Supplemental Online Material for

How intergroup context shapes children's decision to compensate and punish unfairness

All data is available on Open Science Framework:
https://osf.io/r4cyt/?view_only=e3c452b735184e469fbaebab9f3b6d96

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1 Experimenter Adjustments

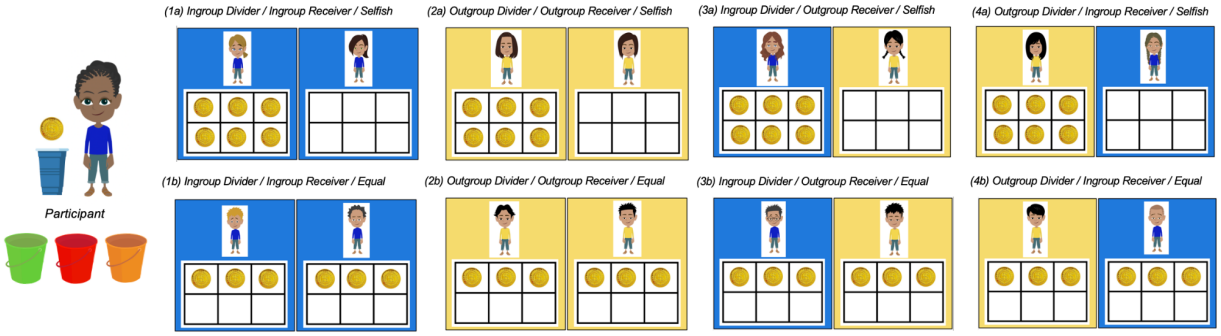
One aspect of the present study to note is that there was some small variation in the exact script presented to children due to experimenter error. Some children participated in a version of the study that included slightly different wording (n = 39) that was later adjusted for the final version (n = 109). The only differences between these two versions involved minor wording changes that we do not think will have any bearing on the results. For example, the "penultimate version" included a line where we said, "I will explain these buckets using these practice charts." The "final version" included an adjusted line where we said, "Let me explain these buckets. To do that, I am going to use these practice charts." For a full explanation of these differences, see OSF.

2 Illustration of all possible trials

For a full visualization of all experimental trials, see Supplementary Figure 1.

Supplementary Figure 1

Test Trial Configuration



3 Description of (D) First-Person Resource Distribution Task

After the test trials, the experimenter proceeded with four first-person resource division trials (Figure 1D). We included these trials because we wanted to be sure that, in the event we did not see any intergroup effects on children's third-party intervention behavior, the minimal group manipulation affected another aspect of children's behavior: their own decisions about resource distribution. We based this task off of a mini-dictator game that has been found to elicit biased behavior in children (Lazić et al., 2021).

There were two types of first-party resource distribution questions, each of which had two trials (one for an ingroup partner and one for an outgroup partner). One type of trial, which we will call "forced inequality trials," involved the participant deciding whether to keep four tokens for themselves and to give two tokens to a partner, or whether to keep two tokens for themselves and give four tokens to a partner. The other trial type, which we will call "equality allowed trials," involved the participant deciding whether to keep three tokens for themselves and to give three tokens to the partner, or whether to keep six tokens for themselves and to give no tokens to a partner. We included both types because we figured the equality trials may elicit less bias (or none) given that equality is an option and that children tend to prefer equality. As a result, we also wanted to include a trial that required children to exhibit bias.

