**Children are sensitive to reputation when giving to both ingroup and outgroup
members**

Haleh Yazdi¹, Gail D. Heyman¹ and David Barner¹

¹University of California, San Diego

Correspondence:
Haleh Yazdi
Department of Psychology
University of California, San Diego
9500 Gilman Dr.
La Jolla, CA 92093-0109
email: hyazdi@ucsd.edu

Keywords: intergroup sharing; minimal groups; prosocial behavior; reputation concerns; observer effects, giving motives

Abstract

Previous studies establish that reputation concerns play an important role in outgroup giving. However, it is unclear whether the same is true for ingroup giving, which by some accounts tends to be motivated by empathic concerns. To explore this question, we tested the extent to which 5 to 9-year-old children (Study 1: N=164) and adults (Study 2: N=80) shared resources with ingroup and outgroup members, either when being watched by an observer (where we expected reputation concerns to be salient) or in private (where we expected no effect of reputation concerns). We also assessed whether children and adults differ in their beliefs about which form of sharing (ingroup or outgroup giving) is nicer. Although we found that both children and adults exhibited an ingroup bias when sharing, there was no evidence in either group that reputation concerns were greater for outgroup members than for ingroup members. We also found that, in contrast to adults, children shared more resources when observed than in private. Additionally, children evaluated ingroup giving as nicer across different sharing scenarios, whereas adults identified outgroup giving as nicer when the two forms of giving were contrasted. These results are the first to suggest that reputational concerns influence children's sharing both with ingroup and outgroup members, and that children differ from adults in their reasoning about which form of group sharing is nicer.

Humans often share with one another, and frequently do so without expectation of immediate reciprocation. We share food, money, time, and even ideas with other people (Brock & Kim, 2002; Fehr & Fischbacher, 2003), thereby fostering social cohesion and the achievement of goals that might otherwise be difficult to attain (Batson, 1994). However, we don't share our resources equally with all people, nor do we always share for the same reasons (Bernhard, Fischbacher, & Fehr, 2006; Stürmer, Snyder, Kropp, & Siem, 2006). Generally, individuals are more likely to share with members of their own social groups (i.e., ingroups) than with members of other groups (i.e., outgroups; Nesdale & Flessner, 2001; Tajfel & Turner, 2004), a tendency that is evident as early as the preschool years (Fehr, Bernhard, & Rockenbach, 2008; Moore, 2009; Yu, Zhu, & Leslie, 2016). Further, children and adults tend to act more generously when observed by an audience than in private— a difference that is often attributed to a heightened concern with appearing cooperative and reaping the associated benefits (e.g., reputation enhancement; Banerjee, 2002; Engelmann, Over, Herrmann, & Tomasello, 2013; Fujii, Takagishi, Koizumi & Okada, 2015; Leimgruber, Shaw, Santos, & Olson, 2012; Van Vugt & Hardy, 2010). What is less clear is whether concerns for reputation enhancement differ as a function of whether the recipient is an ingroup or outgroup member.

At least among adults, outgroup giving may be driven by qualitatively different motives than ingroup giving (Levine, Prosser, Evans & Reicher, 2005; Saucier, Miller, & Doucet, 2005; Van Leeuwen & Täuber, 2010). Specifically, outgroup giving may be more affected by the interests of the giver than those of the recipient, whereas ingroup giving may be more motivated by empathic concerns (i.e., concern for the well-being of recipients). In one study addressing this issue, Stürmer and colleagues (2005) found that although adults expressed feeling similar levels of empathy for ingroup and outgroup members, empathy was a stronger predictor of helping when the recipient was an ingroup member, whereas feelings

of attraction for the recipient more strongly predicted helping behavior when the recipient was an outgroup member (Stürmer, Snyder, & Omoto, 2005). Compatible with this, social signaling theories (Barclay, 2016; Fehr & Fischbacher, 2003; Gintis, Smith, & Bowles, 2001) and Stürmer's empathy X group membership moderation hypothesis (2005) also posit that individuals are more likely to act out of empathic concerns when helping ingroup members, and more likely to help outgroup members when it provides a benefit to the helper—e.g., by providing an opportunity to appear generous and thereby foster a favorable reputation (Batson, 1991; Silk & House, 2011). Compatible with this hypothesis, a study of Scottish adults found that telling participants that Scots are perceived as “mean” and “stingy” by the English motivated participants to behave more generously to outgroup members to restore their group's reputation (Hopkins et al., 2007). These findings, like those reviewed above, suggest that outgroup giving might stem from more strategic motives than ingroup giving. In the current work, we focus on the role of reputation concerns in driving giving behavior and investigate whether ingroup giving is also impacted by such concerns.

The claims regarding reputation management in adults raise the question of how reputation concerns emerge in childhood, and whether children's sensitivity to reputation concerns differ according to the group identity of a recipient. Like adults, children as young as five years of age exhibit a strong preference for ingroup members over outgroup individuals (Fehr et al., 2008; Nesdale, Griffith, Durkin, & Maass, 2005), whether these groups are familiar and meaningful or are so-called “minimal groups”, established using arbitrary characteristics such as color or drawing ability (Dunham, Baron, & Carey, 2011; Nesdale & Flessner, 2001; Spielman, 2000; Tajfel, Billig, Bundy, & Flament, 1971). Not only do children have a more favorable attitude toward ingroup members than outgroup members, but they also prioritize their ingroup when allocating resources (Fehr et al., 2008; Moore, 2009; Yu et al., 2016) and expect others to act in the same manner (Olson & Spelke, 2008),

even if they believe that sharing equally with both groups is the nicer thing to do (DeJesus, Rhodes, & Kinzler, 2014). However, while there is considerable evidence that children favor their own group over outgroups, it remains unclear what motivates this differential treatment of group members.

Children as young as four years old are also motivated by a desire to make a favorable impression on others (Rapp, Engelmann, Herrmann & Tomasello, 2019; Fu, Heyman, Qian, Guo & Lee, 2015). For instance, 5-year-olds act more cooperatively when they believe that their behaviors will be made known to others (Leimgruber et al., 2012; Piazza, Bering, & Ingram, 2011) and share more when recipients are present than when they are absent (Engelmann, Herrmann, & Tomasello, 2012). Additionally, 6-year-olds act in ways to appear fair while unfairly favoring themselves (Shaw, Monitauri, Piovesan, Olson, Gino, & Norton, 2014). These findings suggest that children, like adults, are sensitive to social contexts and will alter their behavior to manage their reputations and present themselves more positively to others.

What is unknown is whether children and adults have differing reputation concerns depending on their relationship with the recipient. On the one hand, past research suggests that children are often more concerned with appearing “nice” to acquaintances and strangers than to close friends, and several studies show that children share equally or more with non-friends than friends when their behavior will be known to others (Buhrmester, Goldfarb, & Cantrell, 1992; Paulus, 2016). On the other hand, theories of human cooperation argue that individuals should be more concerned with how they are perceived by ingroup members than outgroup members, since they are more likely to have future interactions with, and information about their reputation transmitted between, ingroup members (Mifune, Hashimoto, & Yamagishi, 2010; Yamagishi & Mifune, 2008). In line with this argument, one developmental study found that children gave more when observed by ingroup members than

by outgroup members (Engelmann et al., 2013). However, while this literature suggests that children might be more concerned with presenting themselves positively to ingroup than outgroup members, it does not address the separate question of what motivates how they allocate resources to these groups and whether ingroup giving and outgroup giving are differentially affected by reputation concerns. One novel way to test this question is to examine how reputation concerns might affect children's behavior with ingroup and outgroup members when they are being evaluated by a neutral third party.

Critically, past studies find that understanding of prosocial motives changes in development, raising the possibility that children and adults reason differently about sharing with ingroup and outgroup members. For example, adults perceive reputation enhancement as an ulterior motive that diminishes the kindness of a prosocial act, whereas children younger than nine do not (Heyman, Barner, Heumann, & Schenck, 2013; Heyman, Fu, Barner, Zhishan, Zhou, & Lee, 2016). This may be because adults focus primarily on an actor's prosocial *intentions* when evaluating cooperative behavior (Critcher & Dunning, 2011; Ham & Vonk, 2011), and therefore discount acts of giving that are done for self-serving motives like enhancing their own reputation (Heyman et al., 2013; Padilla-Walker & Carlo, 2014). In contrast, children younger than nine judge acts of giving as *nicer* if they occur in contexts that enhance the reputation of the giver (Heyman et al., 2013; see also Butzin & Dozier, 1986). Thus, younger children differ from adults in how positively they view the efforts of others to enhance their own reputations, and in how they weigh these efforts when judging acts of ostensible generosity.

