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Preschoolers' Selfish Sharing Is Reduced by Prior Experience With Proportional Generosity

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ABSTRACT

Young children make sophisticated social and normative inferences based on proportional reasoning. We explored the possibility that proportional cues also help children learn from and about their own generosity. Across two experiments, 3- to 4-year-olds had the opportunity to give either 1 of 4, 1 of 3, 1 of 2, or 1 of 1 of their resources to an individual in need. We then measured children's subsequent prosociality by looking at sharing behavior with a new individual. The more proportionally generous the initial action, the less likely children were to share selfishly in the second phase. Our results suggest that children make sense of their own actions using proportional cues and that giving children experience with difficult, prosocial actions increases the likelihood of their recurrence.

Young children show an early-developing capacity to be prosocial toward others: by the preschool age, children share valuable resources with both friends and strangers (Moore, 2009; Rheingold, Hay, & West, 1976; Schmidt & Sommerville, 2011), comfort those in need (Dunfield, Kuhlmeier, O'Connell, & Kelley, 2011), and help others achieve their goals (Warneken & Tomasello, 2006). At the same time, however, young children have trouble sharing personal possessions (Eisenberg-Berg, Haake, Hand, & Sadalla, 1979), giving away high-value items (Blake & Rand, 2010), and splitting resources fairly (Smith, Blake, & Harris, 2013). To date, the mechanisms and situations that encourage prosocial (vs. selfish) action are not entirely well understood.

Prior studies have suggested that children construct ideas about themselves through their prior experiences. In a recent study (Chernyak & Kushnir, 2013), preschoolers were given the chance either to behave prosocially at a cost to themselves (told they could keep a sticker for themselves or give it to a puppet) or at no cost to themselves (told they could throw the sticker out or give it to a puppet). Although both groups of children initially behaved prosocially, children who were given the opportunity to do so at a cost to themselves went on to share a greater number of stickers during the next phase of the study. This study suggests that inducing costly sharing serves as one way through which children form ideas about their own prosociality (see also Gneezy, Imas, Brown, Nelson, & Norton, 2012, for a similar demonstration with adults). In another demonstration, Warneken and Tomasello (2008) allowed 20-month-old children the opportunity to behave prosocially (help an adult retrieve an out of reach object). One group of children was rewarded materially for doing so, another was given social praise, and a third group was given no feedback or reward. Just as children who made costly choices (Chernyak & Kushnir, 2013), children who performed actions with no material reward were the most likely to continue being prosocial. In further support of the idea that context

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helps children understand their own prosocial behavior, several lines of older work (Grusec, Kuczynski, Rushton, & Simutis, 1978; McGrath & Power, 1990) show that children are more likely to continue being prosocial after an adult labels their prosocial action as being caused by a self-oriented, internal attribution (e.g., "you shared because you must like helping others"; see also Bryan, Master, & Walton, 2014). The results of these studies suggest that experience with prosocial action alone is insufficient to cause future prosocial behavior. Instead, children's interpretations and evaluations of their own actions increase the likelihood that children will continue to act prosocially. Such evaluations can come from the way adults label and interpret children's actions (as in the latter example), but could also come from the child's own experience of social agency (for instance, through making a costly choice, as in the former example). Taken together, this work suggests that children make important evaluations of their own prosocial behavior, and are motivated to stay self-consistent with those evaluations (see also Tasimi & Young, 2016).

How children come to form these evaluations of their own behavior, and the types of cues that they use to form them is an important empirical question. In this work, we investigate whether children use proportional cues to make sense of their own prosocial behavior. There are several lines of work suggesting that proportional cues serve as an important contextual cue.

Recent work has shown that proportional cues help children make social inferences. For example, when toddlers observe someone choosing a proportionally rare object (1 red ball out of a box of mostly yellow), they infer that the action was the result of the agent's preference; when toddlers observe someone choosing a proportionally common object (1 red ball out of a box of mostly red), they do not make any inference regarding preference (Kushnir, Xu, & Wellman, 2010; see also Wellman, Kushnir, Xu, & Brink, 2016).