4 Description of (E) Evaluations Task

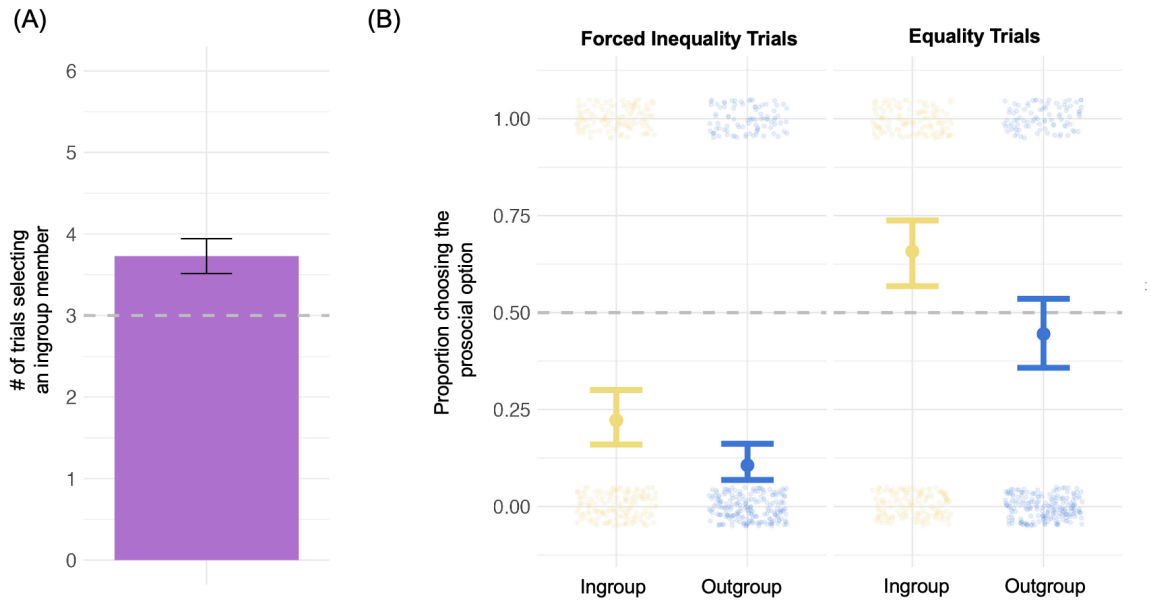
The experimenter asked some final evaluation questions (Figure 1E). These questions served to provide insight into children's social judgments of selfishness. The experimenter asked three questions about dividers and three questions about receivers; whether dividers were asked about first was counterbalanced. For the divider question, the experimenter asked about both yellow and blue group dividers: "Sometimes I told you about a kid in the yellow (blue) group who kept all six tokens and gave no tokens to the other kid. Do you think this was good or bad?" If the participant indicated "good," the experimenter followed up by asking, "How good: A tiny bit good, a little bit good, or very good?" If the participant indicated "bad," the experimenter followed up by asking, "How bad: A tiny bit bad, a little bit bad, or very bad?" After asking about a yellow and blue group divider, the experimenter asked, "Which was worse: When a kid in the yellow group kept all six tokens and gave no tokens to the other kid, or when a kid in the blue group kept all six tokens and gave no tokens to the other kid?" For the receiver questions, the experimenter asked about both yellow and blue receivers: "Sometimes I told you about a kid in the yellow (blue) group who did not get any tokens. Did you think this was good or bad?" The same follow-up question structure was followed here. After asking about a yellow and blue group receiver, the experimenter asked: "Which was worse: When a kid in the yellow group did not get any tokens, or when a kid in the blue group did not get any tokens?"

5 Group Membership Manipulation Data

We wanted to ensure that our group manipulation did indeed induce ingroup bias. To do so, we first examined children's self-reported social preferences. We summed children's selections across two items—whether they wanted to work with an ingroup (1) or outgroup member (0) on a school project and on a seesaw—resulting in a total score ranging from 0 (always chose outgroup) to 6 (always chose ingroup). Children generally preferred ingroup over outgroup members (M = 3.73; SD = 1.27), a preference significantly greater than chance (3; $t(139) = 6.77$, $p < .001$; Supplementary Figure 2A). Ingroup bias on this combined measure did not vary by age (B = -0.01, SE = .09, p = .881), indicating that the minimal group manipulation effectively induced ingroup bias across the sampled age range.

