within WEIRD cultures, but future research should investigate whether any cultural and linguistic differences would emerge particularly from non-WEIRD samples and languages with different structural properties.

Another interesting question for future research concerns the limits of children's trust in gossip or gossipers. As with any kind of information sharing, gossipers might possess ulterior motives in revealing certain pieces of information but hiding others, and so children must practice epistemic vigilance (Sperber et al., 2010). Thus, future research could investigate the contexts in which children understand, for example, that gossip can be used as a strategic tool to improve one's own standing by selectively harming the reputations of others.

To conclude, our studies highlight the role that reputation plays in the social lives of young children (Banerjee et al., 2020; Silver & Shaw, 2018). The current findings suggest that reputational information transmitted via gossip structures young children's social interactions by allowing them to identify trustworthy individuals and to avoid less trustworthy ones. By age 5, and more reliably at age 7, children pay attention to the reputation of the individuals they receive information from and start engaging in prosocial gossip by passing on reputational information to their partners.

References

Banerjee, R., Heyman, G. D., & Lee, K. (2020). The development of moral self-presentation. In L. A. Jensen (Ed.), *The Oxford handbook of moral*

development (pp. 91–109). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780190676049.013.6

Bates, D., Mächler, M., Bolker, B., & Walker, S. (2015). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software*, *67*(1), 1–48. https://doi.org/10.18637/jss.v067.i01

Boehm, C. (2012). *Moral origins: The evolution of virtue, altruism, and shame*. Basic Books.

Brandt, S., Lieven, E., & Tomasello, M. (2010). Development of word order in German complement-clause constructions: Effects of input frequencies, lexical items, and discourse function. *Language*, *86*(3), 583–610. https://doi.org/10.1353/lan.2010.0010

Corriveau, K., & Harris, P. L. (2009). Choosing your informant: Weighing familiarity and recent accuracy. *Developmental Science*, *12*(3), 426–437. https://doi.org/10.1111/j.1467-7687.2008.00792.x

Diessel, H., & Tomasello, M. (2001). The acquisition of finite complement clauses in English: A corpus-based analysis. *Cognitive Linguistics*, *12*(2), 97–141. https://doi.org/10.1515/cogl.12.2.97

Dunbar, R. I. M. (1998). *Grooming, gossip, and the evolution of language (1st Harvard University Press paperback ed*). Harvard University Press.

Einav, S., & Robinson, E. J. (2011). When being right is not enough: Four-year-olds distinguish knowledgeable informants from merely accurate informants. *Psychological Science*, *22*(10), 1250–1253. https://doi.org/10.1177/0956797611416998

Engelmann, J. M., & Rapp, D. J. (2018). The influence of reputational concerns on children's prosociality. *Current Opinion in Psychology*, *20*, 92–95. https://doi.org/10.1016/j.copsyc.2017.08.024

Engelmann, J. M., Herrmann, E., & Tomasello, M. (2016). Preschoolers affect others' reputations through prosocial gossip. *British Journal of Developmental Psychology*, *34*(3), 447–460. https://doi.org/10.1111/bjdp.12143

Feinberg, M., Willer, R., Stellar, J., & Keltner, D. (2012). The virtues of gossip: Reputational information sharing as prosocial behavior. *Journal of Personality and Social Psychology*, *102*(5), 1015–1030. https://doi.org/10.1037/a0026650

Fu, G., Heyman, G. D., Qian, M., Guo, T., & Lee, K. (2016). Young children with a positive reputation to maintain are less likely to cheat. *Developmental Science*, *19*(2), 275–283. https://doi.org/10.1111/desc.12304

Hamlin, J. K., Wynn, K., & Bloom, P. (2007). Social evaluation by preverbal infants. *Nature*, *450*(7169), 557–559. https://doi.org/10.1038/nature06288

Harris, P. L. (2015). *Trusting what you're told: How children learn from others*. Belknap Harvard.

