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Children are eager to take credit for prosocial acts, and cost affects this tendency

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ABSTRACT

We report two experiments on children's tendency to enhance their reputations through communicative acts. In the experiments, 4-year-olds (N = 120) had the opportunity to inform a social partner that they had helped him in his absence. In a first experiment, we pitted a prosocial act ("Let's help clean up for Doggie!") against an instrumental act ("Let's move these out of our way"). Children in the prosocial condition were quicker to inform their partner of the act and more likely to protest when another individual was given credit for it. In a second experiment, we replicated the prosocial condition but with a new manipulation: high-cost versus low-cost helping. We manipulated both the language surrounding cost (i.e., "This will be pretty tough to clean up" vs. "It will be really easy to clean this up") and how difficult the task itself was. As predicted, children in the high-cost condition were quicker to inform their partner of the act and more likely to take back credit for it. These results suggest that even 4-year-old children make active attempts to elicit positive reputational judgments for their prosocial acts, with cost as a moderating factor.

Introduction

For altruistic, cooperative, or prosocial behavior to evolve, the benefits of helping must outweigh the associated costs. One benefit is positive reputational judgments from others (Milinski, 2016;

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Nowak & Sigmund, 2005). If a positive reputation is the evolutionary function of prosocial behavior, then we would expect it to increase when it is observable by others, and indeed there is much research showing that individuals engage in more prosocial behavior when others are aware (Bereczkei et al., 2007; Rege & Telle, 2004). Moreover, these gains in reputation appear to increase in parallel with the costs incurred or effort required by the helper (Delgado et al., 2015; Hall et al., 2015; Lyle et al., 2009).

To examine at what point in human evolution the pressure to maintain a positive prosocial reputation might have emerged, we can look toward research conducted with nonhuman primates. Over the years, researchers have found that for most species it is critical to be aware of who is cooperative and who is not. Prior work shows that chimpanzees choose to recruit conspecifics who they know from prior experience are more effective partners (Melis et al., 2006). However, although chimpanzees certainly care to take note of others' cooperative behavior, they do not show the same concern as even 5-year-old children do regarding their *own* positive reputations (Engelmann et al., 2012, 2017). In the first of these two studies, children showed an increase in prosocial behavior only when they were being watched by a third party (Engelmann et al., 2012). The second study found that although chimpanzees are more motivated to acquire resources in a competitive versus noncompetitive context, only children show increased effort in a noncompetitive yet public (observable by a third party) setting. So, whereas chimpanzees mainly pay attention to the cooperative tendencies of conspecifics and care to compete with them, this contrasts with human children who, from early on, are motivated to change their *own* behavior just by the mere presence of another individual.

Although children engage in prosocial behavior even as infants (Liszkowski et al., 2008; Warneken et al., 2007), it is not until 5 years of age that they adjust their behavior depending on whether they are being observed (i.e., when reputation is at stake). For example, Engelmann and colleagues (2012) gave children the opportunity to either donate stickers to or steal stickers from an anonymous peer, and these two conditions were crossed with either being observed by a classmate (public) or being in the room alone (private). Five-year-olds were both less likely to steal and more likely to share when being observed, demonstrating that kids this age are not only averse to appearing antisocial but also driven to appear prosocial. Similarly, Leimgruber and colleagues (2012) found that 5-year-olds were willing to share a large proportion of their stickers only when the recipient would be aware of (a) who was donating the stickers and (b) the amount of stickers donated. When the actor was hidden from view, or when the donations were presented in an opaque container, children were far less generous. More recently, Rapp and colleagues (2019) extended these findings by asking whether children can anticipate being observed, finding that children are more generous donors when they are told that the most generous child will have his or her photo displayed on the wall. In this case, children were able to imagine a future scenario in which they would be presented to others in a positive light. Finally, Fu et al., 2016 found that regardless of whether they were being observed, 5-year-olds who were told that other classmates think they are a "good kid" were less likely to cheat than kids who were not given this information. Thus, it appears that 5-year-olds both track others' evaluations and rely on others' evaluations to guide their own private behavior.

As described above, most studies point to 5 years of age as a turning point for the development of reputational concern. However, several recent studies point to the possibility that it is present even earlier, albeit in slightly different forms. Even at 3 years, children who were labeled "smart" were more likely to cheat on a subsequent task, likely because they felt compelled to maintain the reputation they had been given (Zhao et al., 2017). In addition, 3- and 4-year-olds waited longer in a delay of gratification task when they were told that either their teacher or a peer would learn how long they waited, and they waited especially long when it was their teacher who would find out (Ma et al., 2020). Although it is possible that children in this study were simply behaving rationally in anticipation of a reward from their teacher, it still demonstrates that preschool-aged children are knowledgeable regarding what others value and adjust their behavior according to who will be made aware of their performance. More recently, Asaba & Gweon (2022) explored children's developing ability to correct an individual's unfavorable impression of them, finding that even 4-year-olds will choose to display their competence to someone who previously saw them fail versus succeed at a task. Altogether, these studies suggest that even before they are susceptible to observer effects, children's behavior is influenced by reputational information and by the possibility of judgment from third parties.

However, missing from any of these mentioned studies is the use of children's spontaneous communication as a dependent variable. For example, in Asaba & Gweon's (2022) paradigm, if the 'failure observer' simply walked into the room to come grab something, would the child have insisted she watch him/her succeed? And if the recipients of stickers in the Engelmann et al., (2012) study walked into the room, would the observer direct his or her attention toward their prosocial act? In the current study, we asked whether children would choose to inform a social partner of a prosocial act they had performed on the partner's behalf. More specifically, we asked whether children would make active attempts to take credit for an act framed as highly prosocial and other-oriented versus an act framed as instrumental. Whereas previous studies have measured children's behavior when the children find themselves in a private or public environment, in our study we measured children's tendency to make a private prosocial act known. In addition, our measures of reputation management required little instruction or intervention from the experimenter and allowed children to give a wide range of responses.

This method also allowed us to explore a related question, that is, whether children's motivation to inform others of prosocial behavior is influenced by cost. There is recent evidence that even preschoolers integrate costs into their predictions for an agent's future behavior and into their explanations for causes of an agent's observed behavior (Jara-Ettinger et al., 2016). Moreover, Chernyak and Kushnir (2013) found that preschoolers who at first pay a cost to help are more likely to engage in subsequent helping behavior than those who were able to help "for free," perhaps because these children rationally inferred how prosocial they are by their past actions. And lastly, 6- and 7-year-old children view individuals who incur a physical cost to help others (i.e., climbing up a tall staircase) as more virtuous than those who can help more easily (Zhao & Kushnir, 2023). Therefore, in a second experiment, we replicated the basic design of Experiment 1 but adjusted the conditions so that the primary question being answered was whether children are more motivated to inform others of prosocial actions that require them to incur a high versus low cost.