Within the prosocial behavior literature, proportional cues also allow children to make third-party moral evaluations. As adults, we are capable of evaluating actions in terms of absolute cost (Was it difficult for me to help my friend?) but also relative degree of cost (Just how difficult was it?). McCrink, Bloom, and Santos (2010) found that children judged people more positively when they gave away not only a larger number of their resources, but also a larger proportion: 5-year-old-children and adults judged a recipient who gave 3 of 6 resources away more positively than one who gave away 3 of 12 resources (see also Ng, Heyman, & Barner, 2011). Similarly, children are capable of using proportional cues to make resource distribution decisions. By age 3, children give half of their resources to those who have done half the work (Hamann, Warneken, Greenberg, & Tomasello, 2011) and distribute resources in accordance with the proportion of work one has expended (Kanngiesser & Warneken, 2012). Therefore, children use proportional cues both within and outside the moral domain.

Motivated by this work, we asked whether preschool-aged children's own experience with proportional generosity might help them make inferences about their own actions and thus motivate subsequent prosociality (e.g., see Gneezy et al., 2012). We reasoned that children who were the most proportionally generous would be able to make the strongest inferences about their own actions, and would thus be the most motivated to stay self-consistent with those inferences. Such a possibility would be consistent with recent work showing self-consistency effects in young children's prosocial behavior (Bryan et al., 2014; Chernyak & Kushnir, 2013; Eisenberg, Cialdini, McCreath, & Shell, 1987; Tasimi & Young, 2016). Alternatively, children who gave the most initially could also feel the most "licensed" to give the fewest (see work on moral self-licensing; e.g., Merritt, Effron, & Monin, 2010).

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Across two studies, we gave preschool-aged children the opportunity to undertake a prosocial action of giving 1 sticker to a puppet that was described as feeling sad. We varied the proportional generosity of the action by varying the amount of stickers the child also had (either 0, 1, 2, or 3). Thus, the same action (giving 1 sticker) ended up having a different proportional cost to the child (it was either 1 of 1, 1 of 2, 1 of 3, or 1 of 4 of the child's total resources). We then examined children's subsequent prosociality toward a new puppet. If proportional cues serve as a mechanism that guides children's action inferences, we reasoned that children who were the most proportionally generous would be the most likely to be subsequently generous.

EXPERIMENT 1

In Experiment 1, children underwent an initial sharing phase in which they were introduced to a puppet ("Doggie") who was described as feeling sad. We then gave children between 0 and 3 stickers (randomly assigned) to keep for themselves. Additionally, we gave each child 1 more sticker and told them they could either keep that sticker or give it to Doggie. After the initial sharing phase, all children were introduced to a new puppet ("Ellie") and a new set of resources (three stickers) that they could either keep for themselves or share with the new puppet.

Method

Participants Fifty preschoolers (mean age = 3.94 years; range = 2.8–4.89 years; 28 female) participated. Children were recruited from a local school or children's museum in a small university town.

Materials Materials were two plush animals ("Doggie" and "Ellie"); three wooden boxes: Doggie's box, Ellie's box (both of which had pictures on the tops and insides of Doggie and Ellie, respectively), and the child's box (no pictures); and a set of smiley face stickers of varying colors. A schematic of materials and procedure is shown in Figure 1.

Procedure Children were shown a plush animal named "Doggie" and told that Doggie was feeling "very sad today." Doggie was then put away and a toy box was placed on the table and introduced as "Doggie's box." The child was then randomly assigned to be shown either 4, 3, 2, or 1 stickers (referred to as the 1 of 4, 1 of 3, 1 of 2, or 1 of 1 conditions, respectively). The experimenter laid out the stickers in a linear array and counted them along with the child in order to assure that they understood the proportion they were giving away.[1] All children were then given the opportunity to make a prosocial action: "You can either keep all of these/this sticker for yourself, or you can give this sticker (pointed to last sticker) to Doggie so that he feels better." Almost all children (47 of 50; 94%; binomial $p < .001$) chose to give the sticker to Doggie regardless of condition, confirming that children across conditions had the same

[1] Three separate experimenters were trained to conduct both experiments. Upon review of the videotapes, we found that one experimenter failed to adhere to the experimental protocol: most critically, she (1) allowed the child to play with the stickers and take them out of the linear array prior to giving the full instructions, (2) did not consistently provide feedback after the child made a choice in the first phase, and (3) did not consistently open and place Doggie's box in front of the child. She was asked to cease data collection, and her data were replaced and not further analyzed.