Supplementary Figure 2

(A) Children's Self-Reported Social Preferences, and (B) Children's Resource Distribution Choices



Second, we examined children's resource distribution decisions across two trial types, each involving six tokens. In "Forced Inequality" trials, children had to choose between benefiting themselves (4-2) or the recipient (2-4). In "Equality Allowed" trials, they could either keep all tokens (6-0) or share

equally (3-3). Each trial type was completed once with an ingroup and once with an outgroup recipient. We fit logistic mixed-effects models predicting children's choices (0 = selfish, 1 = prosocial) from Trial Type, Receiver Group, and Age, with participant ID as a random effect. Comparing increasingly complex models revealed that the main effects model (Model 2) best fit the data ($\chi^2(3) = 104.49$, $p < .001$).

Children were more likely to choose the prosocial option on Equality Allowed trials ($M = .55$) than on Forced Inequality trials ($M = .16$; $B = 1.91$, SE = .23, $p < .001$). They also showed a bias toward ingroup members, choosing the prosocial option more for ingroup ($M = .43$) than outgroup recipients ($M = .24$; $B = -0.88$, SE = .21, $p < .001$; Supplementary Figure 2B). Older children were more likely to make prosocial choices ($B = .23$, SE = .11, $p = .043$). These results suggest that children's ingroup preferences extend beyond self-reports to their incentivized behavior.

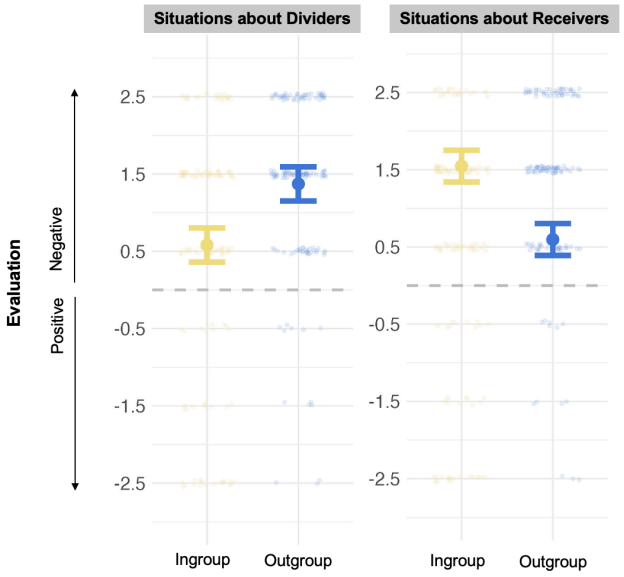
6 Evaluations Data

We examined children's evaluations of situations where an ingroup or an outgroup member established inequality and situations where an ingroup or an outgroup member did not receive resources. Participants were asked to judge the situation as "good" or "bad" and "how good/bad; a tiny bit good/bad, a little bit good/bad, or very bad/good?".

To make sense of the divider evaluation data, we fit linear mixed fixed effects models including Divider Group (ingroup, outgroup; within-subjects) and Age (continuous) as fixed effects predicting children's evaluations (-2.5 = very good, -1.5 = a little bit good, -.5 = a tiny bit good, .5 = a tiny bit bad, 1.5 = a little bit bad, 2.5 = very bad); we also included participant ID as a random effect to account for variability between participants. We fit increasingly complex models and compared them. Model 1 included only the random effect of participant ID (no predictors); Model 2 additionally included the main effects of Age (continuous) and Divider Group (ingroup, outgroup; within-subjects); Model 3 additionally included the two-way interactions amongst Age and Divider Group. Comparing these models revealed that Model 2 (the main effects model) best fit the data, $X^2 = 29.76$, $p < .001$, relative to Model 1. Model 3 did not exhibit model fit beyond Model 2, $p = .290$. In particular, Model 2 revealed an effect of Divider Group, $B = .79$, SE = .14, $p < .001$, such that children were more likely to evaluate a situation that involved an outgroup divider keeping all the tokens ($M = 1.37$, SE = .11) as worse than a situation that involved an ingroup member doing the same thing ($M = .58$, SE = .11) (Supplementary Figure 3). In line with this, we found that the majority of children selected a selfish outgroup divider ($n = 103$) as worse than a selfish ingroup divider ($n = 42$).