Experiment 1

In this experiment, we gave children a chance to inform others about an act they had previously performed that was framed as either prosocial or merely instrumental. Because most studies on reputation management suggest that 4 or 5 years is a critical age, we chose to run our experiment with 4-year-olds.

Method

Participants

Participants in this experiment were 60 4-year-old children (39 girls; M_{age} = 54 months, range = 48–59) recruited from an urban region in the southeastern United States. An additional 19 4-year-olds (not included in our final sample of 60) were excluded for losing interest (n = 7), being fearful toward the puppets, (n = 2), parent or sibling interference (n = 3), difficulty in understanding English (n = 3), or experimenter error (n = 4).

Participants were tested either in the laboratory or at one of two local children's museums. Sessions were recorded using a GoPro camera placed on the table across from Experimenter 1 (E1) and the child, and time was kept using a nearby digital clock also on the table.

All children included in the final sample were native English speakers. Annual income information was requested on our demographic form for all participants, with 26 parents/guardians choosing to provide it. Of these participants, the average income was $161,154 (modal income for the United States = $70,784). Our sample was predominantly White, with caregivers indicating that their children were White (n = 34), Asian (n = 4), Pacific Islander (n = 1), multiracial (n = 5), Latino (n = 1), or African American (n = 3); the caregivers of 12 participants did not provide any racial designation. Written consent was obtained from children's primary caregivers. Participants who were tested at either of the two museums were compensated with both a certificate and a pin. For those families who came to

the lab, in addition to children receiving a "child scientist" certificate, parents/caregivers were compensated with a $10 Amazon gift card.

Materials and design

The study used a between-participants design with random assignment to one of two conditions: *prosocial framing* (n = 30) or *instrumental framing/control* (n = 30). The materials used were two puppets ("Doggie" and "Eeyore," both voiced by E1), two chairs placed in front of either a small table or a counter (one for the child and one for E1), a toy motorcycle and a cloth (both for the first warm-up), a child-friendly animal puzzle (for the second warm-up), tiny scraps of pieces of printing and notebook paper (for the child to help clean up), a plastic cup (for the papers to go inside), and some additional printing paper and crayons for drawing (for the second dependent variable and to occupy the child while E1 asked the parents to come over). See Fig. 1 for a schematic of the layout.

Procedure

Participants were paired with a female experimenter (E1) who controlled two puppets throughout the course of the experiment. The first puppet was Doggie, who functioned initially as a social partner and eventually as a recipient of help/helpee. We used puppets in this experiment not only to make children more comfortable and mitigate the potential power differential between a child and an adult but also so that E1 could serve as two different agents (Hardecker & Tomasello, 2017; Piaget, 1932; Tomasello & Gonzalez-Cabrera, 2017).

The only difference between the two conditions was in the framing of the helping task by E1. During this task, the first puppet (Doggie) had gone to take a nap, and E1 (as herself) motioned toward some paper scraps strewn about on the table that Doggie had left behind and then prompted the child to either *help clean up for Doggie* (prosocial) or *move these papers out of our way* (control). The purpose of this manipulation was to determine whether the framing of a task as prosocial would lead children to be more eager to inform both the recipient of help and third parties of their role in the task.

All participants completed three sets of dependent measures. The first was designed to measure how eager children were to inform the helpee that they had assisted him. The second was designed to measure children's propensity to protest, or to *take credit* for the act, when another actor was

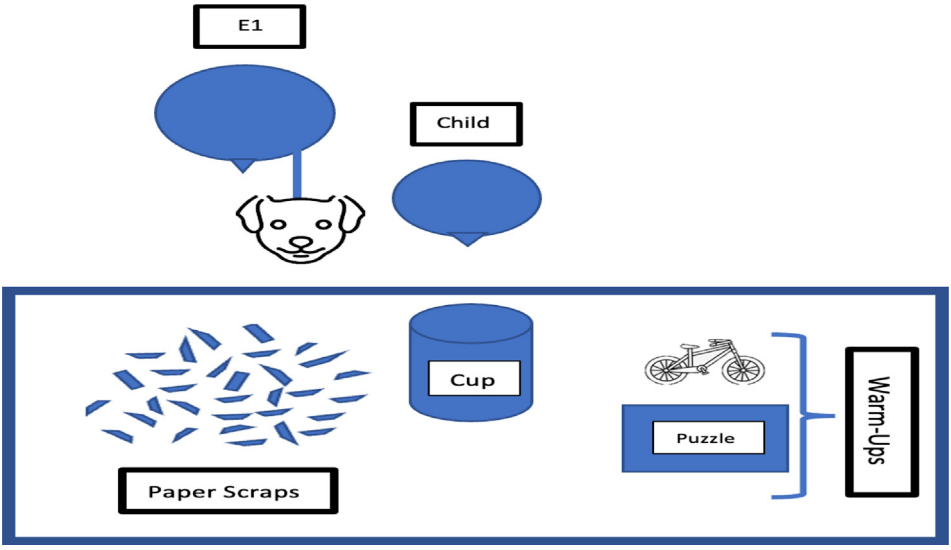

Fig. 1. Schematic showing the experimental setup for both Experiments 1 and 2. Experimenter 1 (E1) sat beside the child, with the puppet stretched outward toward the table. The materials used for the warm-ups were pushed to the left side of the table, and the paper scraps and cup (which they would be moved inside) were placed in front of the experimenter and child.

wrongfully being credited. And the third measure assessed whether children felt that the act of putting away the papers was something noteworthy enough to share with their parent throughout the course of a semi-structured interaction. It took approximately 7 min to go through the two warm-ups and remaining experimental procedure outlined below. Occasionally, children also participated in an additional study at the laboratory, but there was always a 10- to 15-min play break between studies, and none of the same puppets were ever used across the two experiments. See Fig. 2 for an outline for the procedure.

Warm-ups. After E1 and the child sat down at the table, E1 introduced herself and confirmed that the child indeed wanted to participate in the study. E1 then brought out the first puppet, Doggie, and had Doggie ask the child a couple "get to know you" questions. These included "What is your name?", "What is your favorite food?", and "What is your favorite toy?" If at any point during these three questions the child directed his or her answer toward E1 rather than the puppet, E1 asked the child to "tell Doggie, not me." Once the child appeared comfortable, Doggie asked the child if he or she would like to do a puzzle with him. All children were happy to do so. Doggie then split the puzzle pieces up into two piles and the two completed the puzzle. After finishing, Doggie exclaimed, "Yay, we did the puzzle together!" This language was used to encourage children to view Doggie as a social partner. A third and final warm-up asked children to point out, verbally, to Doggie where his toy motorcycle was (children were aware of its location, but it was hidden from Doggie's view). The purpose of this warm-up was to make sure that children were comfortable spontaneously informing Doggie of new information without permission or encouragement from the experimenter.

