# Fairness overrides reputation: The importance of fairness considerations in altruistic cooperation

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**Abstract**

Behavioural findings in several strategic games indicate that people punish others if they think they are being treated 'unfairly' even at the cost of minimizing their own material payoff. We investigated the primary driving force behind such altruistic cooperation. In Experiment 1, we replicated previous findings indicating that the key mechanism contributing to the emergence of altruistic cooperation is fairness considerations. In Experiment 2, we investigated the effect of the opportunity for reputation building and future interaction on altruistic cooperation and found that these factors become effective only when fairness considerations are removed.

**Keywords:** altruistic cooperation; mini ultimatum game, fairness, reputation building, future interaction.

## Introduction

Human altruistic cooperation presents a puzzle from the perspectives of both the standard economic models of the 'self-interested actor' and the evolutionary models of the 'self-regarding individual' because it involves some characteristics that are difficult to reconcile with the predictions of standard game theoretical and evolutionary analyses. In particular, these characteristics are rewarding the cooperators (i.e., altruistic rewarding) and punishing the norm violators (i.e., altruistic punishment), at a personal cost, even though the probability that this cost will be repaid (either by third parties or by that specific agent in the future) is very low (Gintis et al., 2003).

Evidence for the existence of altruistic cooperation largely comes from laboratory experiments in which the respective behavioral pattern has been observed through economic games. One of the best-known economic games used to demonstrate altruistic cooperation (especially, altruistic punishment) is the Ultimatum Game (UG) (Güth, Schmittberger, & Schwarze, 1982), in which two players are presented with a sum of money, and one of them is assigned to the role of Proposer while the other one to the Responder. The Proposer is asked to offer any portion of the given money to the Responder. If the Responder accepts the amount offered by the Proposer, the money is distributed in accordance with the proposal. If the Responder rejects the offer, both get nothing. According to standard economic theory of self-interest, a rational Proposer offers the minimum possible amount, and a rational Responder never rejects any amount unless it is zero (Binmore, 2007). The underlying assumption in this prediction is that both parties care only about how much money they get. However, the vast majority of experimental studies has shown that the modal offers by the Proposers lie between 40%-50% of the total amount and the Responders frequently reject offers below 25% (Güth et al., 1982; Roth, 1995; Henrich et al., 2005). This pattern of results has been replicated cross-culturally (Henrich et al., 2005) and shown to be robust with large stakes (Cameron, 1999). The experiments reported here aimed to investigate the role of several factors (i.e., fairness considerations vs. perceived opportunity of reputation building and future interaction) that might contribute to the emergence of altruistic cooperation in experimental contexts.

### Altruistic cooperation as a function of fairness considerations

Some researchers argue that the underlying mechanism of such non self-regarding behaviors (i.e., high offers by the Proposers and frequent rejections by the Responders) in the UG is not to get as much money as possible, but to maintain fairness norms among players (Gintis et al., 2003; Fehr & Gachter, 2002). In fact, the motivation behind the Proposers' high offers can be explained with or without the involvement of fairness considerations: They simply may not want to offer an amount that can be easily turned down by the Responder, so they are willing to distribute the money in a relatively fair way. Thus the Proposers' main concern still might be getting as much as possible in the end, rather than treating the Responders fairly (Declerck et al., 2009). However, for Responders, the role of fairness concerns is more apparent and must be stronger because they seem to accept ending up with nothing rather than being treated unfairly. Even though the Responders could have been better off by accepting any amount offered, they prefer to punish the Proposer' unfairness, at a cost to themselves. This pattern of response indicates that the Responders engage in altruistic punishment in response to the unfairness of the Proposer.

A special version of UG has been used to demonstrate how much the Responders care about unfair acts of the Proposers. The structure of the so-called Mini UG (see Table 1) is the same as the standard UG, with an exception: The Proposer is again asked to distribute an amount of money but unlike the standard UG, only in one of two ways.

Table 1. General structure of Mini Ultimatum Games.

| Mini Ultimatum Games* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (5/5) Game | | (2/8) Game | | (10/0) Game | | (8/2) Game | |
| Possible distributions | (8/2) | (5/5) | (8/2) | (2/8) | (8/2) | (10/0) | (8/2) | (8/2) |
| Perceived fairness of the (8/2) distribution | Unfair | | Reasonably unfair ** | | Fair | | Neutral | |

* The numbers in the parentheses denote how much the Proposer could get/how much the Responder could get.
** The Proposer seems to have an excuse for offering the more inequitable distribution (8/2), because otherwise he would be unfair to *himself* [i.e., by offering the (2/8) distribution, he would give 8 to the Responder, and take 2 himself].

Both players participate in four consecutive Mini UGs, and throughout all these games one way of distribution is always fixed while the alternative distribution is always different across games. The fixed distribution is a relatively inequitable one (i.e., the Proposer can take $8 for himself, and offer $2 to the Responder, see table 1).

