Journal of Experimental Psychology: General
2017, Vol. 146, No. 4, 485–494

0096-3445/17/$12.00 http://dx.doi.org/10.1037/xge0000244

Fairness Overrides Group Bias in Children's Second-Party Punishment

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Adults and children show ingroup favoritism in their 3rd-party punishment of cooperative norm violations, suggesting that group loyalty importantly shapes enforcement of cooperation. Ingroup favoritism additionally influences punishment of unfairness in the 2-party ultimatum game, in which people are directly affected by unfair behavior. However, the directionality of this relationship is unclear: In some cases, people are more forgiving of ingroup unfairness, whereas in others they are less forgiving. Here we aim to disambiguate this relationship by studying its origins in development, asking whether ingroup favoritism influences children's offers to others and whether it affects their responses to being treated unfairly. Six- to 10-year-olds played a group-based ultimatum game after being assigned to minimal groups and made proposals to—and responded to offers from—members of their in- and outgroups. We tested children's real bargaining behavior in the absence of deception. Results showed that, regardless of group membership, children's primary concern lay with fairness: Participants regularly offered equal splits and were more likely to reject unfair offers than fair offers. Consistent with past work, older children made more generous proposals than did younger children. Although our group manipulation successfully induced ingroup bias in participants, neither children's proposals nor responses were influenced by group membership. This suggests that second-party punishment of fairness norm violations is unbiased early in development and points to the potentially important role of experience with different groups in shaping later emerging bias in norm enforcement. We discuss implications for theories regarding when and to what extent group bias influences cooperation.

Keywords: group bias, fairness, ultimatum game, resource allocation, social–cognitive development

Supplemental materials: http://dx.doi.org/10.1037/xge0000244.supp

Human cooperation is governed by social norms—rules that dictate how individuals should behave in cooperative interactions (Fehr & Fischbacher, 2004a). These norms are upheld through rewarding good behavior and sanctioning bad behavior (Andreoni, Harbaugh, & Vesterlund, 2003; Boyd, Gintis, Bowles, & Richerson, 2003; Fehr & Gächter, 2002; Sefton, Shupp, & Walker, 2007). The power of social norms is particularly evident in decisions regarding distributive justice. Adults show a strong preference for fair outcomes (Dawes, Fowler, Johnson, McElreath, & Smirnov, 2007); react aversively to unfair resource distributions (Fehr & Schmidt, 1999); and, critically, punish violations of fairness norms even when doing so is costly (Fehr & Gächter, 2002; Henrich et al., 2006). A large body of work in experimental economics has shown that the costly punishment of fairness norm violations occurs both in two-party contexts (Güth, Schmittberger, & Schwarze, 1982), in which the punisher is the victim of unfairness, and in three-party contexts (Fehr & Fischbacher, 2004b), in which an unaffected third-party witnesses and then punishes unfairness in others.

A striking finding from studies of norm enforcement is that people do not universally punish cooperative norm violations. Rather, decisions about when to punish are influenced by group bias, that is, positive attitudes toward members of one's own group (reviewed in McAuliffe & Dunham, 2016). Most evidence for group bias in punishment comes from studies of third-party punishment. In these studies, a third party learns about selfish behavior that has been perpetrated by an in- or outgroup member and directed to an in- or outgroup member. Findings show that (a) third parties tend to be more forgiving of ingroup selfishness than outgroup selfishness (Baumgartner, Götte, Gügler, & Fehr, 2012; Schiller, Baumgartner, & Knoch, 2014), (b) people are more punitive when uncooperative behavior affects an ingroup member (Bernhard, Fischbacher, & Fehr, 2006), and (c) people are especially punitive when ingroup members are victimized by outgroup members (Bernhard et al., 2006). Building on these findings, a recent study with 6- and 8-year-olds showed that third-party punishment is biased by ingroup favoritism from its inception in child development (Jordan, McAuliffe, & Warneken, 2014), hinting that group loyalty exerts an influence on children's enforcement of fairness norms from early in development.

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We are grateful to the children, parents and faculty at Frenchtown Elementary for allowing us to run our study at their school. We thank Shaina Coogan, Terri Frasca, Channy Hong and Gorana Gonzalez for their help with this study. We would additionally like to thank the Greater Good Science Center at UC Berkeley and the John Templeton Foundation for support.

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Third-party games show that when people are unaffected observers of unfair behavior, their decisions about when and how much to react to unfairness can be importantly influenced by group loyalty. What is not clear from these studies, however, is how people weigh the competing demands of group bias and fairness when they are directly affected by unfair behavior. This is a critical context in which to explore the relationship between group loyalty and fairness because it requires people to resolve this tension when their own resources are more directly at stake. In this context, is ingroup bias strong enough to override responses to unfair treatment? In line with work on third-party punishment, are people more forgiving of unfairness from ingroup members compared to outgroup members?