Framing. After the short warm-up, children engaged in a cleaning task, framed differently depending on condition. First, Doggie began to yawn and rub his eyes before stating, "I'm feeling sleepy, I think I'm going to take a nap." E1 placed Doggie on the right side of the table on his side and told the child that Doggie would rest for a bit over there. Then, E1 motioned toward the pile of paper scraps strewn

Phase of Experiment	Description
Phase 1: Warm-Ups	Child is introduced to a Dog puppet, voiced by E1. The puppet asks the child a few get-to-know-you questions. The puppet then asks the child to complete a puzzle with him. After completing the puzzle, the puppet seeks assistance locating a toy. After the child informs the puppet where his toy is, the warm-ups conclude.
Phase 2: Clean-Up Task	Dog puppet excuses himself to go take a nap. E1 motions towards a pile of paper shreds strewn about on the table. E1 requests the child help cleaning up the papers and frames this task as either prosocial or instrumental.
Phase 3: DV #1 Informing Doggie	Once E1 and the child have finished cleaning/moving the papers, the Dog puppet returns and gives up to three prompts (at 5-second intervals) which invite the child to speak to the puppet. Either after the child informs the Dog puppet about cleaning/moving the papers, or after the third prompt concludes, the Dog puppet leaves again to continue napping. The child is given some paper and crayons to occupy his/herself with.
Phase 4: DV #2 Protesting Eeyore's Incorrect Statement	While the child is coloring, a new puppet, Eeyore, appears. Eeyore is also voiced by E1. Eeyore introduces himself to the child and then takes note that the papers have been cleaned up. Eeyore mistakenly states, up to 3 times (at 5-seconds interval), that he believes Doggie cleaned up the papers, and the child has the opportunity to protest after each prompt. After the child protests, or after the prompts conclude, Eeyore says goodbye to the child. The child can continue coloring
Phase 5: DV #3 Opportunity to Inform Parent	E1 excuses herself from the table and walks over to the child's parent. E1 asks the parent to please sit beside their child and ask them, "What did you do during the game?" This parent-child conversation is recorded for up to one minute.

Fig. 2. Outline of experimental procedure, including warm-ups, cleanup task, and three dependent variables. E1, Experimenter 1; DV, dependent variable.

about the table and recited one of the following scripts. The language in the prosocial condition was as follows:

> "Do you see this **mess** over here? Doggie was using these papers for an art project, and **he didn't have time to finish cleaning up.** Let's **help clean up for Doggie.** I am going to **clean up these papers** and put them in here, and can you **clean up these papers** and put them in here?
>
> That's right, you can put Doggie's papers in here.
>
> We **helped clean up!**"

And the language in the control condition differed in the following ways:

> Do you see these **papers** over here? Doggie was using these papers for an art project, **and he finished**. Let's **move them out of our way**. I am going to **move these papers** into here, and can you **move these papers into here?**
>
> That's right, you can put Doggie's papers in here.
>
> We **moved the papers out of our way!**

First measure: Informing. E1 then pushed the cup, now full of the paper scraps, forward toward the end of the table. E1 then put her hand toward her ear and said, "Oh? I think I hear something. . . . I think Doggie might be waking up from his nap." E1 then put Doggie back onto her hand and he appeared in front the child. E1 then proceeded to recite three evenly spaced interval prompts, which would serve as the first dependent variable, designed to assess how eager children were to inform Doggie that they had helped put the papers away. The three prompts were (a) "Hello! How's it going over here?"; (b) "Is there anything you want to tell me?"; and (c) "Did anything happen during my nap?" There was approximately a 5-s pause between each prompt. If and when children mentioned to Doggie that they had cleaned up/picked up the papers, Doggie simply replied "Oh, I see, got it!" and the prompts would cease. If children never mentioned the act of cleaning up/picking up the papers, E1 (Doggie) simply finished all the prompts and proceeded to the next phase of the experiment. Doggie then expressed to the child that he was still feeling sleepy and would like to continue napping. E1 then placed Doggie on the side of the table once again.

Second measure: Protest. Our next dependent variable gave children the opportunity to *protest* (Essler et al., 2023; Kanngiesser et al., 2017; Paulus & Wörle, 2019; Rakoczy et al., 2008; Schmidt et al., 2019; Rossano et al., 2011) in response to a novel puppet failing to give the child appropriate credit for cleaning up. To set this up, E1 asked the child if he or she would like to do some coloring while Doggie took a nap. E1 then handed the child some white printing paper and a handful of crayons. E1 waited until the child was actively engaged in coloring before bringing out the second puppet, a blue Donkey named Eeyore. Eeyore, also manned by E1 but using a different, more high-pitched voice, then introduced himself to the child and asked what the child's name was. E1, as herself, encouraged the child to tell Eeyore his or her name in the case that the child was showing hesitancy/shyness. Eeyore then told the child, "Nice to meet you. You can keep coloring!"

E1 waited to make sure that the child reengaged in coloring before beginning the next phase of the experiment, which would serve as the second dependent variable. Eeyore moved to the right of the child, looked straight toward the cup full of paper scraps, and recited three similar prompts that demonstrated Eeyore's belief that Doggie had put the papers back in the cup (with no mention of the child). The prompts were (a) "Oh, the papers are back in the cup now! I guess Doggie put the papers back in the cup!"; (b) "Yes, Doggie must have put the papers back in the cup!"; and (c) "That's right, I think Doggie put the papers back in the cup!" There was a 5-s pause between each prompt. If and when the child interjected/protested/corrected Eeyore (e.g., "No, I cleaned it up!"), Eeyore would reply "Oh, got it!" and the prompts would end. Eeyore would either say goodbye to the child after he or she protested or after the conclusion of the third and final prompt.

Third measure: Parent–child interaction. As the final part of the experiment, E1 asked the child to continue coloring while she went to get the child's parent. E1 approached the parent and asked, as the final part of the "game," to please sit next to the child and ask him or her, "What did you do during the game?" E1 told the parent that she and the research team were simply curious how the child

would remember and describe the game. Once the child and the parent began conversing, E1 recorded for up to 1 min. This semi-structured interaction was the final part of the experiment.