These previous studies suggest that young children may be willing to seek reputation benefits under conditions in which older children and adults are not. This raises the question of whether such concerns play differing roles when giving to ingroup and outgroup members, or if, for children, reputation concerns are always at play. Following the logic of previous

studies, which operationalize reputation concerns by comparing differences between public vs. private giving (Engelmann et al., 2012; Haley & Fessler, 2005; Mifune et al., 2010; Rigdon, Ishii, Watabe, & Kitayama, 2009), Study 1 explored this question by testing the extent to which children give to members of different groups in the presence or absence of a neutral observer. Specifically, we asked whether children's reputational concerns are stronger when giving to outgroup members, or, if instead, they exhibit equal concern for self-presentation when giving to ingroup and outgroup members. Though additional factors, such as empathy, may affect children's giving toward different group members, we were most interested in the role reputation concerns might play in predicting children's ingroup and outgroup giving. Also, we assessed children's evaluations of ingroup and outgroup giving by a third party, to determine which form of giving they perceive as nicer.

We predicted that, consistent with prior literature, children would give more to ingroup members than to outgroup members (Fehr et al., 2008; Spielman, 2000, Yu et al., 2016), and that they would give more in public than in private (Buhrmester et al., 1992; Engelmann et al., 2012; Leimgruber et al., 2012). Less clear, however, was whether this preference for ingroup members would interact with children's reputation concerns. One possibility, compatible with the literature on sharing in adults, is that children's outgroup giving is more motivated by reputational concerns relative to ingroup giving. This would predict that the amount children share with outgroup members should be more affected by being observed than the amount they share with ingroup members. On the other hand, if children believe that sharing with ingroup members is more beneficial for their reputation than sharing with outgroup members, then they may give more to their ingroup when observed than in private. Also possible is that children are mostly concerned with appearing cooperative and fair to an onlooker, and, hence, will share more equally with ingroup and outgroup members when observed than in private.

Regarding children's evaluations of third-party sharing, we didn't have a strong *a priori* hypothesis. It is possible that children perceive outgroup giving as nicer than ingroup giving since it entails helping an individual outside of one's immediate group. On the other hand, children may perceive outgroup giving as a violation of loyalty to one's own group, in which case we might expect children to perceive ingroup giving as nicer.

Study 1

In Study 1, we investigated children's relative concern for positive self-presentation when giving to ingroup and outgroup members, as well as their evaluations of other children's sharing with different group members. To establish group membership, we assigned children to arbitrarily defined groups using the minimal group paradigm (Dunham et al., 2011; Tajfel et al., 1971), and told them that the different groups were in competition with one another (based on previous findings that this strengthens ingroup preference; Spielman, 2000). We then tested children in two phases. In the first phase children performed a sticker allocation task in which they could share stickers with ingroup and outgroup members across trials. We manipulated whether the giving occurred privately or publicly (i.e., in which an observer stood by and watched how much children donated) between subjects, and in line with past work, we reasoned that private sharing is more indicative of a concern for the recipient, whereas public sharing is more indicative of a desire for positive self-presentation or concern for reputation management (Buhrmester et al., 1992; Leimgruber et al., 2012; Heyman et al., 2013). Thus, as noted previously, we operationalized sensitivity to reputation management as the difference in amounts given when allocating resources publicly vs. privately (Haley & Fessler, 2005; Mifune et al., 2010; Rigdon, et al., 2009). In the second phase of the study, we asked children to judge the giving behaviors of fictitious children. All children completed the sticker allocation task prior to the evaluation task since previous

studies find that children often adjust their sharing behaviors to align with those of their peers (House, Henrich, Sarnecka, & Silk, 2013; Ruggeri, Luan, Keller & Gummerum, 2017).

Method

Participants: We tested a total of 164 children (82 females), with 84 children in the Observer condition and 80 in the No Observer condition. This sample size was based on previous studies of children's minimal group sharing that used a similar design and task (Dunham et al., 2011; Engelmann et al., 2013), and a power analysis, which indicated that a sample size of 160 would yield medium power ($d = .40$), assuming an effect size of .25 and an alpha level of .05. Children's ages ranged from 5 to 9 years with 33 5-year-olds, 32 6-year-olds, 35 7-year-olds, 32 8-year-olds, and 32 9-year-olds; 82% were white, 15% were Asian American, 3% were identified as mixed/other by caregivers. Participants were students in a school district that primarily serves an upper middle-class population. The study received ethics approval from UC San Diego's Human Research Protections Program.

Procedures: There were two phases of the procedure. In the first phase children completed a sticker-sharing task, and in the second phase they completed an evaluation task, in which they evaluated the sharing of other children. At the start of the testing session, children randomly selected a green or orange block hidden behind the experimenter's back to assign them to one of two possible minimal groups (the Green or Orange group). Blocks were surreptitiously manipulated to ensure that an equal number of children from each age group were assigned to each color group. Children were told that their group included other children who chose the same color block as them. They were then given a wristband matching the color of their group to wear for the duration of the task. Next, each participant heard four narratives describing a competitive relationship between the two groups (e.g., "The Green group *really* wants to win against the Orange group, and the Orange group *really* wants to win against the Green group", see Appendix A for narratives). The narratives emphasized

competition between the groups without mention of rivalry over resources in order to prevent children from viewing the sticker-sharing task as a competition over resources.

Sticker-sharing task (Phase 1): All children completed the sticker-sharing task, in which they were asked to divide their stickers between themselves and either ingroup or outgroup members. We refer to ingroup and outgroup sharing as ‘Group Sharing Type’ and manipulated this as a within-subjects factor. The between-subjects factor was whether children were observed whilst completing the sharing-task; nearly half of the participants completed the task with an observer present (Observer condition) and the other half did so in the absence of an observer (No Observer condition).

Stimuli for the sticker-sharing task were six full-color head and shoulder photographs of white female children between the ages of 5 and 7 attached to manila envelopes. All recipients were female and of the same race in order to control for gender and race as extraneous variables in children’s ingroup/outgroup sharing behavior, as previous work indicates that children favor some racial groups over others and prefer to give to recipients of their own gender, and to help prevent these effects from overriding children’s minimal group preferences, since gender and race are familiar, non-neutral social groups that children have prior experience with (Dunham et al., 2011). Controlling for gender allowed us to minimize the variability in our findings by analyzing effects due to the gender of participants, rather than the interaction of participant X recipient gender. Note that while it would be possible to double the study size to achieve the power needed to also analyze recipient gender (i.e., to an N of 328), we had no hypotheses regarding recipient gender and therefore did not pursue this question. Photographs of target children were those used by Dunham et al. (2011), and were rated by adults as being similar in attractiveness. They were edited using a photo editing software so that half of the children wore green t-shirts and the other half wore orange t-shirts.

On each trial, children were presented with an envelope featuring a picture of a target child from the contrasting outgroup (three trials) or their same group (three trials). Each time a picture of a target child was presented, the experimenter placed seven stickers on the table in a random arrangement such that stickers were not placed in rows or grouped together in sets. An unequal number of stickers was used so that children would have to choose between favoring themselves or a target recipient without defaulting to a fair distribution. This ensured that, if we observed a developmental shift in children's sharing behavior, this shift would not be primarily due to a change in children's sensitivity to fairness (which occurs between ages 6-8; Blake & McAuliffe, 2011), but rather a change in their sensitivity to group membership and intergroup biases. Children were told that the stickers belonged to them and they could distribute the stickers as they wished. They were led to believe that the envelopes would later be mailed to each target child and were told that the experimenter would not look inside of the envelopes. In each trial, children put the stickers that they wanted to donate inside of the envelope with the target child's picture on it, and the stickers that they wanted to keep in a separate envelope with their name on it. Children completed seven trials in total including one practice trial. For counterbalancing purposes, there were two orders for the presentation of target pictures where one order was the reverse of the other.

There were two Observer conditions (Observer and No Observer) for the sticker-sharing task that differed between subjects. For both conditions, the experimenter placed a poster board between herself and the participant so that the experimenter's view of the participant was obstructed. In the Observer condition, a research assistant sat next to the child and maintained a neutral expression while watching the child complete the sticker-sharing trials. Children were told that the observer cared about how nice they were and was watching them to see how many stickers they shared. The presence of an evaluative observer was emphasized, since prior work shows that children younger than eight years old are insensitive

to a passive adult observer and require verbal cues to understand that their actions are being watched and evaluated (Dutra et al., 2018; Fujii et al., 2015). In the No Observer condition children completed the trials without being watched by a research assistant.

Evaluation task (Phase 2): In Phase 2 of the study, children evaluated sharing scenarios involving third parties. Children were told that they would see images of how other children played a sticker game similar to the one they just completed—except now, they would decide if the children in the images were being nice or mean in sharing their stickers. Since we wanted to later assess how children’s sharing behavior in Phase 1 might relate to their evaluations in Phase 2, we paralleled the evaluation task as closely as possible to children’s experience in the sticker-sharing task with ingroup sharing and outgroup sharing manipulated within subjects, and whether or not an observer was shown manipulated between subjects.