Recent studies have started to address these questions in adults by examining second-party punishment of unfair offers in ultimatum games (Güth et al., 1982). In this game, one individual (the *proposer*) proposes a division of resources to another individual (the *responder*). The responder can either accept or reject the proposer's offer. If the responder accepts, both players keep their allocations. If the responder rejects, neither player receives a payoff. This game offers a powerful means of studying fairness preferences because it provides insight into both (a) what offers are considered acceptable and (b) how likely individuals are to punish unfairness when it comes at the considerable cost of getting nothing. Unfortunately, studies of group-based ultimatum games with adults have yielded mixed findings, with some evidence suggesting that people are more forgiving of unfairness from ingroup members (Kubota, Li, Bar-David, Banaji, & Phelps, 2013; Valenzuela & Srivastava, 2012) and other evidence suggesting that people are less forgiving of unfairness from ingroup members (McLeish & Oxoby, 2011; Mendoza, Lane, & Amodio, 2014). These conflicting results suggest that group bias can attenuate responses to being treated unfairly but leave the directionality of these effects in question. Further, past research has tended to focus on recipient behavior, leaving the structure of intergroup offers in the ultimatum game unclear. Offers are particularly critical in this case because characterizing group bias in a dyadic interaction requires understanding whether both first moves and the responses to those moves are biased by group membership.

Here we attempt to clarify the relationship between group bias and reactions to unfairness by studying how this relationship emerges in development. Specifically, we examine how children weigh the competing demands of ingroup favoritism and fairness concerns, both of which emerge early in development (e.g., Blake, McAuliffe, & Warneken, 2014; Dunham, Baron, & Banaji, 2008) and both of which may work against the desire to maximize payoffs. If moved primarily by ingroup favoritism, positive regard for ingroup members might lead participants to make higher offers to ingroup members and/or accept lower offers from other ingroup members. However, if moved primarily by fairness—defined here as a desire to minimize inequalities—and/or strategic concerns, participants might make (and accept) primarily fair offers irrespective of group membership. Understanding how the relationship between these two factors plays out across development offers important insight into their relative power and priority, a critical issue over the period during which norm enforcement is first emerging. Thus, our main question here is whether second-party punishment is biased by group membership from its inception. The answer to this question will shed light on the origins and directionality of group bias effects on responses to unfair behavior. For instance, evidence that children selectively enforce fairness norms within their groups would suggest that there is a special relationship between parochialism and cooperative norm enforcement, as suggested by some evolutionary theories of group function (reviewed in McAuliffe & Dunham, 2016).

To induce group bias, we used the minimal groups paradigm, in which participants are assigned to previously unfamiliar artificial groups (Billig & Tajfel, 1973; Tajfel, 1970). The minimal groups paradigm can thus serve as a window into children's generalized reasoning about social groups, uncontaminated by particular histories of social learning with respect to specific real-world groups. Assignment to minimal groups has been shown to successfully induce intergroup bias in children (Dunham, Baron, & Carey, 2011) and to influence children's behavior in allocation tasks (Benozio & Diesendruck, 2015; Vaughan, Tajfel, & Williams, 1981), including a task on third-party punishment (Jordan et al., 2014). We use the ultimatum game, which has previously been adapted for work with children (Sutter, 2007; Takagishi, Kameshima, Schug, Koizumi, & Yamagishi, 2010), to explore whether group membership affects children's proposed resource divisions and their responses to both fair and unfair offers. Using this paradigm, we could explore the following questions: (a) Will children be more forgiving of unfair offers proposed by an ingroup member compared to an outgroup member? and (b) Will children adjust their proposals in line with their preferences for ingroup partners (i.e., offering more to ingroup members) or in line with expectations of ingroup forgiveness (i.e., proposing lower offers to ingroup members, anticipating higher tolerance of unfairness as in Bernhard et al., 2006)?

We used no deception in our task because we were interested in how children would naturally and spontaneously broker deals with real partners when real resources were at stake. Indeed, past research has nearly always fixed offers to fair versus highly unfair levels, but such a methodology does not illuminate children's naturalistic bargaining behavior, especially if highly unfair offers are quite rare in real behavior, which one might expect given children's relatively generous giving in unilateral contexts such as the dictator game (Benenson, Pascoe, & Radmore, 2007; Blake & Rand, 2010). We tested 6- to 10-year-olds for several reasons. First, children in this age range show robust ingroup preferences whether measured with explicit (Raabe & Beelmann, 2011) or implicit (Dunham et al., 2008) measures. Second, they are known to engage in both second- and third-party punishment (McAuliffe, Jordan, & Warneken, 2015; Takagishi et al., 2010). Third, in previous work examining the effects of ingroup favoritism on third-party punishment, children in this age range showed hints of attenuating group bias with age (Jordan et al., 2014), raising the possibility that we would see an age-related decline in the influence of groups on bargaining behavior. Finally, children in this age range frequently share equally with others (Benenson et al., 2007; Blake & Rand, 2010), leading us to expect proposals to be distributed nonuniformly across all possible splits and, indeed, to be skewed toward equality. Given the possibility that many or most offers would be fair, we additionally asked participants to respond to hypothetical proposals that spanned all possible divisions, allowing us to examine how children would react to the full range of possible proposals.