However, the available alternative distribution varies in terms of the outcome fairness, sometimes yielding a more equitable outcome (i.e., the Proposer can take $5 for himself, and offer $5 to the Responder, see table 1), and sometimes yielding an even more unequal outcome (i.e., the Proposer can take $10 for himself, and offer $0 to the Responder, see table 1). Under the standard assumptions, rejection rates for the fixed distribution (8/2) were expected to be the same regardless of its alternatives, as its monetary value stays unchanged across games (Falk et al., 2003). However, this particular distribution was rejected much more frequently when the Proposer intentionally ignored the more equitable alternative distribution [i.e., the (5/5) distribution] than when he ignored the more unequal alternative distribution [i.e., the (10/0) distribution] (Falk et al., 2003; Sutter, 2007). Thus the rejection decisions made by the Responders seem not to be determined by the absolute amount of the offer (i.e., $2), but by whether the offer is seen as relatively unfair [i.e., in comparison to (5/5) split] or fair [i.e., in comparison to (10/0) split]. See table 1 for the perceived fairness of the fixed distribution (8/2) across four games.

These findings indicate that the Responders punish the unfairness of the Proposers by rejecting an amount of money in one case and appreciate the fairness of the Proposer by accepting the very same amount in another case. It has been argued therefore that fairness considerations must be the underlying motive behind altruistic cooperation (Gintis et al., 2003; Fehr & Gachter, 2002).

## Altruistic cooperation as a function of mis-perceived opportunity of reputation building and future interaction

Although the importance of fairness considerations in such bargaining games has been widely accepted, the real reasons for altruistic cooperation (i.e., the Responders' rejection/acceptance behaviors in the UG) have been a source of much debate (Declerck et al., 2009). As mentioned earlier, by rejecting a non-zero offer, the Responders seem to engage in actions that are opposite to their self-interest, in order to maintain the fairness norms between parties. Thus fairness considerations seem to override the self-regarding/rational motives. Confidence in such a conclusion mainly comes from the two critical features of the above-mentioned experiments: The identities of both players are kept hidden (i.e., anonymous) and they will never meet again in another round (i.e., one-shot encounter). These specific features, therefore, eliminate the possibility of reputation building (henceforth, RB) and future interaction (henceforth, FI) as potential sources of this seemingly fairness-driven behavior (Fehr & Fischbacher, 2003). Any involvement of the possibility of RB and FI would be especially critical in this context because the altruistic behavior obtained in these experiments then could be explained within the boundaries of self-regarding motives: It is rational and adaptive to reject unfair offers if the possibility of re-encountering the same game partner in the future is high enough or if the possibility of building a reputation among other players is at stake. The underlying reason for this claim is that rejecting unfair offers protects the player from being offered with unequal distributions by the same game partner in the future or by third parties, and thus this behavior serves the player's self interest (Burnham & Johnson, 2005; Hagen & Hammerstein, 2006).

This argument goes further in the direction that people engage in altruistic cooperation in one-shot and anonymous encounters simply because they confuse the experimental settings with the more familiar environments where interactions are normally repeated and non-anonymous (Burnham & Johnson, 2005). In fact, the participants might still be responding to implicit cues suggesting that future interaction is possible or that their reputation is at stake. One finding that supports this interpretation is that the presence of eyespots on the computer desktop, which triggers the sense that participants are being watched, leads to increased generosity in another money allocation game (Haley & Fessler, 2005). Some other studies suggest that even the

perception of being involved in a situation where future interaction and reputation building is possible triggers altruistic cooperation in one-shot, and anonymously played economic games (Kiyanori et al., 2000). Thus behaving in an altruistically cooperative manner in the UGs might not solely result from the concern for the maintenance of fairness norms, but from the mis-perceived opportunity of reputation building and future interaction (Haley & Fessler, 2005; Bateson, Nettle, & Roberts, 2006).

### Present Experiments

Previous studies have already established that the (8/2) distribution is rejected at different levels depending on whether the alternative distributions are perceived as fair or not (i.e., highest rejections observed when the alternative was more equitable). However their findings diverge in terms of rejection rates of the (8/2) distribution when the alternative distribution was more inequitable. More specifically, 9% of the Responders rejected the (8/2) distribution in the (10/0) game in Falk et al.'s (2003) study whereas almost 28% rejected in Sutter's (2007) study. Considering these differences in previous findings, we found it necessary to re-establish the basic phenomenon observed in the Mini UG (presented in Table 1) in our own subject pool, in Experiment 1.