Prior to beginning the evaluation task, examples of a child performing a “nice” act (cleaning up the classroom) and a “mean” act (pushing another child down on purpose) were read to each participant. Children answered whether the actions were nice or mean to ensure that they understood the meaning of each term. Next, children saw eight PowerPoint slides, where each slide depicted scenarios of a target child sharing stickers with another child who was in her ingroup or outgroup in the presence or absence of a female observer. At the start of each trial, the experimenter narrated which color group the giver and recipient belonged to and how many stickers were shared (e.g., “This child is part of the Green group and she donated five of her stickers to this child in the Orange group”). Target children in the evaluation task were represented by pictures of 16 children between the ages of 5 to 7, with a mix of givers and recipients in the Orange and Green group.

Eight scenarios in total were presented to children in the evaluation task: Four scenarios consisted of the giver donating her stickers to an ingroup member and four

scenarios consisted of the giver donating her stickers to an outgroup member, where the ratios of giving and keeping stickers were 7:0, 5:2, 2:5, 0:7 for both types of giving. We use the term ‘Group Sharing Type’ to refer to whether the giver shared with an ingroup or outgroup member, and the term ‘Resource Allocation’ to refer to the number of stickers donated by the giver to the recipient (e.g., 7, 5, 2, or 0 stickers). Two orders for the presentation of PowerPoint slides were used, where one order was the reverse of the other. For each trial, children judged whether the giver was nice or mean, and were probed to elaborate by answering “How nice?” or “How mean?” using a six-point pictorial Likert scale with three smiling and three frowning faces, adopted from Ng, Heyman, and Barner (2011) and transformed into values: 6 (very, very, nice) to 1 (very, very, mean) for data analysis.

Results

Our primary question in Phase 1 was whether children would be differently affected by reputation concerns when sharing with ingroup versus outgroup members. In Phase 2, we assessed children’s beliefs about different types of sharing to see whether they perceive ingroup or outgroup giving as nicer.

Sticker-sharing task (Phase 1): To examine how children shared their stickers with ingroup and outgroup members in the presence or absence of an observer, we constructed generalized linear mixed-effects regression models and compared a reduced model to fuller models.¹ No significant effects of gender were found, so it was not included in any of the models. The reduced model included Age and Group Sharing Type (ingroup, outgroup) as predictor variables, Participant/Group Sharing Type as a nested random effect, and percentage of stickers donated in a given trial as the response variable. The full, best fitting model included all predictor variables contained in the reduced model in addition to Observer condition (Observer, No Observer) and the interaction between Group Sharing Type and

¹ Analyses were performed in R 3.5.2 (<http://www.r-project.org>) using the lmerTest package (Kuznetsova, Brockhoff, & Christensen, 2016).

Observer condition.² Likelihood ratio tests indicated that the addition of each factor significantly improved the fit of the model in comparison to the reduced model (all $ps < .03$ for all tests), and a test of multicollinearity using variance inflation factor (VIF) revealed low collinearity among predictor variables (all VIFs < 2.25). The full model differed significantly from the basic model, $\chi^2(2) = 15.69, p < .001$ and a test of model fit indicated high goodness of fit ($R^2 = .73$). We found that Age predicted 28.17% unique variance, Group Sharing Type predicted 34.02%, Observer condition predicted 36.96%, and the interaction between Group Sharing Type and Observer condition predicted .85%. The degrees of freedom reported in this analysis were computed using the Satterthwaite approximation³ and post hoc analyses were computed using Tukey's Honestly Significant Differences (HSD) with p set at .05.

As expected (**Fig. 1**), we found a significant main effect of Observer condition ($F(1, 158) = 27.65, p < .001$), such that children who were observed donated significantly more stickers ($M = 54\%$, $SE = 2.09$), than children who were not observed (HSD, $p < .001$, $M = 38\%$, $SE = 2.14$). This finding is consistent with previous work showing that children are more generous when sharing in public than in private (Engelmann et al., 2012; Leimgruber et al., 2012). Also consistent with past work (Olson & Spelke, 2008; Tajfel & Turner, 2004; Yu et al., 2016), we found a main effect of Group Sharing Type ($F(1, 162) = 25.46, p < .001$), such that children donated significantly more stickers to ingroup members ($M = 50\%$, $SE = 1.64$) than to outgroup members (HSD, $p < .001$, $M = 43\%$, $SE = 1.64$). Most germane to the question of the present study, we did not find a significant interaction between Observer condition and Group Sharing Type ($F(1, 162) = .64, p = .426$), suggesting that children's giving to ingroup and outgroup members was equally affected by reputational concerns.

² The final model specification was: Percentage of Stickers Shared $\sim$ Group Sharing Type + Observer condition + Group Sharing Type*Observer condition + Age + (1 | Participant /Group Sharing Type).

³ The Satterthwaite approximation is a formula used to calculate the approximate degrees of freedom for a linear combination of independent sample variances.

Figure 1: Percentage of stickers given by Observer condition (Observer, No Observer) and Group Sharing Type (ingroup, outgroup). Error bars indicate mean standard error, and violin plots show density distribution of responses.

Post-hoc analyses indicated a significant difference between the percentage of stickers shared by 5-year-olds ($M = 35\%$, $SE = 3.34$) and 6-year-olds (HSD, $p = .009$, $M = 51\%$, $SE = 3.39$), as well as between 5-year-olds and 8-year-olds (HSD, $p < .001$, $M = 56\%$, $SE = 3.39$), demonstrating that younger children generally shared fewer stickers. Also, *post-hoc* tests revealed no interactions due to age, indicating that younger and older children were similarly sensitive to observer effects—a finding that parallels those of past studies (Aloise-Young, 1993; Banerjee, 2002; Piazza et al., 2011).

Evaluation task (Phase 2): To test whether children's sharing behavior in Phase 1 parallels their beliefs about ingroup and outgroup sharing, we assessed how children rated the niceness of another, fictitious child's sharing behavior in Phase 2, the evaluation task. We used the model comparison method described above with linear regression models, rather than linear mixed-effects regression models, since children rated each scenario only once. No

significant effects of gender were found, so this factor was not included in any of the models. Correlations computed prior to creating regression models revealed low collinearity among predictor variables (all VIFs = 1). The reduced model included Age and Group Sharing Type (ingroup, outgroup) as predictor variables, and average niceness ratings as the outcome variable. Likelihood ratio tests indicated that adding Resource Allocation to the reduced model significantly improved its goodness of fit ($p < .001$) but adding the interaction between Resource Allocation and Group Sharing Type did not ($p = .103$) and neither did adding Observer condition ($p = .156$), therefore, these variables were not included in the full model. The full model differed significantly from the reduced model, $\chi^2(3) = 694.47, p < .001$ and the overall model fit was $R^2 = .43$, indicating moderate goodness of fit.⁴ We found that Age predicted .16% unique variance, Group Sharing Type predicted 3.13%, Resource Allocation predicted 39.75%, and 56.96% of the variance in children's niceness ratings was not explained by the model. We did not find any age effects, so have omitted participant age from our description of findings below.

Our analysis revealed a significant main effect of Group Sharing Type (see **Fig. 2**), such that children rated ingroup sharing ($M = 4.39, SE = .07$) as significantly nicer than outgroup sharing ($M = 3.75, SE = .07$), $F(1, 1330) = 69.23, p < .001$. This result is compatible with previous work showing that children endorse group cohesion and loyalty (Aboud, 2003; Abrams, Rutland, Ferrell, & Pelletier, 2008; Castelli, De Amicis, & Sherman, 2007; although see DeJesus et al., 2014 for one scenario in which children favor equal giving across groups when acts of ingroup and outgroup giving are explicitly contrasted). Our results also revealed a main effect of Resource Allocation ($F(3, 1330) = 291.32, p < .001$), such that children rated sharing 7 stickers as nicer than sharing 5, 2, or 0 stickers (all HSDs, p

⁴ The final model specification was: Average Niceness Ratings ~ Group Sharing Type + Resource Allocation + Age.

< .001), sharing 5 stickers as nicer than sharing 2 or 0 stickers (all HSDs, $p < .001$), and sharing 2 stickers as nicer than sharing 0 stickers (HSD, $p < .001$). As mentioned above, the interaction between Resource Allocation and Group Sharing Type was not significant and not included in the model. Consistent with DeJesus et al. (2014), we also found that children's own sharing behavior in Phase 1 was unrelated to their evaluations in Phase 2 (see Appendix B for details).

Figure 2: Children's average niceness ratings (1 = very, very, mean, 6 = very, very, nice) by Resource Allocation and Sharing Type (ingroup giving, outgroup giving).