Method

Participants

Participants were 96 children (51 girls) tested at an elementary school in Connecticut. This sample size was selected based on past work using similar methods (Jordan et al., 2014). Parents provided informed consent on letters that had been sent home. After receiving consent forms, we divided participants into one of two age groups: 6- to 7-years-olds (M = 87.16 months ± 5.14; N = 44) and 8- to 10-years-old (M = 111.23 months ± 7.34; N = 52). Several children turned 8 during the course of the study. Of those children, most were correctly tested in their originally assigned age group, but a few were inadvertently paired with older partners and were thus moved to the older age group. In addition to our 96 participants, 14 children were tested in proposer-only roles, and five were tested in responder-only roles. These additional children were tested to ensure that we had a sufficient number of proposals from all age, gender, and group categories before starting the paired game (in the case of the proposer-only children) and to ensure that every proposal made over the course of the game was responded to by a responder. All analyses are based on the 96 children who played both roles, but some of these children responded to offers generated by the children who played only as proposers.

Design

No deception was used in this study. Children made proposals to other participants and responded to offers from other participants. Because we could test only one child at a time, children were tested alone and proposed and responded to partners represented by a drawing of a child on a paper bag (see Figure 1 for diagram of study setup, and see Figure S1 in the online supplemental materials for a photograph of the setup). As proposers, participants offered allocations of tokens to two partners: an ingroup member and outgroup member. As responders, participants responded to two offers: one that had been made by an ingroup proposer and one that had been made by an outgroup proposer. Participants were paired with same-age-group and same-gender in- and outgroup partners.

We counterbalanced the following variables between participants: whether children (a) were first tested as proposers or responders, (b) were first paired with an in- or outgroup partner within proposer and responder roles, (c) were instructed on how to accept or reject offers first, (d) were first told they could give or keep as many beads as they wanted, and (e) sat on the right or left of the apparatus.

Procedure

Introduction to tokens and prizes. Children were introduced to the testing area and asked for their assent to begin the game and filming. They were told that they would be making decisions about wooden beads, which would serve as tokens and be tallied and exchanged for a prize once all children had played the game. To ensure that children understood trading and bead value, we gave them four beads and asked whether they wanted to exchange their beads for four small stickers or one large sticker. Following this exchange, children were asked to rank three prizes (a pencil, a small fabric Frisbee, and a small stuffed animal). Following ranking, the experimenter explained that their ranking aligned with how many beads were needed for each prize: A small number would be needed to exchange for their least preferred prize, whereas a large number would be needed for their favorite prize. We deliberately kept the required number of beads ambiguous so that we could ensure that children were incentivized to collect as many beads as possible while also ensuring that all children would receive their favorite prize at the end of the study.

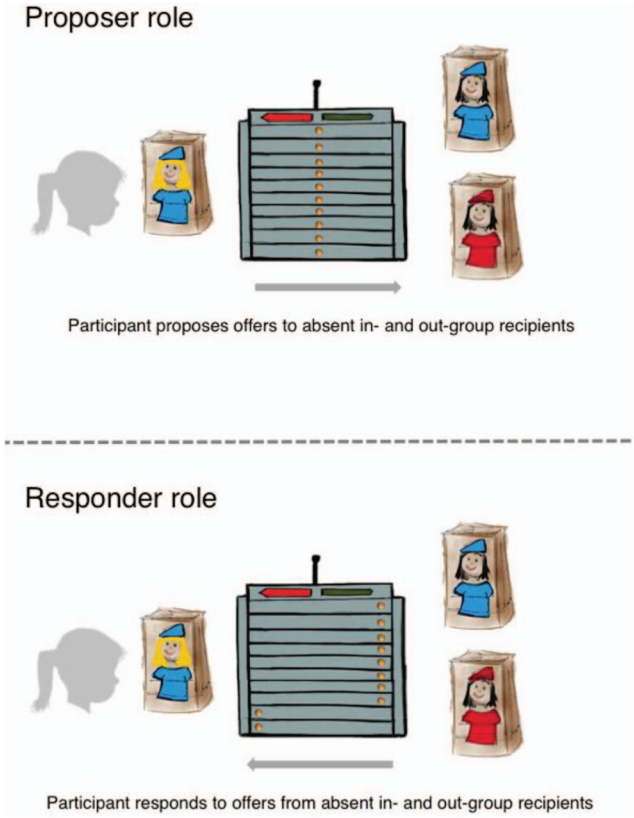

Figure 1. Diagram of experimental setup. Participants played in both proposer and responder roles. Within roles, they were paired with both in- and outgroup partners who were represented by drawings on paper bags. Participants used an apparatus to make and respond to proposals. They apparatus consisted of 10 pods which each contained a bead token. In the proposer role, participants pushed offered beads to their partner's side. In the responder role, participants used the handle to accept offers by pulling the handle toward the green arrow (arrows pointing to the right) or reject offers by pulling the handle toward the red arrow (arrows pointing to the left). See the online article for the color version of this figure.

Minimal group manipulation. Following their introduction to the beads and prizes, children were asked to draw their face on a paper bag that would be used for storing beads. They were then assigned to a team (minimal group) based on their preference between the colors blue and red. Following group assignment, children were asked to color in a T-shirt and hat on their paper bag to signify team membership. In line with past work with both real and minimal groups (Baron & Dunham, 2015; Dunham et al., 2011; Renno & Shutts, 2015), we used a simple forced-choice task

to test whether our group manipulation induced ingroup bias. Participants were presented with five pairs of drawings of girls or boys (gender-matched to the participant) on the red and blue teams. For each pair, children were asked whether they would rather play with the child on the red or blue team. We then tallied their ingroup choices and used this number when analyzing whether our manipulation induced an ingroup bias.