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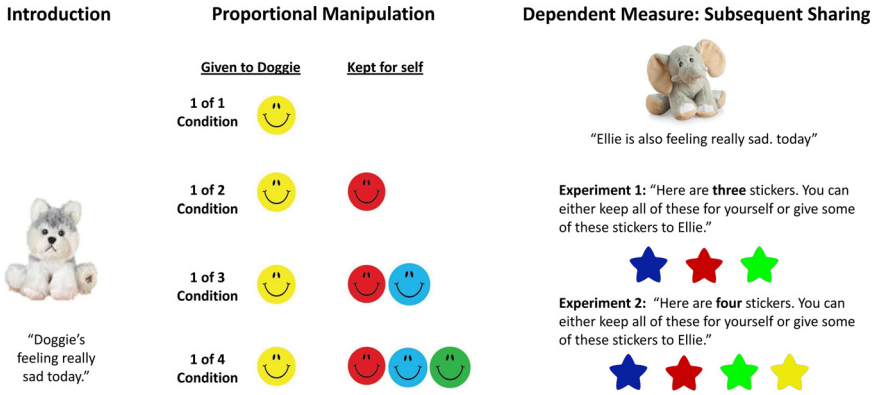


Figure 1. Representation of materials and procedure.

initial experience of giving 1 sticker to a sad puppet.[2] Once children made their choices, the box was put away, and the experimenter asked the child, "Do you remember when you gave the sticker to Doggie—did you choose to or have to do that?" (the order of "choose to" and "have to" was counterbalanced).[3]

Dependent Measure Our critical question was whether the proportion of stickers given then influenced children's subsequent generosity toward a new individual in a new task. Because we wished to assess children's behavior in a new situation and not children's attempts to rectify the previous situation, we introduced children to a new individual and a new set of resources. All children were thus shown a new puppet ("Ellie") and told that Ellie was also feeling sad today. Ellie was then put away and two boxes were placed in front of the child—Ellie's box (which included pictures of Ellie on the top and inside) and the child's own box (no pictures). The positioning of the two boxes was counterbalanced. The experimenter then stated that she had three more stickers and placed them between the two boxes, counted the stickers along with the child, and told the child she or he could either keep all of them for her- or himself or share some with Ellie. We chose the number three in order to force children to make either generous or selfish splits. Reprompts were used if children left any stickers on the table ("and what do you want to do with these/that one?"), until a box was chosen for each sticker.

Coding All children were videotaped with the exception of one child whose parents did not provide video consent, and whose answers were instead transcribed by a research assistant. Each video was coded by one of two research assistants. A coder blind to the condition the children were in then coded a subset (22–25%) of each research assistant's videos for number of stickers given to Ellie. Interrater reliability was 100% for both coders.

Nearly all children (46 of 50; 92%) chose to give at least one sticker and keep at least one for themselves, suggesting that children were both motivated to keep the resources and

[2] We report the full data set, including the small subset of children who opted not to give the sticker to the puppet initially (3 in Experiment 1, 5 in Experiment 2). All reported results hold whether including or excluding this subset.

[3] An analysis of this question showed that the overwhelming majority of children (73%) across both experiments simply responded with the last option given to them (i.e., "choose to" if the question was asked "Did you have to or choose to give that sticker?"). Recent research on this topic has shown that children of this age do not systematically understand or use the word "choose" until about 6 years of age (Kushnir, Gopnik, Chernyak, Seiver, & Wellman, 2015). We therefore do not further analyze this question.