Discussion

There were two main findings in Study 1. First, we found that children were equally concerned with their reputation when giving to outgroup and ingroup members; children gave more stickers overall when observed than not observed, but to the same degree regardless of the recipient's group identity. Second, we found that children evaluated ingroup giving as nicer than outgroup giving for all instances. Both of these results raise interesting questions

regarding how children view reputation management. The first result suggests that, although children view outgroup giving as an opportunity to enhance their reputation, they also view ingroup giving in this way. The second result, that children judge ingroup giving to be nicer than outgroup giving, is compatible with how they generally behaved when sharing their own stickers.

Our finding that children's ingroup and outgroup giving increased to a similar extent under observation is somewhat surprising in light of past work showing that children strategically manage their reputations depending on whether the recipient is an ingroup or outgroup member (Buhrmester et al., 1992; Engelmann et al., 2013; Paulus, 2016). It is also unexpected in the context of adult work suggesting that many forms of outgroup sharing, but not ingroup giving, are strategic in nature and arise from the desire to appear generous, or to signal status and power to outgroup members (Halabi, Dovidio, & Nadler, 2008; Klein & Azzi, 2001; Van Leeuwen & Täuber, 2010). One possible explanation is that children have unique beliefs relative to adults about ingroup and outgroup sharing. For instance, children may differ from adults in their understanding of the strategic benefits associated with outgroup giving, or how they interpret this information. However, no previous study has asked this question in adults using methods similar to those in the developmental literature. To address this issue, we used a procedure similar to the one used in Study 1 with adults.

Study 2

Study 1 found that, when children were asked to share with ingroup and outgroup members, they gave more when observed – a result which previous studies have interpreted as evidence for sensitivity to reputational concerns (Bateson, Nettle & Roberts, 2006; Leimgruber et al., 2012; Van Vugt & Hardy, 2010). However, surprisingly, this effect of being observed by a neutral onlooker did not differ when children gave to ingroup versus outgroup members, suggesting that, at least in children, ingroup giving may be just as

impacted by reputational concerns as outgroup giving. These results appear to be inconsistent with arguments that adults give to ingroup members chiefly out of empathic concern, and to outgroup members more out of self-serving concerns, such as impression management (Aboud & Levy, 2000; Stürmer et al., 2005, 2006). However, while these studies found more empathy-driven behavior towards ingroups, most have not tested whether reputational concerns are less important when giving to ingroup members. This is a problem because while empathy may explain more variance in ingroup giving – whether in adults or in children – it remains possible that ingroup giving is also impacted by reputation concerns, and perhaps to the same degree as for outgroup giving. Although the current study does not test empathy, our results bear on the extent to which it alone determines ingroup giving, and more importantly our results speak to alternative mechanisms.

Given these considerations, Study 2 examined whether reputational concerns differ across ingroup and outgroup giving in adults in a minimal group paradigm that paralleled the method of Study 1. Also of interest was whether adults, like children, perceive ingroup giving as nicer. Given that the tasks used in Study 2 were adapted from methods designed to test children, we also used a survey to probe adults' beliefs regarding ingroup and outgroup sharing in a format that is more familiar for their age group.

Method

Participants: Adult participants were undergraduate students recruited from the University of California San Diego's subject pool, who participated in exchange for course credit. A total of 80 adults (42 females) were tested, with 40 in the Observer condition and 40 in the No Observer condition. Participants' ages ranged from 18 to 29 years ($M = 20.54$, $SD = 2.05$); 36% self-identified as white, 30% self-identified as Asian, 24% self-identified as Hispanic, 5% self-identified as African American, 2.5% self-identified as Middle Eastern,

and 2.5% self-identified as mixed/other. Participants were assigned to the Green and Orange group equally across genders and Observer conditions.

Procedures: Adult tasks paralleled those of Study 1, but were adapted to be realistic and convincing for an older age group. Participants completed three phases: a resource allocation task in Phase 1, an evaluation task in Phase 2, and a survey gauging their beliefs about ingroup and outgroup sharing in Phase 3. To make the sharing task more convincing, adult participants were led to believe that they were allocating resources (tokens) with ingroup and outgroup members in real time. To make this more plausible, participants were recruited in groups and saw other participants enter and leave the waiting room at the same time as them. To be sure that participants ascribed value to the tokens, they were told that each token would serve as an entry to a raffle that would take place weeks after the experiment ended. As in Study 1, Observer condition (Observer, No Observer) was a between-subjects factor, and Group Sharing Type (ingroup recipient, outgroup recipient) was manipulated within-subjects across trials.

At the start of the first task (Phase 1), the experimenter informed participants that they would take part in a study that was previously conducted with children. Participants were told that they would be part of the Orange or the Green group. As in Study 1, they were told that the two groups were in competition with one another and selected a green or orange block from a bag. Blocks were manipulated so that an equal number of male and female participants in each Observer condition were assigned to each color group. Participants then wore a t-shirt matching their color group for the duration of the task.

A research assistant took a photo of the participant wearing the colored t-shirt and printed and pasted two colored copies of the participant's photo onto manila envelopes. Participants were told that they would see photos of other participants who were playing the token game and their envelope would be shared with these players. The research assistant

returned to the testing room with two piles of manila envelopes. Both piles had the participant's envelope with their photo on top in direct view of the participant, and envelopes with pictures of ingroup and outgroup members underneath it. The research assistant left one pile of envelopes with the experimenter and then left the room after informing the participant that the other pile would be given to another player down the hall. For participants in the Observer condition, the research assistant returned and sat next to the participant to observe them during the token-sharing task. For both the Observer and No Observer conditions, the experimenter placed a privacy board between herself and the participant during each trial.

Token-sharing task (Phase 1): In Phase 1, all participants completed a token-sharing task similar to the sticker-sharing task in Study 1. Half of the participants completed the task with an observer present and the other half completed the task without an observer. The observer manipulation was done in a slightly different manner with adults than with children in order to prevent participants from becoming suspicious of this manipulation. Specifically, with adults the experimenter only mentioned the observer once, rather than repeatedly reminding the participant of the observer's presence.

Instead of stickers, tokens were used as the resource. Participants were told that tokens would serve as entries to a raffle that would occur in the coming weeks. To prevent participants from viewing the task as a zero-sum game, they were told that the more people who played the game, and the more tokens there were, the more prizes there would be. Experimenters tested two participants at the same time in separate but adjacent rooms so that participants would believe that they were playing the token game in real time with others.

Similar to Study 1, there were six trials in total for the token-sharing task, and, at the start of each trial, participants were given seven tokens to distribute between themselves and a target player. Stimuli for the task were six full-color head and shoulder photographs of white females between the ages of 20 and 33 wearing orange or green t-shirts pasted onto the

front of manila envelopes. We chose all female targets to mimic the sharing task in Study 1. Though we were concerned that participants might find it odd that they were presented with all female targets, none of the participants mentioned this during or after the task during debriefing. All participants were presented with the same six target recipients, but the order of targets was counterbalanced as well as Group Sharing Type (ingroup or outgroup recipient), such that half of the participants saw a target wearing an orange shirt while the other half saw the same target wearing a green shirt.

Evaluation task (Phase 2): Phase 2 paralleled the evaluation task of Study 1 with children. Participants were told that the experimenter had secured permission from past players to disclose how they distributed their tokens in Phase 1. Next, participants were presented with eight PowerPoint slides: Four of the slides portrayed ingroup sharing and four slides portrayed outgroup sharing. As in Study 1, the slides depicted various token allocations (7:0, 5:2, 2:5, 0:7) between the giver and recipient. Target givers were represented in photographs of white females between the ages of 20-33 and target recipients were portrayed as orange or green colored silhouettes. Participants who were in the Observer condition in Phase 1 saw a picture of a female observer on each PowerPoint slide and were told that players completed the task with the observer present. Two different orders for the presentation of PowerPoint slides were used, such that one order was the reverse of the other. For each trial, participants evaluated the niceness of the giver using the same six-point pictorial Likert-type scale as used with children in Study 1.

Sharing survey (Phase 3): After Phase 1 and 2 of the study, we asked participants to complete a sharing survey. The goals of the survey were to (a) test whether participants' self-reported sharing behavior in the token-sharing task aligned with their actual sharing behavior, (b) gauge participants' explicit evaluations of ingroup and outgroup sharing, and (c) assess their reasons for why they might believe ingroup or outgroup giving is nicer. In the survey,

participants were asked to report their own sharing behavior in the token-sharing task by selecting one of the four options: (1) gave more to people in my own color group, (2) gave the same to people in each color group, (3) gave more to people in the other color group, and (4) don't remember. No participant responded that they did not remember how they shared their tokens. To test which scenario participants perceived as nicer, the next item participants answered was: "Would you think someone is nicer if they gave more tokens to their own color group or to the other color group?" and were given two response options to choose from: (1) own group and (2) other group. This question was followed by a free response question: "Why do you think so?". Due to time constraints, not all participants could stay to complete the survey, so we collected responses from 60 participants (30 females) and eliminated 1 participant from the analysis due to incomplete answers.