Apparatus introduction and practice. Following the minimal group manipulation, children were introduced to the apparatus used in our task. The apparatus consisted of a solid plastic board with 10 tracks, into each of which was situated a "bead pod" (see Figure 1). Bead pods were small metal capsules large enough to contain a single bead. These pods could be manually pushed to either side of the board. Attached to one side of the apparatus was a metal handle. Once the bead pods were aligned with the outer edges of the board, the handle could be pulled into the green or red zone (marked by a green and red arrow, respectively). Pulling the handle to the green zone caused the beads to be delivered to two side trays, and thus pulling to the green zone resulted in the acceptance of a given distribution of beads. Pulling the handle to the red zone caused the beads to disappear into hidden compartments underneath the plastic board, and thus pulling to the red zone resulted in the rejection of a given distribution of beads. The experimenter demonstrated how to slide the bead pods across the board and how to pull the handle into the green and red zones (handle demonstration was counterbalanced between participants).

Practice trials. Participants were then given two practice trials to test handle comprehension. During practice trials, the experimenter explained that she had two beads and could make one of three decisions: She could (a) keep both beads for herself, (b) give both beads to the participant, or (c) keep one bead and give the other to the participant. The experimenter then explained that "just for fun," she would give one to the participant and keep one for herself. Her decision in doing this was explained so that the participant would not think that equality was the expected norm. Participants were then asked to demonstrate their understanding of the green and red zones. The majority of participants spontaneously did this (96% for green, 92% for red). In cases where participants did not spontaneously pass this comprehension check, they were given further explanation and/or demonstration until they had pulled the handle to both green and red zones.

Proposer and responder trials. During proposer trials, participants were told that they would be playing with a partner from the same or other team who had not played the game yet but would be coming to play later. Absent partners were represented by paper bags that had been prepared by the experimenter. It was explained to participants that these bags would be used until the partners could come in and prepare their own paper bags. Participants were then given 10 beads and told that they could divide the beads between themselves and their partner in whatever way they wanted. It was then explained that the partner would play the game later and have a chance to respond to the participant's offer by pulling the handle into the green or red zone. Children physically moved the beads on the apparatus to indicate their division, moving the beads that they wanted to keep toward themselves and moving the beads that they wanted to give to their partner toward their partner's side of the apparatus. Once they had made an allocation decision, their decision was recorded on a card (see Figure S2 in the online supplemental materials). After they had made one decision, they were paired with another partner, who was either an ingroup or outgroup member (the opposite of their previous pairing), and were given the chance to make their second proposal.

During responder trials, participants were told that they would be playing with a partner from the same or other team who had already played the game. Absent partners were represented by paper bags that had been created by child proposers during testing. The experimenter explained that their partners had been given 10 beads and were allowed to divide them up however they wanted to and that their decision had been recorded on a card. The participants were then shown the cards and asked to state their proposals. They were then told that they would be able to make a decision by pulling the handle. After children had responded to one proposal, they were paired with another partner, who was either an ingroup or outgroup member (the opposite of their previous pairing), and were given the chance to respond to a second offer.

Before making a decision in both proposer and responder trials, children were asked (a) what would happen if they or their partner pulled the handle to the red and green zones and (b) to explain what would happen to their beads and their partner's beads at the end of the game.

Follow-up questions and debriefing. After participants had made two proposals and responded to two proposals, they were asked to explain their decisions. They were also asked whether they thought the children coming to play later would accept or reject their proposals. Following these questions, children were asked whether they thought the other players were real or just pretend. Most participants (76%) thought the children were real. Analyses that included belief as a predictor did not change our results, nor did subsetting the data by only those participants who believed their partners were real (see Table S1 in the online supplemental materials).

Hypothetical questions. Because of the age range we tested, we expected to observe a large number of fair offers, that is, offers clustering around 50%. Therefore, to examine how responses would vary across different distributions, we also asked children to respond to the full range of hypothetical offers (i.e., offers from 0 to 10). In this final part of the task, children were told that they were going to pretend that they were playing with another child. We did not give children any information about their partner's group membership. The experimenter then listed off all possible divisions of 10 beads, and participants were asked whether they would accept or reject the different distributions.

Coding and Analyses

The experimenter coded participants' proposals and responses during testing. A research assistant independently coded participants' decisions from videos of sessions for which we had complete recording (all but one session). Reliability between live and video coding was high for all dependent measures (ultimatum game proposals: 98% agreement; ultimatum game responses: Cohen's $\kappa = .98$; hypothetical responses: Cohen's $\kappa = .99$). We additionally coded children's reaction times (RTs) before making a decision in response to an offer. However, RT data are not presented here, because preliminary analyses showed that times did not vary across any of our predictors of interest.

We were also interested in whether children invoked ideas of fairness in their explanations of why they made decisions. To explore this question, we examined children's responses to the postexperimental questions, which asked why they responded or proposed in the ways that they did. These answers were transcribed from coding by a research assistant. A second coder, who was not involved in the study, identified cases in which the child explicitly mentioned *fairness* or related terms (e.g., *equal, half, 50–50 split, even*). In parallel, explanations were independently coded by Katherine McAuliffe. Reliability between coders was excellent for explanations of responses (Cohen's $\kappa = .95$) and proposals (Cohen's $\kappa = .99$).