Coding

Informing. Regarding the first dependent variable, during which children had the opportunity to inform Doggie that they cleaned up/picked up the papers, children were given a ranked score according to at what point they informed. To receive credit for informing, it was not enough for children to say only "the papers!" or "the cup!"; rather, the process of cleaning up or putting the papers away needed to be described. Children received a score of 0 if they informed Doggie as soon as he appeared, before he even had the chance to give the first prompt in full. Children were given a score of 1 if they informed after the first prompt, a score of 2 if they informed after the second prompt, a score of 3 if they informed after the third prompt, and a score of 4 if they failed to inform at any point. We also recorded the amount of total time (in seconds) that passed before children informed, assigning the children who never informed a score of 15 s (because all children had at least that much time to inform). A second coder naïve to the hypotheses performed reliability on a random 25% of observations (coding the variable as rank order). Raters disagreed on 0 of 15 cases (0%), $\kappa = 1.000$.

Protest. The scoring system for the second dependent variable, which measured children's tendency to protest or take credit back for the helpful act, was highly similar. However, because children were preoccupied and not spoken to directly, a fair amount of children did not protest or produce any vocalizations at all. Therefore, in addition to a ranked score, we assigned children a binary score of either 1 (protested) or 0 (never protested). And because children's behavior was dependent on hearing Eeyore assign credit incorrectly, it would have been highly unusual for children to protest before he finished the first prompt, and indeed this never occurred. Therefore, no children were given a *ranked* score of 0 for this dependent variable. Children were given a score of 1 to 4 according to the same guidelines as the previous variable (protest after first prompt, after second prompt, after third prompt, or not at all, respectively). We also recorded total amount of time (in seconds) that passed before children protested, assigning those who never protested a score of 15 s (because all children had at least that much time to inform). A second coder naïve to the hypotheses performed reliability on a random 25% of observations (coding the variable as rank order), and any disagreements were resolved through discussion. Prior to discussion, raters disagreed on 1 of 15 cases (6.67%), $\kappa = .865$.

Parent–child interaction. Lastly, regarding the parent–child interaction, we gave children a score on a binary scale (0/1) according to whether they mentioned to their parent, *spontaneously,* that they had picked up/cleaned up the papers. We did not give children credit for this dependent variable if their parent, for example, pointed to the cup and asked them "What happened there?" Parents usually began asking more direct questions if their children were not responding in detail to the initial prompt of "What did you do during the game?" We also recorded how many seconds had passed from the time the parents and children began conversing to the point at which children mentioned cleaning up the papers/putting the papers away, assigning the children who never informed the maximum value of 60 s. A second coder naïve to the hypotheses performed reliability on a random 25% of observations (marking whether the child informed the parent or not), and any disagreements were resolved through discussion. Prior to discussion, raters disagreed on 2 of 15 cases (13.33%), $\kappa = .737$.

Relationship between variables. In addition to measuring correlations between the latency measures (in seconds) for all three variables, we also assigned participants a score of 0, 1, 2, or 3 according to how many of the three measured behaviors (informing helpee, protesting, and informing parent) children engaged in.

Results

Informing

As shown in Fig. 3, children in the prosocial condition ($M = 2.27$, $SD = 1.39$) informed Doggie that they had cleaned up the papers after significantly fewer prompts than children in the control condi-

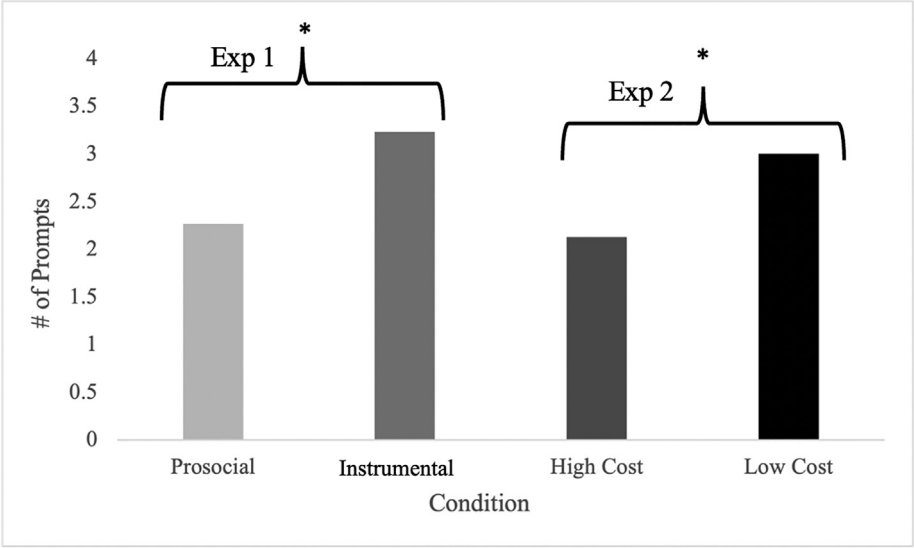

Fig. 3. Number of prompts recited by the first puppet before the child spoke about cleaning up the papers in Experiments 1 and 2. Participants received a score from 1 to 3 according to which prompts they reported after, a score of 0 if they responded even before the first prompt, and a score of 4 if they never informed. Error bars represent standard errors. $^{*}p < .05$.

tion ($M = 3.23$, $SD = 0.90$), Mann–Whitney $U = 280.5$, $p = .01$. This effect was also significant when we analyzed the data in terms of seconds until children informed rather than the number of prompts (prosocial: $M = 10.63$, $SD = 8.12$; control: $M = 16.20$, $SD = 6.23$), $t(58) = -2.98$, $p = .004$, $d = .76$. Excluding the children who never informed, the difference between conditions was still significant (prosocial: $M = 9.05$, $SD = 9.01$; control: $M = 17.11$, $SD = 8.2$), $t(37) = -.2.87$, $p = .007$, $d = .93$.

And, importantly, there was no significant difference between conditions in the number of children who informed at *any* point, so it was not the case that children in the control condition could not remember what happened (prosocial: 73.33%; control: 56.67%), $\chi^2(1, 60) = 1.83$, $p = .18$, odds ratio = 2.10. In addition, no gender differences emerged between boys and girls in their overall rates of informing (girls: 64.10%; boys: 61.90%), $\chi^2(1, 60) = 0.028$, $p = .87$, odds ratio = 1.09.

Protesting

In line with our hypothesis, significantly more children in the prosocial condition (73.33%) than the control condition (40.00%) corrected Eeyore's statement and took credit for putting the papers back into the cup, $\chi^2(1, 60) = 6.79$, $p = .009$, odds ratio = 4.12 (Fig. 4). Using the rank-ordered analysis of number of prompts (prosocial: $M = 2.10$, $SD = 1.32$; control: $M = 2.90$, $SD = 1.42$), this difference was significant, Mann–Whitney $U = 314$, $p = .05$. As with the previous measure, we also measured the latency until children protested in seconds (prosocial: $M = 8.97$, $SD = 7.77$; control: $M = 10.80$, $SD = 6.60$). This difference was *not* significant, $t(58) = -0.99$, $p = .33$, $d = .25$. Excluding children who never protested, this difference was still not significant (prosocial: $M = 7.36$, $SD = 9.07$; control: $M = 4.50$, $SD = 6.53$), $t(32) = 0.96$, $p = .34$, $d = .35$. As we saw before, no gender differences emerged between boys and girls in their overall rates of protesting (girls: 58.97%; boys: 52.38%), $\chi^2(1, 60) = 0.24$, $p = .62$, odds ratio = 1.31.