Results

Token-sharing task (Phase 1): Similar to Study 1, we examined how participants shared their tokens with ingroup and outgroup members when observed and not observed. In order to allow a direct comparison of results across studies, we report results from a general linear mixed-effects regression model based on the final model structure used in Study 1.⁵ Tests run prior to creating regression models revealed low collinearity among predictor variables (all VIFs < 2.3). No significant effect of gender was observed, and following the model used in Study 1, it was not included. Model comparisons indicated no difference between a reduced model with only Group Sharing Type as a predictor variable and the full model ($\chi^2(7) = .41, p = .813$). The overall model fit was $R^2 = .89$, indicating substantial goodness of fit. An analysis of each predictor variable indicated that Group Sharing Type

⁵ The final model specification was: Percentage of Tokens Shared ~ Group Sharing Type + Observer condition + Group Sharing Type*Observer condition + (1 | Participant /Group Sharing Type).

predicted 99.02% unique variance, Observer condition predicted .23% and the interaction between Group Sharing Type and Observer condition predicted .75%.

As in Study 1, we found a significant effect of Group Sharing Type, with participants donating significantly more tokens to ingroup members ($M = 49\%$, $SD = .23$) than to outgroup members ($M = 33\%$, $SD = .24$), $F(1, 78.58) = 40.55$, $p < .001$. However, unlike our finding for children in Study 1, the presence of an observer did not appear to affect adults' sharing (see **Fig. 3**). Participants who were observed during the task ($M = 41\%$, $SD = .26$) shared similarly to participants who were not observed ($M = 42\%$, $SD = .24$), $F(1, 79.08) = .09$, $p = .759$. Also, as in Study 1, we did not find an interaction between Observer condition and Group Sharing Type, $F(1, 78.58) = .31$, $p = .581$. Overall, while we found a strong and significant effect of Group Sharing Type on adult giving, we did not find evidence that outgroup giving was influenced more by reputational concerns than ingroup giving. More generally, in this paradigm, adults appeared to be less concerned than children with reputation management, despite exhibiting other well-attested effects, such as a robust ingroup preference.

Figure 3: Percentage of tokens given by Observer condition (Observer, No Observer) and Group Sharing Type (ingroup, outgroup). Error bars indicate mean standard error, and violin plots show density distribution of responses.

Evaluation task (Phase 2): Similar to Study 1, participants' niceness ratings (1= very, very, mean...6= very, very, nice) in the evaluation task were analyzed using model comparisons between reduced and fuller models.⁶ Likelihood ratio tests indicated that adding Resource Allocation to the reduced model significantly increased its goodness of fit $\chi^2(3) = 764.8, p < .001$, but adding the interaction between Resource Allocation and Group Sharing Type did not ($p = .929$) nor did adding Observer condition ($p = .978$). Correlations computed prior to generating the full regression model revealed low collinearity among predictor variables (all VIFs = 1). In the final model, Resource Allocation predicted 69.72% unique variance, Group Sharing Type predicted .01%, and 30.27% of the variance in participants'

⁶ The final model specification was: Average Niceness Ratings ~ Group Sharing Type + Resource Allocation.

niceness ratings was not explained by the model. The overall model fit was $R^2 = .70$, indicating moderately high goodness of fit.

Unlike findings from Study 1 with children, no effect of Group Sharing Type was observed among adults—participants rated scenarios of ingroup sharing ($M = 4.27$, $SE = .05$) similarly to scenarios of outgroup sharing ($M = 4.29$, $SE = .05$), $F(1, 635) = .13$, $p = .720$. Similar to Study 1, and as expected, a significant effect of Resource Allocation was found ($F(3, 635) = 377.43$, $p < .001$), such that participants rated sharing 7 tokens as nicer than sharing 5, 2, or 0 tokens (all HSDs, $p < .001$), sharing 5 tokens as nicer than sharing 2 or 0 tokens (all HSDs, $p < .001$), and sharing 2 tokens as nicer than sharing 0 tokens (HSD, $p < .001$) (see **Fig. 4**). Thus, we found a strong and significant effect of Resource Allocation on niceness ratings, but no effect of Observer condition, and no preference for ingroup vs. outgroup giving.

Figure 4: Adults' average niceness ratings (1 = very, very, mean, 6 = very, very, nice) by Resource Allocation and Sharing Type (ingroup giving, outgroup giving).

Sharing Survey (Phase 3): To further explore the question of whether adults perceive ingroup giving as nicer than outgroup giving, we analyzed their responses to the sharing survey. Results are reported in **Table 1**. A total of 59 participants (29 females) were included in the analysis. Of those participants 52% reported that they gave more tokens to ingroup members than outgroup members, while 46% reported that they distributed their tokens equally between groups, and 2% reported that they gave more tokens to outgroup members. However, interestingly, 39% of participants behaved differently from their self-reported allocations, with most (57%) incorrectly reporting that they distributed their tokens equally between groups, whereas they actually exhibited an ingroup bias. Also, when asked to explicitly contrast ingroup and outgroup giving, 81% of respondents indicated that giving to outgroup members is nicer than giving to ingroup members—a result that is compatible with participants' exaggeration of the extent to which they shared with outgroup members. The most common explanation that participants gave for this judgment was that it is more selfless to give to another group since it decreases the chances of one's own group benefitting and thus requires greater sacrifice. Many other participants mentioned that it is more difficult, and less common, to give to people who share no similarities or direct relation with you, thereby making outgroup giving the more generous act.

Table 1

Adult Evaluations of Ingroup and Outgroup Giving Organized by Self-reported Token Distributions

How did you share your tokens?	Which is nicer?			
	Ingroup giving		Outgroup giving	
	<i>Frequency</i>	<i>Percent</i>	<i>Frequency</i>	<i>Percent</i>
Gave more to ingroup	8	72.7	23	47.92
Distributed equally between groups	3	27.3	24	50
Gave more to outgroup	0	0	1	2.08
Total	11	100	48	100

Discussion

In Study 2 we tested whether reputation concerns motivate giving to outgroup and ingroup members in adults, and how adults evaluate these different forms of giving when judging other people. We found that adults, like children, showed comparable observer effects when giving to both outgroup and ingroup members. However, adults were less affected by the presence of an observer and showed a stronger bias to share with ingroup members than children. Further, in the evaluation task, adults based their niceness ratings on the number of tokens shared rather than the type of sharing that occurred (ingroup vs. outgroup sharing), which is likely why we observed no differences between how adults rated scenarios where 0 stickers were shared with ingroup versus outgroup members. Another possibility is that the format of the evaluation task was better suited for gauging children's moral evaluations rather than those of adults, which is why we included an additional survey in Study 2. Thus, the difference we observed between children and adults in their niceness perceptions of ingroup and outgroup giving could be partly due to having only asked adults to

make a forced-choice between the two forms of giving. Interestingly, despite giving more to ingroup members, adults subsequently reported in the survey that they shared equally across groups and indicated that giving to outgroup members is nicer than giving to ingroup members when asked about this explicitly – a possible explanation for why they under-reported their own ingroup bias.

General Discussion

Theories of prosocial behavior in adults argue that ingroup giving is guided more by empathic concerns, and less by concerns related to reputation, relative to outgroup giving (Aboud & Levy, 2000; Stürmer et al., 2005, 2006). Based on this literature, we asked whether children might reason differently about reputation concerns for ingroup and outgroup giving. Following previous studies, Study 1 operationalized reputation concerns by asking children to share resources in a minimal-group paradigm, either while being observed or privately. We also asked children to judge the giving behaviors of others. Surprisingly, we found that, while children shared more resources when being observed, this effect was just as large for ingroup giving as for outgroup giving. In addition, we found that children judged others to be nicer when they shared with ingroup members as opposed to outgroup members. In Study 2, we found that adults also showed a clear ingroup bias when sharing resources between groups, but, unlike children, they exhibited a general indifference to observer effects. Also, unlike children, adults identified outgroup giving as nicer than ingroup giving when explicitly asked to make a choice between the two. Together, these results suggest that, at least in the context of giving to members of minimal groups, reputation concerns do not differ significantly between ingroup and outgroup giving in children or adults.

In Study 1, we found that, though children generally favor members of their ingroup, when a neutral observer is present, children's sharing behavior increases similarly towards ingroup and outgroup members. This finding is notable because, although many studies have

examined cases where children favor their ingroup and disfavor outgroup members (e.g., Aboud, 2003; Spielman, 2000; Tajfel & Turner, 2004), few have explored how children manage their reputations when interacting with different group members and when observed by a neutral onlooker. Here, we provide evidence that children are equally sensitive to reputation concerns when sharing with outgroup and ingroup members.