Statistical analyses were conducted using R statistical software (Version 3.1.1; R Core Team, 2014). Participants' proposals were treated as a continuous variable and analyzed using linear mixed models (LMMs). Participants' responses and hypothetical decisions were binary response terms (0 = accept, 1 = reject) and analyzed using generalized linear mixed models (GLMMs). Predictors were fit as fixed effects in models. Predictors of interest were group membership (in- or outgroup), participant gender, age group, and offer. Age group was treated as a categorical variable with two levels (6- to 7-year-olds and 8- to 10-year-olds). In analyses of responder behavior, offers were classified as "fair" (greater than or equal to five of the 10 beads) or "unfair" (less than five of the 10 beads). In analyses of hypothetical decisions, offer was a numerical predictor (ranging from "gave nothing" to "gave 10"). To control for repeated measures, we included participant identities as random intercepts. Models were run using R package lme4 (Bates, Maechler, & Bolker, 2012). In mixed-model analyses, we first examined a full model that included predictor variables of interest and all possible interactions (in cases where there was homogeneity in responses for a given category [e.g., no rejections of fair offers by older boys], interactions were excluded). We then removed predictors individually to test whether their inclusion improved model fit. Model comparisons were conducted with likelihood ratio tests using the "drop1" command.

Results

Group Manipulation

Our manipulation successfully induced ingroup bias in our participants: Participants chose their ingroup member on average in three of the five trials (3.1 ± 1.2). Ingroup bias (chose ingroup at least three times) was seen for 62 of our 96 participants. A one-sample *t* test confirmed this bias, $t(95) = 4.76$, $p \leq .001$, and was consistent with a binomial test of the proportion of participants who favored their ingroup ($p = .006$). Analyses that included ingroup bias as a predictor did not change our results, nor did subsetting the data by only those participants who showed a preference for their ingroup (see Table S2 in the online supplemental materials).

Proposer Behavior

On average children proposed keeping six of 10 beads ($M = 4.0 \pm 1.4$). Older children made slightly more generous offers than did younger children (8- to 10-year-olds: $M = 4.4 \pm 1.1$; 6- to 7-year-olds: $M = 3.6 \pm 1.7$), regardless of their partner's group membership (see Figure 2). Our minimal model showed a first-order effect of age group, $\chi^2(1, N = 96) = 12.48$, $p < .001$ (see Table 1). There were no effects of group membership or gender and no Group Membership × Age Group interactions or Group Membership × Gender interactions (*p*s > .1).

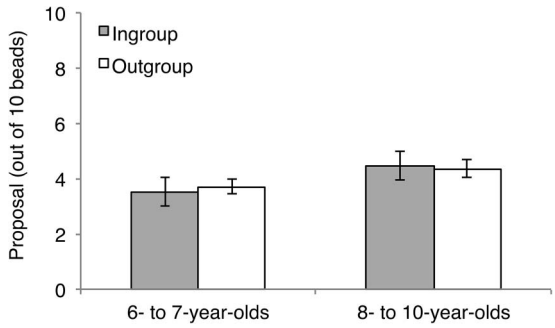

Figure 2. Average proposals made to in- and outgroup responders by children in the 6- to 7-year-olds and 8- to 10-year-old age groups. Error bars show confidence intervals.

Responder Behavior

The majority of offers—both fair and unfair—were accepted (see Table 2). However, children in both age groups were more likely to reject unfair allocations (less than a 5/5 split) than fair or generous allocations (5/5 split or greater), and this effect was independent of the group membership of the proposer (see Figure 3). Our minimal model showed that offer type (fair vs. unfair) was the only significant predictor of children's rejections, $\chi^2(1, N = 96) = 41.31$, $p < .001$ (see Table 1). There were no effects of group membership, age group, or gender and no two- or three-way interactions (*p*s > .2). We tested the robustness of our minimal model by running an additional GLMM in which offer was fit as a continuous predictor of rejections. Offer remained a significant predictor of rejections in this model, $\chi^2(1, N = 96) = 47.99$, $p < .001$: With increasing offer size, children became less likely to reject ($\beta = -.81$, $SE = .22$, $p < .001$).

Hypothetical Decisions

Children's responses to the hypothetical allocations were broadly in line with their responses in the ultimatum game (see Table 2). As Figure 4 shows, predicted rejections were high for unfair offers and low for equitable offers. Our GLMM showed two significant interactions: one between age and offer, $\chi^2(1, N = 96) = 10.16$, $p = .001$, and one between age and gender, $\chi^2(1, N = 96) = 5.21$, $p = .02$. Figure 4 suggests that the interaction between age and offer was because older children predicted that they would reject hyperunfair or hypergenerous offers more frequently than did younger children, whereas younger children expected that they would reject more marginally unfair offers (6/4 split) than did older children. The interaction between gender and age was due to younger boys' saying they would reject more frequently than did younger girls (see Figure S3 in the online supplemental materials). Although participants predicted that they would be more likely to reject selfish offers compared to generous offers, Figure 4 shows

Table 1
Estimate (With Standard Error) and Goodness-of-Fit Statistics for Fixed Effects in Mixed Models Predicting Participants' Proposals (Continuous Dependent Variable) and Responses in the Ultimatum Game