Parent–child interaction

Regarding the parent–child Interaction, although slightly more children in the prosocial condition (46.66%) versus the control condition (23.33%) informed their parent that they had cleaned up the papers, this difference did not reach significance, $\chi^2(1, 60) = 3.58$, $p = .06$, odds ratio = 2.88 (Fig 5).

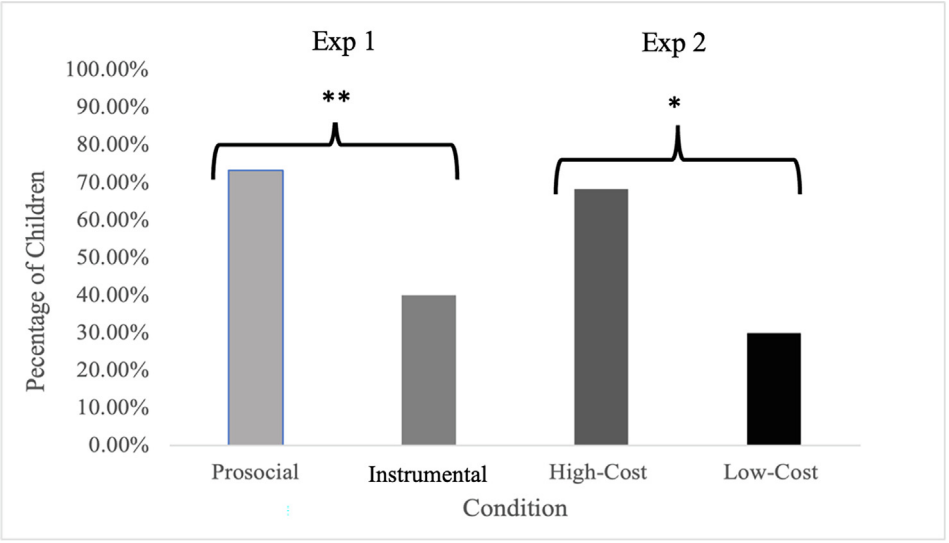

Fig. 4. Percentage of children in each condition and experiment who protested when the second puppet incorrectly gave the first puppet, rather than the child, credit for picking up the papers. $^{*}p < .05$; $^{**}p < .01$.

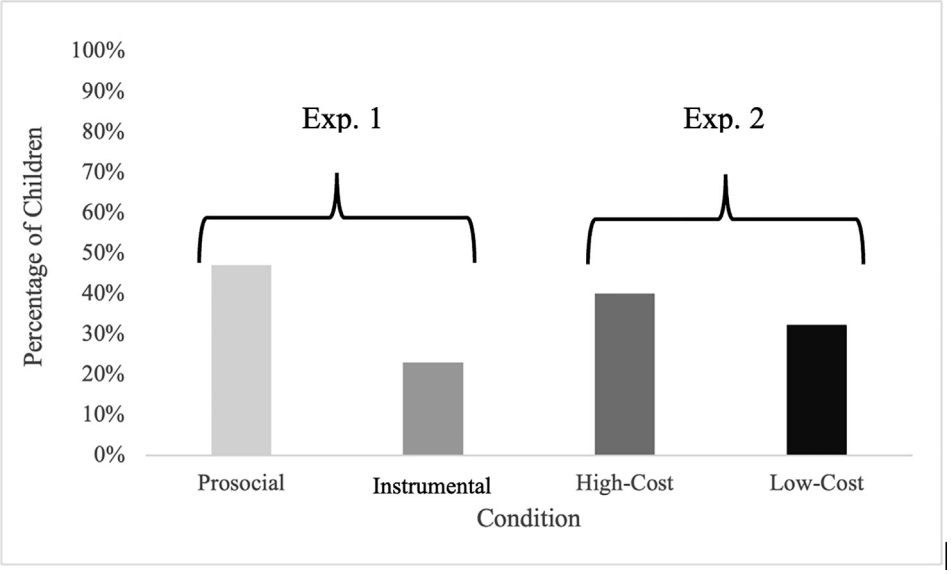

Fig. 5. Percentage of children in each condition and experiment who spontaneously informed their parent that they had cleaned up/moved the papers. $.05 < p < 1.0$.

We also analyzed this measure in terms of latency in seconds (prosocial: $M = 37.67$, $SD = 24.74$; control: $M = 49.23$, $SD = 21.16$), and we again found no significant difference, $t(59) = 1.95$, $p = .06$. Excluding the children who did not inform their parent at any point, the difference between conditions was still not significant (prosocial: $M = 15.33$, $SD = 14.12$; control: $M = 13.86$, $SD = 16.12$), $t(20) = 0.22$,

p = .83. Mirroring previous results, there was no evidence of gender differences in the overall rates of informing their parent (boys: 38.40%; girls: 28.57%), $\chi^2(1, 60) = 0.587$, p = .44, odds ratio = 0.64.

Relationships between variables

We also computed correlations to explore the relationship between children's tendency to inform the helpee, protest the mistaken puppet, and inform their parent about the helpful/instrumental act. We found a significant positive correlation, across conditions, between children's latency in seconds to inform the helpee and children's latency to protest (r = .26, n = 60, p = .04). Additional relationships between informing the helpee, protesting the mistaken puppet, and informing their parent were also examined, but these were not significant (see online supplementary material).

Moreover, we found that, across conditions, 11 of 60 participants (18.33%) did not engage in any of the three behaviors (informing helpee, protesting, or informing parent), 13 of 60 (21.67%) engaged in only one of the behaviors, 21 of 60 (35%) engaged in at least two of the behaviors, and 15 of 60 (25%) engaged in all three behaviors. Examining the differences between conditions, children in the prosocial condition, on average, engaged in more of the measured behaviors (M = 2.03, SD = 0.93) than children in the control condition (M = 1.30, SD = 1.06), and this difference was significant, Mann–Whitney U = 277, p = .01.