Haux, L., Engelmann, J. M., Herrmann, E., & Tomasello, M. (2017). Do young children preferentially trust gossip or firsthand observation in choosing a collaborative partner? *Social Development*, *26*(3), 466–474. https://doi.org/10.1111/sode.12225

Henrich, J., Heine, S. J., & Norenzayan, A. (2010). Most people are not WEIRD. *Nature*, *466*(7302), 29. https://doi.org/10.1038/466029a

Herrmann, E., Keupp, S., Hare, B., Vaish, A., & Tomasello, M. (2013). Direct and indirect reputation formation in nonhuman great apes (Pan paniscus, Pan troglodytes, Gorilla gorilla, Pongo pygmaeus) and human children (Homo sapiens)": Correction to Herrmann, Keupp, Hare, Vaish, and Tomasello (2012). *Journal of Comparative Psychology*, *127*(1), 32. https://doi.org/10.1037/a0032042

Ingram, G. P. D., & Bering, J. M. (2010). Children's Tattling: The reporting of everyday norm violations in preschool settings. *Child Development*, *81*(3), 945–957. https://doi.org/10.1111/j.1467-8624.2010.01444.x

Jaswal, V. K., & Neely, L. A. (2006). Adults don't always know best: Preschoolers use past reliability over age when learning new words. *Psychological Science*, *17*(9), 757–758. https://doi.org/10.1111/j.1467-9280.2006.01778.x

Koenig, M. A., & Harris, P. L. (2005). Preschoolers mistrust ignorant and inaccurate speakers. *Child Development*, *76*(6), 1261–1277. https://doi.org/10.1111/j.1467-8624.2005.00849.x

Köymen, B., Mammen, M., & Tomasello, M. (2016). Preschoolers use common ground in their justificatory reasoning with peers. *Developmental Psychology*, *52*(3), 423–429. https://doi.org/10.1037/dev0000089

Köymen, B., O'Madagain, C., Domberg, A., & Tomasello, M. (2020). Young children's ability to produce valid and relevant counter-arguments. *Child Development*, *91*(3), 685–693. https://doi.org/10.1111/cdev.13338

Köymen, B., & Tomasello, M. (2018). Children's meta-talk in their collaborative decision making with peers. *Journal of Experimental Child Psychology*, *166*, 549–566. https://doi.org/10.1016/j.jecp.2017.09.018

Köymen, B., & Tomasello, M. (2020). The early ontogeny of reason giving. *Child Development Perspectives*, *14*(4), 215–220. https://doi.org/10.1111/cdep.12384

Köymen, B., & Engelmann, J. M. (2021). *RepReason Study 2* (#60670). https://aspredicted.org/ue3us.pdf

Mammen, M., Köymen, B., & Tomasello, M. (2018). The reasons young children give to peers when explaining their judgments of moral and conventional rules. *Developmental Psychology*, *54*(2), 254–262. https://doi.org/10.1037/dev0000424

Mammen, M., Köymen, B., & Tomasello, M. (2019). Children's reasoning with peers and parents about moral dilemmas. *Developmental Psychology*, *55*(11), 2324–2335. https://doi.org/10.1037/dev0000807

Mascaro, O., & Sperber, D. (2009). The moral, epistemic, and mindreading components of children's vigilance towards deception. *Cognition*, *112*(3), 367–380. https://doi.org/10.1016/j.cognition.2009.05.012

R Core Team. (2020). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. https://www.R-project.org/

Rapp, D. J., Engelmann, J. M., Herrmann, E., & Tomasello, M. (2019). Young children's reputational strategies in a peer group context. *Developmental Psychology*, *55*(2), 329–336. https://doi.org/10.1037/dev0000639

Sabbagh, M. A., & Baldwin, D. A. (2001). Learning words from knowledgeable versus ignorant speakers: Links between preschoolers' theory of mind and semantic development. *Child Development*, *72*(4), 1054–1070. https://doi.org/10.1111/1467-8624.00334

Silver, I. M., & Shaw, A. (2018). Pint-sized public relations: The development of reputation management. *Trends in Cognitive Sciences*, *22*(4), 277–279. https://doi.org/10.1016/j.tics.2018.01.006

Sobel, D. M., & Corriveau, K. H. (2010). Children monitor individuals' expertise for word learning. *Child Development*, *81*(2), 669–679. https://doi.org/10.1111/j.1467-8624.2009.01422.x

Sommerfeld, R. D., Krambeck, H.-J., Semmann, D., & Milinski, M. (2007). Gossip as an alternative for direct observation in games of indirect reciprocity. *Proceedings of the National Academy of Sciences of the United States of America*, *104*(44), 17435–17440. https://doi.org/10.1073/pnas.0704598104

Sperber, D., Clément, F., Heintz, C., Mascaro, O., Mercier, H., Origgi, G., & Wilson, D. (2010). Epistemic Vigilance. *Mind & Language*, *25*(4), 359–393. https://doi.org/10.1111/j.1468-0017.2010.01394.x

Vaish, A., Missana, M., & Tomasello, M. (2011). Three-year-old children intervene in third-party moral transgressions. *British Journal of Developmental Psychology*, *29*(1), 124–130. https://doi.org/10.1348/026151010X532888