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also to share. The critical question was therefore whether children prioritized themselves or the puppet in the final distributions. Distributions were coded as either *generous sharing* (giving the majority of stickers to Ellie) or *selfish sharing* (keeping the majority of stickers for themselves).

Results and Discussion

Our critical question was whether initial proportional generosity guided children's subsequent sharing (toward Ellie). We predicted a linear relationship between initial degree of costliness and likelihood of generous sharing. To investigate this prediction, we ran a binary regression using percentage of stickers given in the first phase (i.e., condition type: 1 of 4 [25%], 1 of 3 [33%], 1 of 2 [50%], or 1 of 1 [100%]), age, and gender as the predictors and whether children displayed generous sharing (yes/no) in the second phase as the response (see Figure 2). We report details on final models used in our Supplemental Materials (Chernyak, Trieu, & Kushnir, 2016). There was a significant effect of condition (initial proportion given) on the likelihood of subsequent generous sharing, $B = 2.87$, $SE(B) = 1.14$, Wald(1) = 6.39, $p = .01$, and no other significant effects (all $ps > .15$).

In spite of performing the exact same prosocial action initially (giving one sticker), the proportional costliness to the child predicted the likelihood of subsequent generosity. Our results are thus consistent with the idea that proportional cues serve as a mechanism to help children make sense of and infer their own prosocial intentions and abilities. Notably, in this experiment, children could *only* give generously or selfishly—because they had three stickers, children were forced to distribute stickers either in favor of themselves or the puppet. We know, however, that young children have a strong tendency to distribute resources equally (Olson & Spelke, 2008; Shaw & Olson, 2012, 2013) and expect others to do the same (Schmidt & Sommerville, 2011; Sloane, Baillargeon, & Premack, 2012). A more stringent test, therefore, of the idea that children rationally infer their own prosocial preferences from proportional cues, is one that also includes the option of equal sharing.

In Experiment 2, we thus pitted a known cognitive bias (equal sharing) against the effect we found in Experiment 1. We repeated our experiment, but made one small

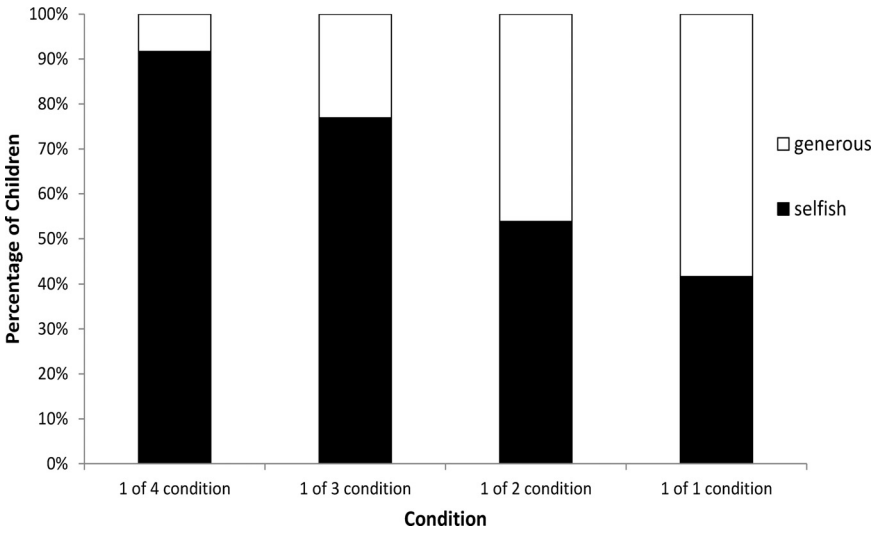


Figure 2. Proportion of sharing types across conditions in Experiment 1.

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modification: During the dependent measure phase, we presented children with four stickers, thus allowing them the option of equal sharing. Our modified design allowed us to test an additional research question: In Experiment 1, children who chose not to give generously could *only* give selfishly: We thus do not know whether proportional generosity increases generous sharing, or, alternatively, decreases selfish sharing (or both). The design of Experiment 2 thus allowed us to distinguish these possibilities: children who chose not to give generously could give either equally *or* selfishly. Similarly, children who chose not to give selfishly could give either equally *or* generously.