Although children in our study were sensitive to the presence of an observer when sharing their own resources, we found that their evaluations of third-party giving did not differ when conducted in the presence or absence of an observer. One reason that children were insensitive to this factor may be that it was less salient than in previous work that reported observer effects. In our study, children were assigned to evaluate givers who were observed or not observed between subjects (which corresponded with whether the child was themselves observed when performing the sharing task). In contrast, other studies (e.g., Heyman et al., 2013; 2016) directly contrasted public versus private giving within subjects, making explicit that the givers shared either publicly or privately with the intention of revealing or concealing their act of sharing. Thus, it is possible that children in our study were not sensitive to the observer condition when making their evaluations.

Relatedly, our finding that observer effects were less robust in adults than in children may be due to emphasizing the presence of an observer more to children than adults in an effort to make the task instructions age appropriate for each group. For example, stronger observer effects might have been found if we had reminded adults that they were being watched and evaluated at the start of each trial. Also possible is that children generally have greater concerns with how they will be judged by others (Ruggeri et al., 2017; Wolf, Bazargani, Kilford, Dumontheil, Blakemore, 2015). Finally, our study is not unique in failing to find observer effects in adults. Although such effects have been found in some previous studies (Bateson et al., 2006; Haley & Fessler, 2005; Powell, Roberts, & Nettle, 2012), others

do not find such effects (Carbon & Hesslinger, 2011; Lamba & Mace, 2010; Raihani & Bshary, 2012), suggesting that they are not robust across different experimental contexts (Fehr & Schneider, 2010; Rigdon et al., 2009).

In addition to examining sharing behavior, Study 1 examined children's evaluations of how others share resources. Here, we found that children rated ingroup sharing as significantly nicer than outgroup sharing. This was in contrast to the evaluations of adults, who viewed outgroup giving as nicer, sometimes noting that giving to outgroup members is less likely to be driven by self-serving ulterior motives. We considered two possible interpretations of this effect. First, children may evaluate ingroup giving as nicer because, unlike adults, they fail to discount self-serving motives when judging other people's giving (Heyman et al., 2013), and therefore fail to discount ingroup giving. A second possibility is that children view ingroup giving as nicer because they feel a strong obligation to their group. Compatible with this possibility, past studies show that children expect individuals to prioritize ingroup members over outgroup members (DeJesus et al., 2014, Olson & Spelke, 2008), and evaluate loyal group members as nicer, more likeable, and more trustworthy than disloyal group members (Castelli et al., 2007; Misch, Over, & Carpenter, 2014).

Unlike children, when adults in Study 2 were asked to judge other people's acts of giving in the evaluation task, they based their judgments on the overall quantity of resources shared and did not rate ingroup giving differently from outgroup giving. However, when asked to directly compare the two forms of giving in a follow-up survey, adults identified outgroup giving as nicer than ingroup giving. Adults also exaggerated the extent to which they gave to the two groups equitably. One possibility is that adults forgot how they distributed their tokens across all trials. Another possibility is that adults knowingly exaggerated how much they gave to outgroup members in order to present a favorable image of themselves: participants seemed to be aware that other individuals also favor their own

group when sharing resources, since many expressed in survey responses that outgroup giving is nicer precisely because it is more unexpected than ingroup giving. A third possibility is that adults were biased to recall their decisions or actions in a way that maintains their desired self-views (e.g., I am a fair and generous person; Alicke & Sedikides, 2009; Guenther & Alicke, 2008).

This returns us to the question of why adults think that it is nicer to direct acts of giving to individuals who are not in one's own group? One possibility is that this effect is due to a prior expectation that people should share more with ingroup members, making it exceptionally nice to give to members of an outgroup. For example, if a parent were to throw their child a birthday party we might not perceive this act as unusually generous, whereas if that same parent funded a birthday party for a child that was not their own, we might view this act as more deserving of praise, since it exceeds the expectations that we have for that giver-recipient relationship. Similarly, we might negatively judge a parent who throws birthday parties for other children, but not their own, because we expect that parents should first fulfill their obligation to their own child before extending their generosity to an outgroup member. Compatible with this line of reasoning, research regarding charitable giving and aid indicates that adults feel an obligation to first help domestic victims, who they perceive as belonging to their ingroup, before extending help to international victims, who they perceive as outgroup members (Cuddy, Rock, and Norton, 2007; Kogut & Ritov, 2007). The statistics for charitable giving reflect these group differences: Americans donated nearly 4 times more to Hurricane Katrina efforts than to Indian Ocean tsunami relief, though the death toll for the tsunami was estimated to be 190 times more than that of Hurricane Katrina (Kost, Tran, Tuntideelert, Kulrattanamaneepon, & Peungposop, 2006), and in 2018 the bulk of private charity in the U.S. was directed to local causes, with only 5% of total donations going to international causes (Giving USA Foundation, 2019). In the current study, it is possible that participants rated outgroup giving as nicer on the assumption that anyone who shares with

outgroup members has already given to their own group to some extent, thus making that person exceptionally generous.

Our findings leave open a number of important questions. First, while our results indicate that children are concerned with reputation whether when sharing with ingroup or outgroup members, it is likely that their motives for each form of giving nevertheless differ importantly, and that empathic concerns may play a greater role in ingroup giving than in outgroup giving – a possibility that we did not directly test in this study. Second, we cannot rule out the possibility that children in the Observer condition gave more resources out of a general concern with wanting to behave nicely rather than concerns with being directly evaluated (although see Fujii et al., 2015 for an account where young children's sharing behavior was not affected by indirect cues of evaluation). Third, we used a neutral observer in our experimental design since we were most interested in the relationship between reputation concerns more generally and their effect on ingroup and outgroup giving; thus, our findings speak only to sharing patterns that occur in the presence of a neutral audience. It is possible that we would have found a stronger observer effect if the group membership of the observer (e.g. Engelmann et al., 2013) or the observer's relationship to the participant (e.g., Buhrmester et al., 1992) had been manipulated. Finally, further work is needed to investigate how our results generalize to different targets and populations. We used only female targets who were white, so it will be important to examine how our results generalize to male targets and other races. It is also unclear how our results will generalize to familiar social or cultural groups (Nesdale et al., 2005; Simon, Stürmer, & Steffens, 2000) or to close friends and family members versus strangers (Buhrmester et al., 1992; Costin & Jones, 1992; Moore, 2009; Olson & Spelke, 2008).

The current study is the first to show that children are equally affected by reputation concerns when giving to ingroup and outgroup members. Here we found that even the

youngest children shared more when the strategic, and potentially selfish opportunity for reputation enhancement was present. This raises the question of whether activating more prosocial motives, such as empathic concern, could encourage children to behave more cooperatively in an intergroup context. Our findings are also the first to show that children, unlike adults, evaluate ingroup sharing as nicer than outgroup sharing, indicating a developmental shift between childhood and adulthood in how individuals reason about ingroup and outgroup giving.

Acknowledgements

We thank Del Mar Heights Elementary School for their involvement with recruiting participants, and Miriam Rubenson, Sophie Standen, Nestor Tulagan, Vennisia Mo, Vaishnavi Nandanam, Sydney Ghazarian and Kaitlyn Peck for their help in testing participants. We also thank Tim Lew, Katie Wagner, and Rose Schneider for their help with data analysis.

References

- Aboud, F. E. (2003). The formation of ingroup favoritism and outgroup prejudice in young children: Are they distinct attitudes?. *Developmental Psychology*, 39, 48-60.
doi:10.1037/0012-1649.39.1.48.
- Aboud, F. E., & Levy, S. R. (2000). Interventions to reduce prejudice and discrimination in children and adolescents. In S. Oskamp (Ed.), *"The Claremont Symposium on Applied Social Psychology" Reducing prejudice and discrimination* (pp. 269-293). Mahwah, NJ: Lawrence Erlbaum Associates.
- Abrams, D., Rutland, A., Ferrell, J., & Pelletier, J. (2008). Children's judgments of disloyal and immoral peer behavior: Subjective group dynamics in minimal intergroup contexts. *Child Development*, 79, 444-461. doi:10.1111/j.1467-8624.2007.01135.x.
- Alicke, M. D., & Sedikides, C. (2009). Self-enhancement and self-protection: What they are and what they do. *European Review of Social Psychology*, 20, 1-48.
doi:10.1080/10463280802613866.
- Aloise-Young, P.A. (1993). The development of self-presentation: Self-promotion in 6-to-10-year-old children. *Social Cognition*, 11, 201-222. doi:10.1521/soco.1993.11.2.201
- Banerjee, R. (2002). Audience effects on self-presentation in childhood. *Social Development*, 11, 487-507. doi:10.1111/1467-9507.00212.
- Barclay, P. (2016). Biological markets and the effects of partner choice on cooperation and friendship. *Current Opinion in Psychology*, 7, 33-38.
doi:10.1016/j.copsyc.2015.07.012.
- Bateson, M., Nettle, D., & Roberts, G. (2006). Cues of being watched enhance cooperation in a real-world setting. *Biology Letters*, 2, 412-414. doi:10.1098/rsbl.2006.0509
- Batson, C.D. (1991). *The altruism question: Toward a social-psychological answer*. Hillsdale, NJ: Erlbaum.