Variable	Proposals	Responses	Strategy decisions
Intercept	3.61*** (.16)	−3.37*** (.59)	.99*** (.26)
Age group: 8- to 10-year-olds	.80*** (.22)		.25 (.35)
Offer code: Unfair		2.93*** (.62)	
Offer: Increasing			−.48*** (.05)
Participant gender: Male			.74* (.31)
Age Group × Offer: 8- to 10-Year-Olds × Continuous			.18** (.06)
Age Group × Participant Gender: 8- to 10-Year-Olds × Male			−.92* (.40)
AIC	666.09	168.93	1,143.50
BIC	679.12	178.70	1,178.22
Log likelihood	−329.05	−81.46	−564.75
Deviance	658.09	162.93	1,129.50
No. of observers	192	192	1,054
No. of groups: Participant ID	96	96	96
Variance			
Participant ID (intercept)	.43	.00	.38
Residual	1.42	1.00	1.00

Note. Responses were coded as 1 = reject and 0 = accept. AIC = Akaike's information criterion; BIC = Bayesian information criterion.
* $p < .05$. ** $p < .01$. *** $p < .001$.

that children also predicted that they would reject more hypergenerous offers than equal offers.

Children's Justifications of Their Decisions

We examined children's responses to postexperimental questions to test whether they appealed to notions of fairness when explaining their decisions. Indeed, children in both age groups frequently mentioned fairness or related words when offering proposals that were equal to or greater than five of their 10 beads (>50% of justifications referred to fairness; see Table S3 in the online supplemental materials for details). By contrast, they rarely invoked concepts of fairness when offering less than half of their beads (<15% of justifications referred to fairness; see Table S3 in the online supplemental materials). Children also mentioned notions of fairness after accepting fair offers and after rejecting unfair offers. Together, data from children's explanations of their decisions suggest that many children were thinking explicitly about concepts of fairness when making and responding to proposals.

We also examined whether children expected their proposals to be accepted or rejected to gain insight into whether they were being strategic in their proposals. Children expected that fair offers were most likely going to be accepted (expected only 13% to be rejected) and that unfair offers were less likely to be accepted (expected 46% to be rejected; see Table S4 in the online supplemental materials for details). These data suggest that children were fairly good at predicting partners' responses, because their expectations roughly mapped onto children's actual responses, although proposers predicted slightly more frequent rejections of both fair and unfair offers than were actually present (children actually rejected 39% of unfair offers and 3% of fair offers; see Table 2).

Discussion

Although children in our study tended to show a pattern of ingroup bias in playmate preference, much like that frequently observed in past studies (e.g., Dunham et al., 2011), this bias had no influence on their proposals or responses in the ultimatum game. On average, children offered about four of the 10 tokens to their partner, with older children proposing slightly more generous offers than did younger children. Children in both age groups readily punished unfair offers, frequently preferring nothing to an unfair split, suggesting that children's rejections were driven by an aversive response to unfairness even when this response entailed high costs. Our analyses of proposer behavior showed that children's proposals were frequently fair, which reinforces the conclusion that fairness was a major driver of game behavior. Indeed, children often invoked

Table 2
Frequency of Accepting Versus Rejecting Proposals Ranging From Completely Selfish to Completely Generous and Comparing Actual and Hypothetical Responses

Amount offered	Actual responses		Hypothetical responses		Acceptance %	
	Accept	Reject	Accept	Reject	Actual	Hypothetical
0	2	7	7	89	22	7
1	5	8	27	69	38	28
2	5	5	32	64	50	33
3	8	7	42	54	53	44
4	42	13	63	32	76	66
5	80	2	94	2	98	98
6	7	1	83	13	88	86
7			84	12		88
8			76	19		80
9			77	19		80
10			65	31		68

Note. In a completely selfish offer, the proposer would offer 0 and keep all 10; in a completely generous offer, the proposer would offer all 10 and keep 0.

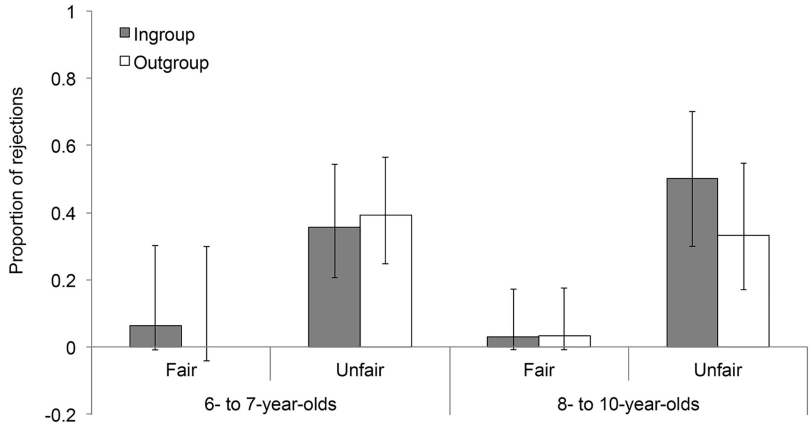

Figure 3. Proportion of rejections of fair (greater than or equal to a 50% share) and unfair (less than a 50% share) proposals. Rejections shown by age group and group membership. Error bars show binomial confidence intervals.

explicit notions of fairness in their explanations of their decisions. The frequency of fair proposals is also suggestive of strategic motivations: Children may have offered fairness because they expected these offers to be accepted. Our examination of their predictions about partner behavior is consistent with this suggestion: Children expected fair offers to be accepted. Finally, our data suggest that hyperunfair offers, often used to test children's responses to unfairness in third-party games (e.g., Jordan et al., 2014; McAuliffe et al., 2015), may not be representative of children's natural bargaining behavior.