EXPERIMENT 2

The design of Experiment 2 followed exactly that of Experiment 1, except that children were given four stickers during the dependent measure phase.

Method

Participants Forty-nine preschoolers (mean age = 3.92 years; range = 2.88–4.91 years; 23 female) participated. Children were recruited from a local school or children's museum.

Materials and Procedure Materials and procedure followed that of Experiment 1, with the critical modification that four stickers were presented during the dependent measure phase (see Figure 1). As in Experiment 1, almost all children (44/49; 90%; binomial $p < .001$) chose to give the sticker to Doggie (undertake in the initial prosocial action).

Coding All children were videotaped with the exception of three children whose parents did not provide video consent, and whose answers were instead transcribed by a research assistant. Each video was coded by one of two research assistants. A condition-blind coder then coded a subset (22–25%) of each researcher's videos for number of stickers given to Ellie. Interrater reliability was 100% for both coders. Distributions were coded as *generous sharing* (giving the majority of stickers to Ellie), *fair sharing* (giving 2 of 4 stickers to Ellie), or *selfish sharing* (keeping the majority of stickers).

Results and Discussion

Our critical question was whether initial proportional generosity guided children's subsequent sharing (toward Ellie). We ran an ordinal regression using percentage of stickers given in the first phase (i.e., condition type: 1 of 4 [25%], 1 of 3 [33%], 1 of 2 [50%], or 1 of 1 [100%]), age, and gender as the predictors and sharing type in the second phase (selfish, fair, generous) as the response (see Figure 3). Once again, the results revealed that initial proportion given significantly predicted sharing type, $B = 2.61$, $SE(B) = 1.11$, Wald(1) = 5.55, $p = .02$; no other effects reached significance (all $ps > .25$).

Our next question was whether children would default to fair sharing when given the chance. As seen in Figure 3, children displayed high rates of fair sharing: If we consider that each child would divide each sticker up randomly (either place it into Ellie's box or his/her own box), the likelihood of sharing fairly by chance would be 37.5%. Twenty-nine (of 49; 60%) children chose to share fairly, which was significantly above chance levels, binomial $p < .01$. A binomial regression using condition type, age, and gender as the predictors and fair sharing as the response showed that there were no differences in fair sharing across conditions, $B = 1.88$, $SE(B) = 1.13$, Wald(1) = 2.78, $p = .10$, age, or gender (all $ps > .25$). Therefore, when fairness

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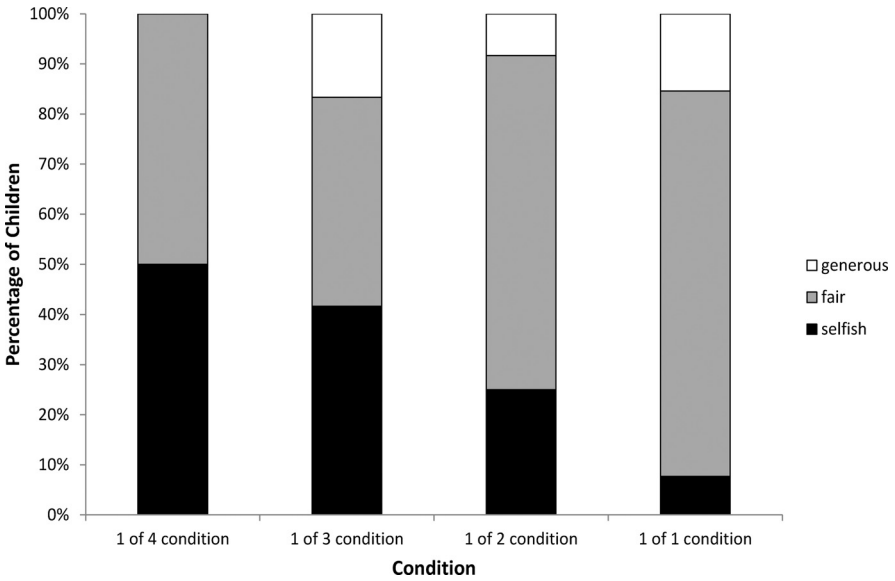


Figure 3. Proportion of sharing types across conditions in Experiment 2.

was possible, most children shared fairly in the second phase regardless of prior experience with proportional generosity in the first phase.