Discussion

Experiment 1 provides evidence that children as young as 4 years are eager to inform others of actions that have been framed as prosocial and that they are unwilling to allow someone else to receive credit for a prosocial act they performed. One explanation for this behavior is that children understand the power of prosocial actions in cultivating a positive cooperative reputation among groupmates. If children chose to not inform the puppet, the act would have remained unknown and no potential reputational benefits would have been reaped. Children in the control condition likely did not perceive such benefits, leading them to be both less excited to talk about the focal act and more content to sit back and allow someone else to receive credit.

An additional factor that may affect children's motivation to inform another of a prosocial action is how *costly* the act was or, in other words, how much effort was required from children. Previous findings suggest that both children and adults value costly helpers due to their willingness to make personal sacrifices on behalf of others (Birkás et al., 2006; Hardy & Van Vugt, 2006; Zhao & Kushnir, 2023). For example, children view a peer who needed to climb a tall set of stairs to assist someone, or who needed to resist playing a fun game, as more virtuous than a peer who could help with less effort (Zhao & Kushnir, 2023). Given these findings, it seems reasonable that children will expect their own costly actions to increase their moral/reputational standing, and thus they should be eager to make such actions known.

Our second experiment not only allowed us to explore a new theoretical question but also served as a control for the issue of relevance in Experiment 1. An alternative explanation for our findings from Experiment 1 is that children in the prosocial condition believed their actions to be more relevant to the puppet (i.e., "clean up *for Doggie*" vs. "move these out of *our way*"). In this case, children may have simply been informing the puppet more quickly not for reputational reasons specifically but rather because they believed he ought to be made aware. By implementing two new conditions that equalize the amount of prosocial language and references to the puppet, we controlled for that possibility. In this new paradigm, the primary difference between the two conditions was how much of a cost the act would impose on the child.

Experiment 2

For our second experiment, we replicated the design of our prosocial condition while implementing two new conditions: *high cost* and *low cost.* In the high-cost condition, the framing of the helping task was designed to make effort highly salient, and the task itself was somewhat difficult to complete. In the low-cost condition, the task was intentionally made easier to complete and the framing also

stressed its simplicity. This new manipulation allowed us to determine whether prosocial language alone drives children's informing behavior or whether preschoolers are also sensitive to the increased reputational benefits associated with performing *costly* prosocial actions.

Method

Participants

Participants in this experiment were 60 4-year-old children (39 girls; M_{age} = 53 months, range = 48–59) recruited from a university town or capital city in the southeastern United States. An additional 12 children (not included in our final sample) were excluded for losing interest (n = 2), being shy or fearful toward the puppets (n = 2), issues with the recording (n = 3), difficulty in understanding English (n = 2), or interference from other children at the testing site (n = 3). As with Experiment 1, participants were tested either in the laboratory or at one of two local children's museums.

All children included in the final sample were native English speakers. Annual income information was requested on our demographic form for all participants, with 33 parents/guardians choosing to provide it. Of these participants, the average income was $197, 740 (modal Income for the United States = $70,784). Caregivers indicated that their children were White (n = 39), Asian (n = 4), multiracial (n = 7), Hispanic (n = 1), or African American (n = 3); the caregivers of 6 participants did not provide any racial designation. Written consent was obtained from children's primary caregivers. Participants who were tested at either of the two museums were compensated with both a certificate and a pin. For those families who came to the lab, in addition to children receiving a certificate, parents/caregivers were compensated with a $10 Amazon gift card.

Materials and design

The study used a between-participants design with random assignment to one of two conditions: *high cost* (n = 30) or *low cost* (n = 30). The materials for Experiment 2 were identical to those for Experiment 1 in all but one respect: For the low-cost condition, rather than using tiny paper shreds as we had done before, we used large chunks of notebook paper that were significantly easier to grab off the table and that took less time to clean up. Otherwise, we used the same toys for the warm-ups, the same puppets, and the same blank coloring paper with crayons as before.

Procedure

Warm-ups. Both warm-ups were identical to those in Experiment 1 and proceeded in the same order.

Framing. The test section of Experiment 2 was identical to that of Experiment 1 in terms of the order in which events proceeded; however, the script was adjusted and the size of the papers differed between our two conditions. In the high-cost condition the papers were still small scraps that were challenging for children to grab and pick up, whereas in the low-cost condition we deliberately used bigger chunks of paper that were easier to grab and less time-consuming to put away. The language between the two conditions also differed for the helping task. In the high-cost condition children were told that there are "so many papers, it will be pretty tough to clean this up, it might take a while," whereas children in the low-cost condition were told that "there are only a few papers, it will be really easy to clean this up, it might take just a minute." Importantly, however, the task was described as equally prosocial in both conditions, with E1 stating "let's help clean up for Doggie!" after describing the task.

Informing, protest, and parent–child interaction. The procedure for the three dependent variables—informing, protest, and parent–child interaction—was identical to that of Experiment 1.

Coding

The coding system for our three dependent variables did not differ from that in Experiment 1. We again analyzed both the informing and protesting measures as a binary, rank-order, and continuous variable.

For the rank-order analysis of the informing dependent variable, participants again received a score of 0 to 4 depending on when they informed the first puppet that they had cleaned up. When analyzing the informing data in terms of seconds, we again assigned "never informers" a score of 15 s.

Regarding the protest measure, children again received a binary score of 0 or 1 depending on whether they protested at any point. In both conditions, 100% of children who protested did so after the first prompt. Therefore, we refrained from analyzing this variable as rank order. When analyzing the data in terms of latency in seconds, we again assigned the "never protestors" a score of 15 s.

The parent–child interactions were analyzed both as a binary variable (inform parent or not) and as continuous in terms of latency. For the continuous analysis, children who did not inform their parent were assigned the maximum value of 60 s (because the interaction was 1 min long).

A second coder naïve to the hypotheses performed reliability on a random 25% of observations. Regarding the first informing variable (rank order), raters disagreed on 0 of 15 cases (0%), $\kappa = 1.000$. Regarding the protesting variable (rank order), raters disagreed on 1 of 15 cases (6.67%), $\kappa = .865$. And regarding the informing parent variable, raters also disagreed on 1 of 15 cases (inform parent or not) (6.67%), $\kappa = .865$. Any disagreements were resolved through discussion.

Relationship between variables. As in Experiment 1, in addition to measuring correlations between the latency measures (in seconds) for all three variables, we also assigned participants a score of 0, 1, 2, or 3 according to how many of the three measured behaviors (informing helpee, protesting, and informing parent) children engaged in.