Because the majority of actual offers were fair, our data are more limited with respect to the question of how children respond to highly unfair offers. However, children's responses to hypothetical offers provided important insight into the range of offers they consider acceptable. Critically, these responses mapped onto their real responses in that they expected to reject equal splits less than disadvantageously unequal splits. Their responses to hypothetically generous offers go beyond this by showing that children in this age range also expected to reject advantageously unequal allocations, which were extremely rare in their natural bargaining behavior and about which we can therefore not make strong conclusions. However, other work has shown that older children do begin to reject distributions that are advantageous to them (Blake & McAuliffe, 2011; McAuliffe, Blake, Kim, Wrangham, & Warneken, 2013), providing support for the possibility that children would reject highly advantageous offers in the ultimatum game.

It is critical to note that, despite not finding any effects of group membership on children's proposals or responses, we did robustly induce ingroup bias in our participants, as evidenced by their playmate preferences. Further, in unilateral allocation contexts such as the dictator game, ingroup bias measured in this way *is*

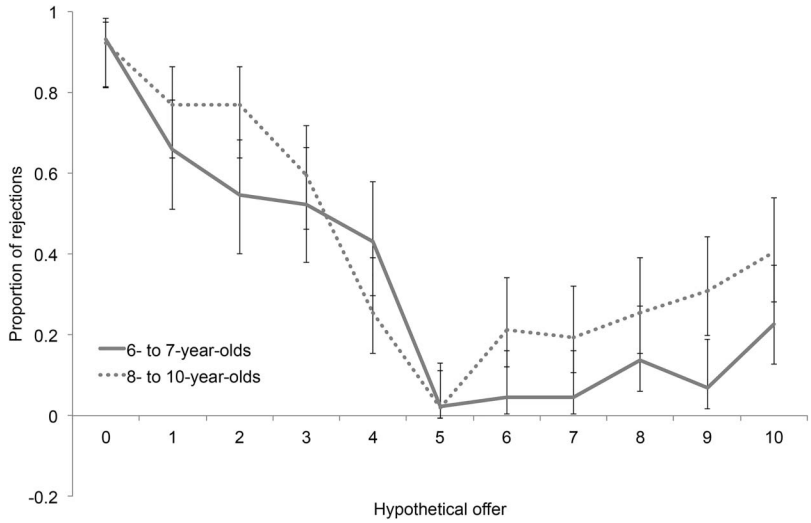

Figure 4. Children's reported rejections of hypothetical divisions of 10 beads. Children were presented with all possible divisions and asked whether they would accept or reject. Hypothetical rejections across all possible divisions are shown by age group. Error bars show binomial confidence intervals.

predictive of giving (Dunham et al., 2011; Renno & Shutts, 2015). These findings are critical in interpreting the lack of bias in ultimatum game behavior. Although it is of course possible that we would have found group effects on game behavior had we tested real-world social categories (e.g., race), we think this is unlikely given that minimal group effects parallel those of real social categories in many ways (e.g., Mullen, Brown, & Smith, 1992), and indeed there has been some meta-analytic support for the possibility that in adults minimal group effects meet or even exceed real-world group effects on economic games (Lane, 2016).

Thus, our data suggest that second-party enforcement of fairness norms is unbiased from its inception in development. This contrasts with findings from group-based ultimatum games in adults, in which group membership may influence responses to unfair offers (Kubota et al., 2013; Mendoza et al., 2014). However, the interpretation to be offered for those findings is unclear, because the directionality of reported effects has varied across studies. One possibility consistent with our findings is that the lack of a default bias early in development supports considerable contextual flexibility later in life. That is, absent an early default perhaps it should not be surprising that the directionality of group effects on behavior in adults depends on a range of factors, including experimental design and participant population. Further, it is worth noting that reported effects of group bias on behavior in the ultimatum game in adults are small (Kubota et al., 2013) or specific to certain offer types (Mendoza et al., 2014). Thus, an important avenue for future work is to replicate these effects across different group contexts and to include a wide range of ages in order to investigate the onset of group bias in second-party punishment.

The finding that our minimal group manipulation did not affect children's second-party enforcement of fairness norms is intriguing in light of work showing group bias in a third-party punishment context (Jordan et al., 2014). We must of course be careful in our comparisons to past work, given that our methods were not identical. However, several commonalities between our tasks, including the fact that we used the same group manipulation, tested children in the same age range, and even used the same apparatus, suggest that a cautious comparison is warranted. We think that there are three possible reasons why children may have shown group bias in punishment in the third-party game but not in our ultimatum game. First, this difference may be due to how people reconcile the tension between fairness and ingroup favoritism in second- versus third-party contexts. Specifically, in a third-party context, punishers are observers to unfairness as opposed to victims of unfairness and thus may be better able to reason about the unfair treatment in more abstract terms, thus reaching more of a balance between fairness concerns and ingroup favoritism. In other words, in a third-party context, children are able to consider both fairness and group membership before they make a decision about whether to punish a fairness norm violation. In a second-party context such as the ultimatum game, however, punishers are directly affected by the unfair behavior and thus may be less able to override their overwhelming negative response to unfairness, leading their response to unfairness to trump their ingroup preference. Relatedly, in this second-party context children are motivated to reach an agreement about what offer is acceptable, and this may push fairness concerns to the forefront of the decision-making process. Indeed, Yamagishi and Kiyonari (2000) suggested that group bias should be present in situations potentially involving indirect reciprocity (such as in the third-party punishment game) but absent when individuals are involved in situations that involve direct reciprocity (such as the ultimatum game).