- Batson, C. D. (1994). Why act for the public good? Four answers. *Personality and Social Psychology Bulletin*, 20, 603-610. doi:10.1177/0146167294205016.
- Bernhard, H., Fischbacher, U. & Fehr, E. (2006). Parochial altruism in humans. *Nature*, 442, 912-915. doi:10.1038/nature04981.
- Blake, P. R., & McAuliffe, K. (2011). "I had so much it didn't seem fair": Eight-year-olds reject two forms of inequity. *Cognition*, 120, 215-224. doi:10.1016/j.cognition.2011.04.006.
- Bock, G. W., & Kim, Y. G. (2002). Breaking the myths of rewards: An exploratory study of attitudes about knowledge sharing. *Information Resources Management Journal (IRMJ)*, 15, 14-21. doi:10.4018.irmj.2002040102.
- Buhrmester, D., Goldfarb, J., & Cantrell, D. (1992). Self- presentation when sharing with friends and non-friends. *Journal of Early Adolescence*, 12, 61-79. doi:10.1177/0272431692012001004.
- Butzin, C. A., & Dozier, M. (1986). Children's use of ulterior motive information. *Child Development*, 1375-1385. doi:10.2307/1130417.
- Carbon, C. C., & Hesslinger, V. M. (2011). Bateson et al.'s (2006) cues-of-being-watched paradigm revisited. *Swiss Journal of Psychology*, 70, 203-210. doi:10.1024/1421-0185/a000058.
- Castelli, L., De Amicis, L., & Sherman, S. J. (2007). The loyal member effect: On the preference for ingroup members who engage in exclusive relations with the ingroup. *Developmental Psychology*, 43, 1347-1359. doi:10.1037/0012-1649.43.6.1347.
- Costin, S. E., & Jones, D. C. (1992). Friendship as a facilitator of emotional responsiveness and prosocial interventions among young children. *Developmental Psychology*, 28, 941-947. doi:10.1037/0012-1649.28.5.941.

- Critcher, C. R., & Dunning, D. (2011). No good deed goes unquestioned: Cynical reconstruals maintain belief in the power of self-interest. *Journal of Experimental Social Psychology*, 47, 1207-1213. doi:10.1016/j.jesp.2011.05.001.
- Cuddy, A. J., Rock, M. S., & Norton, M. I. (2007). Aid in the aftermath of Hurricane Katrina: Inferences of secondary emotions and intergroup helping. *Group Processes & Intergroup Relations*, 10, 107-118. doi:10.1177/1368430207071344.
- DeJesus, J.M., Rhodes, M. & Kinzler, K.D. (2014). Evaluations versus expectations: Children's divergent beliefs about resource distribution. *Cognitive Science*, 38, 178-193. doi:10.1111/cogs.12093.
- Dunham, Y., Baron, A. S., & Carey, S. (2011). Consequences of "minimal" group affiliations in childhood. *Child Development*, 82, 793-811. doi:10.1111/j.1467-8624.2011.01577.x.
- Dutra, N. B., Boccardi, N. C., Silva, P. R. R., de Oliveira Siqueira, J., Hattori, W. T., Yamamoto, M. E., & de Alencar, A. I. (2018). Adult criticism and vigilance diminish free riding by children in a social dilemma. *Journal of Experimental Child Psychology*, 167, 1-9. doi:10.1016/j.jecp.2017.10.007.
- Engelmann, J.M., Herrmann, E., & Tomasello, M. (2012). Five-year olds, but not chimpanzees, attempt to manage their reputations. *PLoS One*, 7. e48433. doi:10.1371/journal.pone.0048433.
- Engelmann, J.M., Over, H., Herrmann, E. & Tomasello, M. (2013). Young children care more about their reputation with ingroup members and potential reciprocators. *Developmental Science*, 16, 952-958. doi:10.1111/desc.12086.
- Fehr, E., Bernhard, H. & Rockenbach, B. (2008). Egalitarianism in young children. *Nature*, 454, 1079-1084. doi:10.1038/nature07155.

- Fehr, E. & Fischbacher, U. (2003). The nature of human altruism. *Nature*, 425, 785-791.
doi:10.1038/nature02043.
- Fehr, E., & Schneider, F. (2010). Eyes are on us, but nobody cares: are eye cues relevant for strong reciprocity?. *Proceedings of the Royal Society of London B: Biological Sciences*, 277, 1315-1323. doi:10.1098/rspb.2009.1900.
- 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, 275-283.
doi:10.1111/desc.12304.
- Fujii, T., Takagishi, H., Koizumi, M., & Okada, H. (2015). The effect of direct and indirect monitoring on generosity among preschoolers. *Scientific Reports*, 5, 9025.
doi:10.1038/srep09025.
- Gintis, H., Smith, E. A. & Bowles, S. (2001). Costly signaling and cooperation. *Journal of Theoretical Biology*, 213, 103-119. doi:10.1006/jtbi.2001.2406.
- Giving USA Foundation (2019). The annual report on philanthropy for the year 2018.
Indianapolis: The Center on Philanthropy at Indiana University.
- Guenther, C. L., & Alicke, M. D. (2008). Self-enhancement and belief perseverance. *Journal of Experimental Social Psychology*, 44, 706-712. doi:10.1016/j.jesp.2007.04.010
- Halabi, S., Dovidio, J. F., & Nadler, A. (2008). When and how do high status group members offer help: Effects of social dominance orientation and status threat. *Political Psychology*, 29, 841-858. doi:10.1111/j.1467-9221.2008.00669.x.
- Haley, K. J., & Fessler, D. M. (2005). Nobody's watching?: Subtle cues affect generosity in an anonymous economic game. *Evolution and Human behavior*, 26, 245-256.
doi:10.1016/j.evolhumbehav.2005.01.002.
- Ham, J., & Vonk, R. (2011). Impressions of impression management: Evidence of spontaneous suspicion of ulterior motivation. *Journal of Experimental Social Psychology*, 47, 466-471. doi:10.1016/j.jesp.2010.12.008.

- Heyman, G. D., Barner, D., Heumann, J., & Schenck, L. (2013). Children's sensitivity to ulterior motives when evaluating prosocial behavior. *Cognitive Science*, 38, 683-700. doi:10.1111/cogs.12089.
- Heyman, G. D., Fu, G., Barner, D., Zhishan, H., Zhou, L., & Lee, K. (2016). Children's evaluation of public and private generosity and its relation to behavior: Evidence from China. *Journal of experimental child psychology*, 150, 16-30. doi:10.1016/j.jecp.2016.05.001.
- Hopkins, N., Reicher, S., Harrison, K., Cassidy, C., Bull, R., & Levine, M. (2007). Helping to improve the group stereotype: On the strategic dimension of prosocial behavior. *Personality and Social Psychology Bulletin*, 33, 776-788. doi:10.1177/0146167207301023.
- House, B., Henrich, J., Sarnecka, B., & Silk, J. B. (2013). The development of contingent reciprocity in children. *Evolution and Human Behavior*, 34, 86-93. doi:10.1016/j.evolhumbehav.2012.10.001.
- Klein, O., & Azzi, A. E. (2001). The strategic confirmation of meta-stereotypes: How group members attempt to tailor an out-group's representation of themselves. *British Journal of Social Psychology*, 40, 279-293. doi:10.1348/014466601164759
- Kogut, T., & Ritov, I. (2007). "One of us": Outstanding willingness to help save a single identified compatriot. *Organizational Behavior and Human Decision Processes*, 104, 150-157. doi:10.1016/j.obhdp.2007.04.006.
- Kost, G. J., Tran, N. K., Tuntideelert, M., Kulrattanamaneepon, S., & Peungposop, N. (2006). Katrina, the tsunami, and point-of-care testing: Optimizing rapid response diagnosis in disasters. *American Journal of Clinical Pathology*, 126, 513-520. doi:10.1309/NWU5E6T0L4PFCBD9.
- Kuznetsova, A., Brockhoff, P.B., & Christensen, R.H.B. (2016). lmerTest: Tests in linear mixed effects models. *R package version*, 2, 0-252015.