As a consequence of this, the rates of generous sharing were relatively low—only 5 of 49 children (10%) chose to share generously. This result stands in contrast to the rates of generous sharing found in Experiment 1 (when fair sharing was impossible), in which 17 of 50 (34%) children chose to share generously. The difference between the two experiments was significant, Fisher's exact test $p = .007$. A binomial regression using condition type, age, and gender as the predictors and generous sharing as the response showed no difference in generous sharing across conditions or across ages, all $ps > .10$.

The rates of selfish sharing were also relatively low: 15 of 49 children (31%) chose to share selfishly in Experiment 2, in contrast with Experiment 1 in which 33 of 50 (66%) of children shared selfishly, Fisher's exact $p < .001$. A binomial regression using condition type, age, and gender as the predictors and selfish sharing as the response showed that initial proportion shared in the first negatively predicted the likelihood of selfish sharing in the second phase, $B = -3.58$, $SE(B) = 1.62$, Wald(1) = 4.90, $p = .03$, and no other significant effects, $ps > .25$. Therefore, selfish sharing was reduced by initial experience with proportional generosity. This more stringent test (with the availability of a fair option) suggests that initial experience with proportional generosity decreased selfish behavior.

GENERAL DISCUSSION

Across two experiments we found that proportional generosity in the first phase reduced children's selfish sharing in the second phase. Importantly, although all children gave the exact same surface action of giving one sticker to the puppet, the proportional cues guided children's subsequent sharing decisions. This result is in line with the hypothesis that proportional cues help children construct their own prosocial intentions, as well as work that finds that children make moral evaluations of others based on proportional sharing (McCrink et al., 2010). We show that even when the initial experience of giving is exactly the same (each child gave one

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sticker, made the same choice of giving or keeping the sticker, and was never rewarded for it), the proportional generosity of the act guides children's subsequent behavior.

Paradoxically, the more stickers children received, the fewer they gave. Similarly, the fewer stickers the children received, the more they gave. The pattern of results speaks to the strength of self-consistency effects in young children. Giving away one's only resource or even half of one's resources could have caused moral self-licensing (i.e., a "license" to be selfish once already having proven oneself to be prosocial; see Merritt et al., 2010). Children who gave away their only sticker could have felt a particular desire to "even out" the scoreboard by later taking more stickers for themselves. We found, however, that this was not the case: children who were the most generous at first were also the most likely to be generous subsequently. We note that while moral self-licensing effects have been well-documented in adults, to our knowledge, there is no present evidence of moral self-licensing effects in young children. One possibility for why we may not see licensing effects may be that young children do not yet have a coherent sense of prosocial identity to feel "licensed" about (see Hardy & Carlo, 2011), nor do they have a sophisticated view of "moral credit" (i.e., a concept of how actions do and don't contribute to their moral self-identity). Another possibility is that costly sharing of the kind we induced is more likely to cause self-consistency effects even in adults (Gneezy et al., 2012; see also Mullen & Monin, 2016, for a fuller treatment of these issues). Given these possibilities, we believe it may be fruitful for future work to investigate the developmental onset of self-licensing effects.