Another possible reason why children's behavior in the ultimatum game was not biased by ingroup favoritism is that they were primarily driven by self-interest and thus set aside ingroup bias in the service of maximizing their own payoff. By contrast, children in third-party contexts are not attempting to negotiate with a partner and therefore do not have to override self-interest when making norm enforcement decisions. Indeed, self-interest seems necessary to fully explain our data for proposer behavior, in which offers were, on average, just shy of equal rather than equal, as if proposers were balancing a self-interested desire to get more with an expectation of the maximum degree of unfairness that would be tolerated. Thus, in many cases children may have been offering fair or near-fair offers because they expected these offers to be accepted, suggesting strategic motivations (and their expectations were largely accurate, as evidenced by children's hypothetical responses to the full range of possible allocations). Indeed, strategic motivations in the ultimatum game have been demonstrated in this age range: Children make more generous offers in the ultimatum game than in the dictator game (where punishment is not possible), indicating that they consider their partner's response when making proposals (Bereby-Meyer & Fiks, 2013; Steinbeis, Bernhardt, & Singer, 2012). That said, in our design we cannot completely disentangle strategic concerns from fairness concerns, because we do not know how these same children would have behaved in a nonstrategic context (e.g., dictator game). Of course, if self-interest were the only motivation driving decisions in the game, we would predict high acceptance rates of all unfair offers because rejections result in no payoff. We did not see this in our data: When children proposed unfair offers, these offers were frequently rejected. Thus, we argue that although self-interest may have been at play, particularly in proposer behavior, fairness concerns and strategic reasoning are required to fully account for children's behavior in the game.

A final reason why our results may have deviated from work on group membership effects on third-party punishment in children is because, in previous work on third-party enforcement of fairness norms, participants were presented with hyperunfair offers (completely selfish) or perfectly fair offers (equal splits; Jordan et al., 2014). In those cases, children showed ingroup favoritism in their punishment of completely selfish offers. An important result from our study is that such hyperselfish offers are very rare in natural settings. It is of course possible that we would have observed group bias if we had presented children with hyperunfair offers in the ultimatum game. However, one of our primary goals in designing this study was to allow children to negotiate with one another in an unconstrained environment. We thus did not want to artificially introduce proposals, because we were specifically interested in understanding what proposals would naturally arise and how they would be received by responders. Further, the rarity of such offers suggests that even if group bias appears in them, their role in real-world bargaining is quite limited.

One possible limitation of our study design was that we ran this experiment in a single elementary school. Given this, it is possible that children viewed all their partners as ingroup members regardless of their affiliation with the minimal groups. However, we do not think this is a likely explanation for why we did not see a group

effect in the ultimatum game because the majority of children showed a preference for characters from their own group in the pretest choice task. Another possibility is that our group manipulation changed children's preferences but did not influence their thoughts about group-based cooperative norms. To test this possibly, future work could create groups that are associated with within-group cooperative goals and/or between-groups competition. Finally, a limitation of this study concerns the strength of our interpretations of a null result. It is of course possible that children do indeed show group bias in the context of an ultimatum game, but our design was not able to capture this bias. We feel that although this remains a possibility, it is unlikely given that previous work using similar methods (even using the same apparatus) found minimal group effects on third-party punishment (Jordan et al., 2014)

Although children's hypothetical responses were mostly consistent with their real responses, one interesting finding was that younger children expected to be less tolerant of marginally unfair (6/4) offers than did older children, whereas this age effect was not seen in their actual response behavior. Additionally, children expected to reject some hypergenerous offers, which aligns with work showing that American children tend to be averse to both disadvantageous and advantageous inequality (Blake & McAuliffe, 2011; McAuliffe et al., 2013). A puzzling finding from our hypothetical decision data was the interaction between gender and age, which appeared to be due to fact that, in the younger age group, boys were more likely than girls to report that they would reject offers (regardless of distribution). Although we saw this interaction in the hypothetical decisions, we did not find a similar interaction in the actual responses, suggesting that when faced with real decisions, boys and girls are similarly likely to reject offers.

In sum, these findings demonstrate that 6- to 10-year-old children show no group bias in their behavior in the ultimatum game. Rather, children tend to make relatively fair proposals, and these proposals tend to be accepted, demonstrating that young children exhibit an ability to negotiate in this context. When confronted with an unfair offer, children frequently enforce fairness norms via costly second-party punishment yet do so impartially, apparently ignoring the group membership of the selfish proposer. Broadly, our results suggest that fairness concerns override existing group bias in a context in which children are the victims of selfish behavior.

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Received November 19, 2015
Revision received June 6, 2016
Accepted September 23, 2016 ■