- Lamba, S., & Mace, R. (2010). People recognize when they are really anonymous in an economic game. *Evolution and Human Behavior*, 31, 271-278.
doi:10.1016/j.evolhumbehav.2010.02.002.
- Leimgruber, K.L., Shaw, A., Santos, L.R. & Olson, K.R. (2012). Young children are more generous when others are aware of their actions. *PLoS One*, 7, e48292.
doi:10.1371/journal.pone.0048292.
- Levine, M., Prosser, A., Evans, D. & Reicher, S. (2005). Identity and emergency intervention: How social group membership and inclusiveness of group boundaries shapes helping behavior. *Personality and Social Psychology Bulletin*, 31, 443-453.
doi:10.1177/0146167204271651.
- Mifune, N., Hashimoto, H., & Yamagishi, T. (2010). Altruism toward in-group members as a reputation mechanism. *Evolution and Human Behavior*, 31, 109-117.
doi:10.1016/j.evolhumbehav.2009.09.004.
- Misch, A., Over, H., & Carpenter, M. (2014). Stick with your group: Young children's attitudes about group loyalty. *Journal of Experimental Child Psychology*, 126, 19-36.
doi:10.1016/j.jecp.2014.02.008.
- Moore, C. (2009). Fairness in children's resource allocation depends on the recipient. *Psychological Science*, 20, 944-948. doi:10.1111/j.1467-9280.2009.02378.x.
- Nesdale, D., & Flessner, D. (2001). Social identity and the development of children's group attitudes. *Child Development*, 72, 506-517. doi:10.1111/1467-8624.00293.
- Nesdale, D., Griffith, J., Durkin, K., & Maass, A. (2005). Empathy, group norms and children's ethnic attitudes. *Journal of Applied Developmental Psychology*, 26, 623-637. doi:10.1016/j.appdev.2005.08.003.
- Ng, R., Heyman, G.D., & Barner, D. (2011). Collaboration promotes proportional reasoning about resource distribution in young children. *Developmental Psychology*, 47, 1230-1238. doi:10.1037/a0024923.

- Olson, K. R. & Spelke, E. S. (2008). Foundations of cooperation in young children. *Cognition*, 108, 222-231. doi:10.1016/j.cognition.2007.12.003.
- Padilla-Walker, L.M., & Carlo, G. (2014). The study of prosocial behavior: Past, present, and future. In L.M. Padilla-Walker & G. Carlo (Eds.), *Prosocial development: A multidimensional approach*, (pp.3-16). New York, NY: Oxford University Press.
- Paulus, M. (2016). Friendship trumps neediness: The impact of social relations and others' wealth on preschool children's sharing. *Journal of Experimental Child Psychology*, 146, 106-120. doi:10.1016/j.jecp.2016.02.001.
- Piazza, J., Bering, J.M., & Ingram, G. (2011). "Princess Alice is watching you": Children's belief in an invisible person inhibits cheating. *Journal of Experimental Child Psychology*, 109, 311-320. doi:10.1016/j.jecp.2011.02.003.
- Powell, K. L., Roberts, G., & Nettle, D. (2012). Eye images increase charitable donations: Evidence from an opportunistic field experiment in a supermarket. *Ethology*, 118, 1096-1101. doi:10.1111/eth.12011.
- Raihani, N. J., & Bshary, R. (2012). A positive effect of flowers rather than eye images in a large-scale, cross-cultural dictator game. In *Proceedings of the Royal Society B: Biological Science*. doi:10.1098/rspb.2012.0758.
- Rapp, D. J., Engelmann, J. M., Herrmann, E., & Tomasello, M. (2019). Young children's reputational strategies in a peer group context. *Developmental Psychology*, 55, 329-336. doi:10.1037/dev0000639.
- Rigdon, M., Ishii, K., Watabe, M., & Kitayama, S. (2009). Minimal social cues in the dictator game. *Journal of Economic Psychology*, 30, 358-367. doi:10.1016/j.joep.2009.02.002
- Ruggeri, A., Luan, S., Keller, M., & Gummerum, M. (2017). The influence of adult and peer role models on children' and adolescents' sharing decisions. *Child Development*, 89, 1589-1598. doi:10.1111/cdev.12916.

- Saucier, D. A., Miller, C. T., & Doucet, N. (2005). Differences in helping whites and blacks: A meta-analysis. *Personality and Social Psychology Review*, 9, 2-16.
doi:10.1207/s15327957pspr0901_1.
- Simon, B., Stürmer, S., & Steffens, K. (2000). Helping individuals or group members? The role of individual and collective identification in AIDS volunteerism. *Personality and Social Psychology Bulletin*, 26, 497-506. doi:10.1177/0146167200266008.
- Shaw, A., Monitnari, N., Piovesan, M., Olson, K.R., Gino, F. & Norton, M.I. (2014). Children develop a veil of fairness. *Journal of Experimental Psychology*, 143, 363-375. doi:10.1037/a0031247.
- Silk, J. B., & House, B. R. (2011). Evolutionary foundations of human prosocial sentiments. *Proceedings of the National Academy of Sciences*, 108, 10910-10917. doi:10.1073/pnas.1100305108.
- Spielman, D. A. (2000). Young children, minimal groups and dichotomous categorization. *Personality and Social Psychology Bulletin*, 26, 1433-1441. doi:10.1177/0146167200263010.
- Stürmer, S., Snyder, M., Kropp, A., & Siem, B. (2006). Empathy-motivated helping: The moderating role of group membership. *Personality and Social Psychology Bulletin*, 32, 943-956. doi:10.1177/0146167206287363.
- Stürmer, S., Snyder, M., & Omoto, A. M. (2005). Prosocial emotions and helping: the moderating role of group membership. *Journal of Personality and Social Psychology*, 88, 532-546. doi:10.1037/0022-3514.88.3.532.
- Tajfel, H., Billig, M. G., Bundy, R. P. & Flament, C. (1971). Social categorization and intergroup behavior. *European Journal of Social Psychology*, 1, 149-178. doi:10.1002/ejsp.2420010202.

- Tajfel, H., & Turner, J. C. (2004). The social identity theory of intergroup behavior. In J. T. Jost & J. Sidanius (Eds.), *Political psychology: Key readings* (pp. 276-293). London: Psychology Press.
- Van Leeuwen, E., & Täuber, S. (2010). The strategic side of outgroup helping. In S. Stürmer & M. Snyder (Eds.), *The psychology of prosocial behavior: Group processes, intergroup relations, and helping*, (pp. 81-99). Chichester, UK: Wiley-Black.
- Van Vugt, M., & Hardy, C. L. (2010). Cooperation for reputation: Wasteful contributions as costly signals in public goods. *Group Processes & Intergroup Relations*, 13, 101-111. doi:10.1177/1368430209342258.
- Wolf, L. K., Bazargani, N., Kilford, E. J., Dumontheil, I., & Blakemore, S. J. (2015). The audience effect in adolescence depends on who's looking over your shoulder. *Journal of Adolescence*, 43, 5-14. doi:10.1016/j.adolescence,2015.05.003.
- Yamagishi, T., & Mifune, N. (2008). Does shared group membership promote altruism? Fear, greed, and reputation. *Rationality and Society*, 20, 5-30. doi:10.1177/1043463107085442.
- Yu, J., Zhu, L., & Leslie, A. M. (2016). Children's sharing behavior in mini-dictator games: The role of in-group favoritism and theory of mind. *Child Development*, 87(6), 1747-1757. doi:10.1111/cdev.12635.

Appendix A

Competitive Stories of Minimal Groups in Study 1, Phase 1:

The Orange group really wants to win against the Green group, and the Green group really wants to win against the Orange group. The Green group wants to show everyone that they're the best group, and the Orange group wants to show everyone that they're the best group.

At lunchtime, the Orange group always wants to sit at the table first, and the Green group always wants to sit at the table first.

When it's time to play games, the Green group always wants to be the winner and the Orange group always wants to be the winner.

At school, the Orange group always wants to be the first group to get on the bus, and the Green group always wants to be the first group to get on the bus.

*Note: Experimenter counterbalanced whether Orange group or Green group was mentioned first across participants.

Appendix B

Additional Analyses from Study 1, Phase 2

Past work shows that children's judgments of how individuals *should* share resources with ingroup and outgroup members diverge from how they expect individuals to actually behave (DeJesus et al., 2014). Here, we tested whether children behaved according to their own normative standards, or whether their behaviors diverged from what they judged to be nice. To do this, we compared children's sharing in Phase 1 with their evaluations in Phase 2. We computed each participant's average number of stickers shared in Phase 1 ('Mean Stickers Donated') as well as their 'Ingroup Sharing Bias', which was calculated by subtracting the mean number of stickers donated to outgroup members from the mean number of stickers donated to ingroup members. We then tested whether these factors predicted children's niceness ratings in Phase 2 using model comparisons between a reduced linear regression model—the final model used to evaluate children's niceness ratings in Phase 2⁷—and a fuller model which included Age, Mean Stickers Donated and Ingroup Sharing Bias as predictor variables and participants' average niceness ratings as the response variable.⁸ A likelihood ratio test revealed no difference between the full model and the reduced model $\chi^2(2) = 3.33, p = .189$, indicating that children's own sharing behavior in Phase 1 was not a robust predictor for how they evaluated the sharing behavior of others in Phase 2.

⁷ Average Niceness Ratings ~ Group Sharing Type + Resource Allocation + Age.

⁸ The full model specification was: Average Niceness Ratings ~ Mean Stickers Donated + Ingroup Sharing Bias + Group Sharing Type + Resource Allocation + Age.