Results

Informing

In line with prior work on the value of *costly* prosocial actions, results showed that children in the high-cost condition ($M = 2.13$, $SD = 1.25$) informed Doggie that they had cleaned up the papers after significantly fewer prompts than children in the low-cost condition ($M = 3.00$, $SD = 0.95$), Mann–Whitney $U = 273$, $p = .01$ (Fig. 3). This difference was also significant when we analyzed the data in terms of seconds until children informed rather than the number of prompts (high cost: $M = 10.90$, $SD = 8.02$; low cost: $M = 15.97$, $SD = 6.57$), $t(59) = -2.68$, $p = .01$, $d = .69$. Excluding the children who did not inform from this analysis, this difference was still significant (high cost: $M = 10.08$, $SD = 8.58$; low cost: $M = 16.45$, $SD = 8.08$), $t(43) = -2.54$, $p = .02$, $d = .76$.

And as in the previous experiment, there was no difference in the number of total children who chose to inform *at any point* in each condition (high cost: 83.33%; low cost: 66.66%), $\chi^2(1, 60) = 2.22$, $p = .14$, odds ratio = 2.50. However, there was indeed a significant difference, across conditions, between boys and girls in the tendency to inform the puppet at any point (boys: 57.41%; girls: 87.50%), $\chi^2(1, 60) = 5.45$, $p = .02$, odds ratio = 4.05.

Protesting

The protesting measure also proved fruitful for this experiment, with children in the high-cost condition protesting significantly more often (66.67%) than children in the low-cost condition (30.00%), $\chi^2(1, 60) = 8.08$, $p = .004$, odds ratio = 4.66 (Fig. 4). When we analyzed these data in terms of latency in seconds, the results were significant (high cost: $M = 6.40$, $SD = 6.29$; low cost: $M = 11.47$, $SD = 5.55$), $t(59) = -3.31$, $p = .002$. Excluding the children who did not protest, this difference in seconds was no longer significant (high cost: $M = 2.10$, $SD = 1.44$; low cost: $M = 3.22$, $SD = 1.56$), $t(27) = -1.89$, $p = .07$. No gender differences emerged for overall rates of protesting (boys: 46.42%; girls: 50.00%), $\chi^2(1, 60) = 0.08$, $p = .78$, odds ratio = 1.15.

Parent–child interaction

Regarding our final dependent variable, there was no significant difference between the high-cost (40.00%) and low-cost (23.33%) conditions in how many children spontaneously informed their parent that they had picked up the papers, $\chi^2(1, 60) = 1.93$, $p = .17$ (Fig. 5). We also analyzed these data in terms of latency to inform their parent in seconds, and this difference again was not significant (high cost: $M = 43.30$, $SD = 22.77$; low cost: $M = 52.30$, $SD = 16.28$), $t(59) = -1.76$, $p = .08$. Excluding partic-

ipants who did not inform their parent, this difference was still not significant (high cost: M = 18.25, SD = 15.04; low cost: M = 27.00, SD = 17.50), $t(59) = -1.15$, p = .27. Gender differences in overall rates of informing were investigated, but these were not significant, $\chi^2(1, 60) = 0.232$, p = .63, odds ratio = 1.31.

Relationships between variables

We also computed correlations to explore the relationship between children's tendency to inform the helpee, protest the mistaken puppet, and inform their parent about the helpful/instrumental act. We again found a significant positive correlation between children's latency in seconds to inform the helpee and children's tendency to protest (r = 8.36, n = 60, p = .005). Additional relationships between informing the helpee, protesting the mistaken puppet, and informing their parent were also examined, but these were not significant (see supplementary material).

Examining the number of behaviors children were likely to engage in, we found that 8 of 60 children (13.33%) engaged in none of the three behaviors, 22 of 60 (36.67%) engaged in one of three behaviors, 20 of 60 (33.33%) engaged in two of the three behaviors, and 10 of 60 (16.67%) engaged in all three behaviors. Examining the differences between conditions, children in the high-cost condition, on average, engaged in more of the measured behaviors (M = 1.87, SD = 0.82) than children in the low-cost condition (M = 1.20, SD = 0.93), and this difference was significant, Mann–Whitney U = 270, p = .008.

Sensitivity analysis

To assess the statistical significance and adequacy of power for Experiment 2, we conducted a sensitivity analysis. The critical t value for statistical significance was determined to be 2.00. For the latency to inform t test in Experiment 2, the obtained t value was −2.67. Considering the absolute value, the t value was 2.67, which exceeds the critical threshold. This analysis demonstrates that our experiment was adequately powered for the dependent variables under investigation. The supplementary material contains the G*Power output for reference.

Discussion

Experiment 2 shows that children's tendency to take ownership of actions carried out on another's behalf is sensitive to not only prosocial framing but also cost. In both conditions, it was made clear to children that they were doing something helpful for the puppet. However, in the low-cost condition, children were significantly slower to inform the puppet of the act, and they were surprisingly unlikely to protest and correct the mistaken puppet. Therefore, it seems unlikely that children in the first experiment informed more often in the prosocial condition only because they believed the act to be more relevant to the puppet. Moreover, it seems that when an action was not only prosocial but also effortful and challenging, children found the act to be more noteworthy. This valuation might be due to children's awareness that sacrificial prosocial behaviors are positively evaluated (Zhao & Kushnir, 2023) or to their awareness that high-cost actions exemplify the American virtue/norm of "hard work" (Amos et al., 2017). Either way, whether children were motivated to appear prosocial or meritorious, we believe that they anticipated some sort of reputational reward.

It is puzzling, however, that the rates of protest in the low-cost condition differed by such a large margin from the high-cost group. Why were children so unbothered that someone else might receive credit for a prosocial action they performed? It may be that the language in the low-cost condition somehow implied that the action was not *valuable* or worth mentioning. A more complex interpretation of this finding might be that children did not want to appear to care too much about something the experimenter implied to be trivial.

In addition, in Experiment 2 we found that, across conditions, girls informed the puppet of the prosocial act more often than boys. This difference may reflect an early internalization of the expectation/norm that girls/women should be more prosocial and caring than boys/men (Boehnke et al., 1989). These results may also provide an explanation for why teachers often view boys as less prosocial than girls (Bouchard et al., 2014); perhaps boys are simply not as motivated to inform others that they have done something helpful. The absence of a comparable gender difference in Experiment 1 can

likely be attributed to the smaller sample of children exposed to prosocial framing (one condition vs. two conditions), which may have resulted in an underpowered effect.

It is also important to note that our method in this experiment does not allow us to disentangle whether it was the increased effort required or simply the use of costly language that led to the observed condition differences. Given that these two elements often co-occur throughout daily life, we did not choose to isolate them. However, future work can address this confound to determine the precise influence of each manipulation.