Supplementary Figure 3

Children's Evaluations



To make sense of the receiver data, we followed the same analytical strategy but examined Receiver Group rather than Divider Group. This approach similarly revealed that Model 2 best fit the data, X^2 = 47.81, $p < .001$, relative to Model 1. Model 3 did not exhibit model fit beyond Model 2, $p = .361$. In particular, Model 2 revealed an effect of Receiver Group, $B = -.95$, SE = .13, $p < .001$, such that children were more likely to evaluate a situation that involved an ingroup member who did not receive resources (M = 1.55, SE = .10) as worse than a situation that involved an outgroup member (M = .60, SE = .10) (Supplementary Figure 3). In line with this, we also found that the majority of children said that a situation involving an ingroup member who did not receive resources (n = 102) was worse than one involving an outgroup (n = 43).

7 Models

Model1 = mblogit(formula = decisionUpdated ~ fairSelfish + ContinuousAge + childGenderR, random = ~ 1|participantID_Updated, data = dataDecisionFinal,y=FALSE)

Model1A = mblogit(formula = decisionUpdatedReleveled ~ fairSelfish + ContinuousAge + childGenderR, random = ~ 1|participantID_Updated, data = dataDecisionFinal,y=FALSE)

Model1B = mblogit(formula = decisionUpdatedReleveled ~ fairSelfish + ContinuousAge + childGenderR, random = ~ 1|participantID_Updated, data = dataDecisionFinal,y=FALSE)

model2 = mblogit(formula = decisionUpdated ~ dividerID*receiverID*fairSelfish + ContinuousAge + childGenderR, random = ~ 1|participantID_Updated, data = dataDecisionFinal,y=FALSE)

model2A = mblogit(formula = decisionUpdated ~ dividerID*receiverID*fairSelfish*ContinuousAge + childGenderR, random = ~ 1|participantID_Updated, data = dataDecisionFinal)

model2B = mblogit(formula = decisionUpdated ~ dividerID*receiverID*fairSelfish*ingroupTotalCounts + ContinuousAge + childGenderR, random = ~ 1|participantID_Updated, data = dataDecisionFinal,y=FALSE)

model3 = mblogit(formula = decisionUpdated ~ dividerID*receiverID + dividerID*fairSelfish+receiverID*fairSelfish + ContinuousAge + childGenderR, random = ~ 1|participantID_Updated, data = dataDecisionFinal,y=FALSE)

model3A = mblogit(formula = decisionUpdated ~ dividerID*receiverID*ContinuousAge + dividerID*fairSelfish*ContinuousAge+receiverID*fairSelfish*ContinuousAge + childGenderR, random = ~ 1|participantID_Updated, data = dataDecisionFinal,y=FALSE)

model3B = mblogit(formula = decisionUpdated ~ dividerID*receiverID*ingroupTotalCounts + dividerID*fairSelfish*ingroupTotalCounts+receiverID*fairSelfish*ingroupTotalCounts + ContinuousAge + childGenderR, random = ~ 1|participantID_Updated, data = dataDecisionFinal,y=FALSE)

model4 = mblogit(formula = decisionUpdated ~ dividerID*receiverID + ContinuousAge + childGenderR, random = ~ 1|participantID_Updated, data = dataDecisionFinalOnlySelfish,y=FALSE)

model5 = mblogit(formula = decisionUpdated ~ dividerID+receiverID+ContinuousAge+childGenderR, random = ~ 1|participantID_Updated, data = dataDecisionFinalOnlySelfish,y=FALSE)

model5A = mblogit(formula = decisionUpdated ~ dividerID*ContinuousAge+receiverID*ContinuousAge, random = ~ 1|participantID_Updated, data = dataDecisionFinalOnlySelfish,y=FALSE)

model5B = mblogit(formula = decisionUpdated ~ dividerID*ingroupTotalCounts+receiverID*ingroupTotalCounts, random = ~ 1|participantID_Updated, data = dataDecisionFinalOnlySelfish,y=FALSE)