We note that it is an interesting question whether (a) the "selfish" conditions (1 of 4 and 1 of 3 conditions) increased selfish sharing, or whether (b) the "nonselfish" (1 of 2 and 1 of 1) conditions reduced selfish sharing relative to children's baseline sharing. Prior research has looked at the effect of conditions in which children are able to engage in either costless sharing, or in no sharing at all (Chernyak & Kushnir, 2013) on children's subsequent generosity, and found that in these conditions, approximately 26–33% of children engaged in subsequent generous sharing. If these rates reflect baseline sharing, the present study suggests that both (a) and (b) are true: the 1 of 4 and 1 of 3 conditions may have increased selfish sharing relative to this baseline, whereas the 1 of 2 and 1 of 1 conditions decreased selfish sharing. Taken together, our results suggest that costliness did not influence children in a binary manner (e.g., "Was the action costly or noncostly?"), but rather, in a graded and proportional manner. Rather than distinguishing *only* between actions that follow social norms (giving 1 of 2; half) versus those that do not or actions that are selfish (keeping more than half) versus those that are not, children are influenced by the graded, proportional cost of each condition.

In our work, we define cost in purely economic terms—the reason why the 1 of 1 condition is more costly than the 1 of 4 condition is because children give away a larger proportion of resources. It is an open question whether such economic cost also translates to perceived psychological cost. For example, given work suggesting that children are actually happier when giving in a costly manner (Aknin, Hamlin, & Dunn, 2012; Dunn, Aknin, & Norton, 2008; Dunn & Norton, 2013), children may have paradoxically perceived less psychological cost while experiencing greater economical cost. The relationship between economic and psychological costliness deserves further investigation.

When given the choice to share equally, children did so at remarkably high rates, mimicking prior work finding that young children have a strong prior tendency to share resources equally with others (Shaw & Olson, 2012, 2013). However, the children surveyed in our sample were younger than ages previously found to be capable of engaging in equal sharing (see Smith et al., 2013). We believe that the context in which children were presented with the

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sharing scenario may have played a role: Even 3-year-olds are capable of sharing equally when sharing occurs in a collaborative context (Hamann et al., 2011). Similarly, our context of a sympathetic puppet that was in need of comfort may have inspired equal sharing in young children.

A growing body of work is finding that preschool children's prosocial behavior is contextually sensitive (Barragan & Dweck, 2014; Bryan et al., 2014; Chernyak & Kushnir, 2013; Warneken & Tomasello, 2008). Together with our work, such studies provide evidence that reciprocal interactions with adults, trait labels, social praise, free choice, and proportional cues all appear to affect how children behave toward others. We want to note that further work is needed to understand the exact inference that children are making while engaging in prosocial actions. Our results speak to the possibility that children may be constructing their identities through making inferences about themselves with respect to the types of actions they undertake (how generous those actions are). Moreover, children may be making stronger inferences about their own prosocial motives after engaging in proportional generosity. Alternative possibilities include the fact that children may have attempted to maintain a self-consistent reputation in front of the experimenter (Shaw et al., 2014), or that children who were given initially larger endowments felt more entitled to keep subsequent endowments. Thus, proportional cues may be helping children construct an understanding of their prosocial identities, their prosocial reputations, or the proportion of resources to which they are entitled. Future research is needed to disambiguate these possibilities.

There are many features that may have scaffolded the children's abilities to learn from their own proportional generosity. First, the experimenter clearly labeled the number of stickers available to the child ("Here are [four] stickers just for you") as well as the number that the child gave away. Giving such numerical cues may have helped the children understand their relative generosity (or lack thereof) by comparing the numbers that were cited by the experimenter. On the other hand, number concept might not be critical for understanding this task, and instead, children may simply experience greater physiological arousal when giving away their only sticker than when giving away one of four stickers that they had.

These studies suggest that experiences with generous giving help inspire future generosity and decrease future selfishness. Our results suggest an important role of providing children with experience exercising their own generosity, but also stress the role of providing the proper types of generous experiences: providing children with easy experiences may not be sufficient in scaffolding future generosity. In studying which actions do and don't motivate generous behavior, we may be able to further understand which early experiences inspire generosity in young children.

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AUTHOR CONTRIBUTIONS

NC, BYT, and TK designed the studies; BYT collected and coded data with help from research assistants; NC analyzed the data and drafted the manuscript with input from BYT and TK; TK and BYT provided revisions.

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