Yazdi, H., Heyman, G. D., & Barner, D. (2020). Children are sensitive to reputation when giving to both ingroup and outgroup members. *Journal of Experimental Child Psychology*, *194*, 104814. https://doi.org/10.1016/j.jecp.2020.104814

Zhao, L., Heyman, G. D., Chen, L., & Lee, K. (2018). Telling young children they have a reputation for being smart promotes cheating. *Developmental Science*, *21*(3), e12585. https://doi.org/10.1111/desc.12585

(*Appendices follow*)

Appendix A

The Original German Narration of the Clips and Its English Translation in Study 1

Child A

Hallo! Heute, habe ich interessante Tiere gesehen. Und sie heißen Selks.
Hello! Today I saw some interesting animals. And they are called selks.

Sie essen Steine wie diese hier. Sie essen nur Steine, nichts anderes. Nur Steine.
They eat rocks like this. They eat only rocks, nothing else. Only rocks.

Sie trinken blaue Limonade wie diese hier. Sie trinken nur blaue Limonade, nichts anderes. Nur blaue Limonade.
They drink blue soda, like this. They drink only blue soda, nothing else. Only blue soda.

Sie schlafen im Wasser wie diese hier. Sie schlafen im Wasser, nirgendwo sonst. Nur im Wasser.
They sleep in water, like this. They sleep only in water, nowhere else. Only in water.

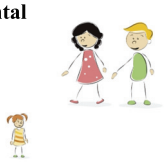
Child B

Hallo! Heute, habe ich interessante Tiere gesehen. Und sie heißen Selks.
Hello! Today I saw some interesting animals. And they are called selks.

Sie essen Sand wie diese hier. Sie essen nur Sand, nichts anderes. Nur Sand.
They eat sand like this. They eat only sand, nothing else. Only sand.

Sie trinken grüne Limonade wie diese hier. Sie trinken nur grüne Limonade, nichts anderes. Nur grüne Limonade.
They drink green soda, like this. They drink only green soda, nothing else. Only green soda.

Sie schlafen auf Blumen wie diese hier. Sie schlafen auf Blumen, nirgendwo sonst. Nur auf Blumen.
They sleep on flowers, like these. They sleep only on flowers, nowhere else. Only on flowers.

	Bad Reputation	**Good reputation**
Experimental Condition	 Female gossiper: *Ich habe gehört dass dieses Mädchen oft lügt.* I heard that this girl often lies. Male gossiper: *Ich auch. Ich habe auch gehört dass sie oft lügt.* Me too. I also heard that she often lies.	 Female gossiper: *Ich habe gehört dass dieses Mädchen immer die Wahrheit sagt.* I heard that this girl always tells the truth. Male gossiper: *Ich auch. Ich habe auch gehört dass sie immer die Wahrheit sagt.* Me too. I also heard that she always tells the truth.
Control Condition	 Female gossiper: *Ich habe gehört dass dieses Mädchen oft unordentlich ist.* I heard that this girl is often messy. Male gossiper: *Ich auch. Ich habe auch gehört dass sie oft unordentlich ist.* Me too. I also heard that she is often messy.	 Female gossiper: *Ich habe gehört dass dieses Mädchen immer ordentlich ist.* I heard that this girl is always tidy. Male gossiper: *Ich auch. Ich habe auch gehört dass sie immer ordentlich ist.* Me too. I also heard that she is always tidy.

(*Appendices continue*)

Appendix B

The Narration in the Audio Recordings Accompanying of the Images in Study 2

EXPERIMENTAL CONDITION

Informant A: *They eat rocks like this. They eat only rocks, nothing else. Only rocks.*
Informant B: *They eat sand like this. They eat only sand, nothing else. Only sand.*

Female gossiper: I heard that this girl always tells the truth.
Male gossiper: Me too. I also heard that she always tells the truth.

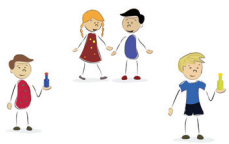
Female gossiper: I heard that this girl often lies.
Male gossiper: Me too. I also heard that she often lies.

CONTROL CONDITION

Informant A: *They drink blue soda like this. They drink only blue soda, nothing else. Only blue soda.*
Informant B: *They drink green soda like this. They drink only green soda, nothing else. Only green soda.*

Female gossiper: I heard that this boy is always tidy.
Male gossiper: Me too. I also heard that he is always tidy.

Female gossiper: I heard that this boy is often messy.
Male gossiper: Me too. I also heard that he is often messy.



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