General discussion

Our conclusion from these two experiments is that even 4-year-old children actively intervene to enhance their reputations in the eyes of others. In the first experiment, we found that framing an action as prosocial and oriented toward the helpee leads 4-year-olds to be more eager to bring attention to the action and to take ownership of it. In previous studies, children simply found themselves in either a public or private situation. In our study, children were faced with making a private action public, and they did not *need* to do anything; indeed, several children chose to not mention anything at all. In addition, the children in our study were only 4 years old, suggesting that the lack of previous evidence for reputation management at this age may have been due to the cognitive demands associated with the task. Children in our experiment did not need to imagine absent others or track multiple agents at a time. For all three dependent measures, children only needed to consider the knowledge state of the agent who was currently speaking to them. So, although 4-year-olds might not be particularly attuned to whether they are currently being watched or not, they are aware of what traits others value and are motivated to display these qualities.

An alternative explanation is that what children were doing was not informing to increase their reputation but simply informing the other agent of what they had previously done, and for whatever reason the prosocial act was more salient and so seemed more newsworthy. In addition, it is possible that children experienced elevated mood as a result of engaging in prosocial behavior, leading them to be more sociable and talkative (Whelan & Zelenski, 2011). However, the findings of the second study make these interpretations less likely. In the second experiment, we introduced a new variable that differentiated between different degrees of prosocial behavior/helping: high cost and low cost. Here we found that children were more concerned about claiming credit for a prosocial act when it was described as laborious and difficult to complete. In this case, the act was always prosocial and all that varied was the effort that children needed to expend (or felt they were expending) to perform the act, and this affected children's motivation to inform. One could perhaps continue to claim that high effort is more salient and newsworthy as well, but we believe that, when considered together, the most plausible interpretation of the two sets of findings is that children were boasting about their prosocial acts.

These findings have implications beyond just reputation management. As discussed previously, recent work has shown that children both view those who incur a physical cost to help as more virtuous (Zhao & Kushnir, 2023) and are more forgiving of those who abstain from helping when the costs (i.e., might get hurt) increase (Sierksma et al., 2013). The children in our study likely had some similar intuitions. In the high-cost condition, the sense of having given up something was likely highly salient for children, as was their awareness that such costly helping can lead to increased positive evaluations. In addition, these results provide further support for the naïve utility calculus framework (Jara-Ettinger et al., 2016). This framework suggests that underlying human social cognition is a basic assumption that agents seek to maximize utility (or rewards) and minimize costs (Jara-Ettinger et al., 2016). Although additional experiments may be necessary to determine whether children were truly seeking an enhanced reputation, we can conclude that children in the high-cost condition were highly motivated to be rewarded for their actions in *some form.* And putting reputation/rewards to the side for a moment, it is also possible that children in the high-cost condition were frustrated/annoyed with the puppet for leaving behind such a big mess for someone else to clean up and wanted to inform him of his misdeed. Given the evidence that children negatively evaluate and sanction free riders, this is also a possibility worth exploring further (Yang et al., 2018).

Limitations

There are, of course, several limitations to our study. First, the difficulty with studying reputation in an experimental context is that there is little if any likelihood of future interaction with the experimenter or puppets. Children may have recognized that there was not much stake in their interactions, and perhaps some of them did not care about the experimenter or puppets' impressions of them at all. Nonetheless, even throughout just the 7-min duration of this study, we found evidence for some degree of reputational concern among 4-year-olds. In addition, during the protesting measure for both our experiments, only the novel puppet was present. Perhaps children would have been more hesitant to protest, across conditions, if the individual they were taking credit from was observing. Another point that deserves attention is the fact that children, across conditions for both experiments, informed their parent of the helpful/instrumental act at relatively low rates. Although this may have to do with the fact that the act was considered less relevant to their parent than the puppet, methodological issues were also at play. During the parent–child interaction, children were given a coloring page to occupy themselves while E1 spoke with the parent, and this led many children to discuss their drawing rather than the other phases of the experiment. It may have been cleaner to instead take children's drawing before the parent sat down.

We also want to reflect on our use of puppets throughout these experiments. During recent years, there has been increased concern that children's interactions with puppets do not translate well to their behavior in the real world (Kenward & Östh, 2015; Packer & Moreno-Dulcey, 2022). However, there is plenty of evidence in defense of puppets; studies have shown that children over 3 years of age engage in similar rates of self-disclosure with puppets and adults (Measelle et al., 1998) and ascribe mental states and sensory experiences to both at similar rates (O'Neill et al., 1992, Wellman, 1992). Furthermore, 4-year-old children invest more in their reputation with a puppet when the experimenter refers to it as a friend and references its mental states than when it is described as an inanimate toy (Asaba et al., 2022). In our study, our puppets described their preferences (i.e., favorite toy, favorite food, "I like"), referenced mental states (i.e., "feeling sleepy," "I think," "I guess"), and were introduced by the experimenter as friends. And although it is conceivable that children might be more hesitant to correct adults than puppets, considering how children do spontaneously protest and report adults' transgressions (Heyman et al., 2016), we are not overly concerned with this possibility.

Lastly, there is evidence from both adults and children that public prosocial actions are not always viewed positively, with individuals often being accused of "empty virtue signaling," "bragging," or attempting to appear "holier than thou" (Berman & Silver, 2022; Miller, 1999). It is possible that some of the children who chose to not inform were aware of these potential risks, which would contrast with previous findings that children are unaware of potential ulterior motives associated with prosocial behavior until 7 or 8 years of age (Heyman et al., 2013). Moreover, there are data to suggest that by 7 years-old cultural forces influence children's willingness to take credit for helpful actions, so our method would likely yield different results with a sample of non-Western children (Fu et al., 2016). Although our data do not allow us to explore these possibilities further, they are fascinating topics for future research.

Conclusion

An abundance of previous research has demonstrated that from an early age children are remarkably cooperative and prosocial. Recent evidence suggests that at first children find it equally rewarding to both watch an individual receive help and to help themselves (Hepach et al., 2023). However, by 5 years of age, children show more positive emotions when they themselves help others, and this effect is even stronger when their reputation may have been positively influenced (i.e., in the presence of an audience) (Hepach et al., 2023). We believe that a similar mechanism was at work in this study. In our experiments, children engaged in behaviors that varied in their degree of prosociality and cost, and we found evidence that they were especially motivated to inform others of acts with the greatest potential to improve their reputations. As adults, we have a myriad of different ways to make prosocial actions public, be it wearing "I gave blood" stickers or participating in highly public "cleanup days"

(Berman & Silver, 2022). Whether children might engage in similar methods of less overt signaling remains an open question, but we have at least demonstrated that at the young age of 4 years, children are motivated to receive credit for their generous prosocial actions, with cost influencing this proclivity.

Data availability

The data availability statement should instead read: The data that support the findings of this study along with supplemental material are publicly available and can be accessed via OSF: https://osf.io/ysuzn/?view_only=a7d6a090fe3c497485ae80e7e16f18b1.

Appendix A. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jecp.2023.105764.

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