In Experiment 2, we aimed to understand the combined effect of the *real* possibility of RB and FI in the Mini UG[1]. If the real reason behind the rejections in one-shot and anonymously played games is the *misperceived* possibility of RB and FI (and thus for maximizing the material pay-off, for the maintenance of fairness norms), then an increase in the level of altruistic cooperation should be expected when the actual possibility is added to the context. Although such an additional effect of possibility of RB and FI has not been investigated in the Mini UG, there are two main reasons for expecting such an increase. First, the importance given to equality is expected to be elevated (Rottemberg, 2008) because the fairness norm (i.e., distributing the allocated money evenly) is strengthened in presence of the possibility of RB and FI (Hertel et al., 2002). Second and more importantly, the sanctions inflicted upon the unfairness of a game partner through altruistic cooperation might be considered as an effective tool for maximizing future gains (Kiyanori et al., 2000). In addition, there were two main reasons for using the Mini UG, instead of the standard UG: First, its structure would allow us to see how the possibility of RB and FI, along with the fairness concerns, would contribute to the Responders' rejections especially when altruistic punishment (i.e., when the alternative offer yielded a more equitable distribution) is expected to take place. Second, in the Mini UG, there is one special game [the (8/2) game, see table 1] in which the Proposer has no choice, but to offer the fixed amount. This particular case would enable us to detect the sole effect of the possibility of RB and FI on the Responders' decisions when an unequal distribution was offered without any (un)fair intentions of the Proposer involved.

[1] The reason for testing their combined effect was that these two factors are highly interrelated (i.e., repeated encounters with the same partner, by default, bring along the opportunity of RB as each player would know what the other player has done so far).

## Experiment 1

We expected the rejection rate of the (8/2) distribution to be different across different Mini UGs. More specifically, the highest rejection rate expected to be in the (5/5) game. In addition we expected to find statistically significant differences between the rejection rates of the (8/2) distribution in the (5/5) and the (10/0) games.

### Method

Participants: Fifty first year psychology students (M age = 19.5, 36 female) at UNSW participated in the experiment as a part of their course requirement, and were informed that they would be paid, contingent on the outcome of their choices.

Procedure: There were 10 experimental sessions in total, and 5 participants were tested at a time in each experimental session. Participants were seated in separate rooms and their identities were kept hidden throughout the whole experiment. All participants played the Mini UG as the Responders since our main interest was to see whether we would be able to replicate the choice pattern of the Responders obtained in previous studies (i.e., Falk et al., 2003). However, each participant was told that only one participant in each group of 5 would be assigned to the Responder role and that the rest would be playing as Proposers. This procedure made them believe that the offer in each game would come from an actual but different participant (Proposer) rather than from the computer. The offers made by the computer mimicked the actual rate of proposals offered by real Proposers in the study of Falk et al. (2003). For instance, in that study, the (8/2) distribution was offered by 31% of the Proposers in the (5/5) game, and 73% in the (2/8) game. Thus the Responders in Experiment 1 were offered (8/2) distribution with the probability of .31 in the (5/5) game, and that of .73 in the (2/8) game. The participants played the games for real money, but currency was defined as Monetary Unit (MU), where 1 MU was equal to 0.5 AUD. The experiment was conducted and run with the Runtime Revolution Software.

Design: The Responders participated in all four Mini UGs presented in Table 1. They were asked to indicate their acceptance/rejection decisions for each of the two possible distributions in each game before hearing the actual distribution offered [i.e., the strategy method was used, see Falk et al., (2003) for further information regarding this method]. For example, in the (10/0) game, the Responders were asked whether they would accept or reject if the Proposer offered them the (10/0) distribution

Table 2. Rejection rates of (8/2) distribution across games in Experiment 1 and 2.

| | Rejection rates of (8/2) distribution | | | |
|---|---|---|---|---|
| | (5/5) Game | (2/8) Game | (10/0) Game | (8/2) Game |
| Experiment 1 | 60% | 42% | 18% | 14% |
| Experiment 2* | 52% | 41% | 18% | 50% |

* Rejection rates reported for Experiment 2 were averaged across rounds.

instead of (8/2); and they were subsequently asked whether they would accept or reject if the Proposer offered the (8/2) distribution instead of (10/0). If the game was (8/2), they were simply asked what they would do if the Proposer had no choice but to offer the (8/2) distribution. Once the Responders indicated their rejection/acceptance decision for each possible distribution, they simply moved on to the next game. After the completion of all four games, the Responders were informed about the overall outcomes and debriefed about the real set-up of the experiment (i.e., the offers were not made by actual proposers). The presentation order of the Mini UGs and that of the possible distributions in each game were randomized.

### Results

Table 2 (top row) shows the rejection rates of (8/2) distribution in different games. The main pattern observed in the previous studies (i.e., Falk et al., 2003; Sutter, 2007) was replicated. To test the overall rejection rate differences across four games, we ran Cochran's Q test. The test confirmed that the rejection rates of the (8/2) distribution were significantly different across four games ($p < .0001$). The rejection rate of the (8/2) distribution in the (5/5) game was the highest among four games. McNemar change tests were performed for the pairwise comparisons and it showed that the rejection rate in the (5/5) game was significantly higher than that of the (10/0) ($p < .0001$)[2]. These results confirmed the previous findings that the rejections to an (unfair) offer were indeed not determined by the absolute amount of money, but by how fair or unfair that offer was perceived in comparison to the other available offers.

## Experiment 2

In order to test the effect of the possibility of RB and FI we changed the structure of the Mini UG from being one-shot and anonymously played to being iterated and non-anonymously played. We predicted that the rejection rates of the (8/2) distribution in the Mini UG should be (i) even higher when its alternative was the (5/5) distribution because it is adaptive to build the reputation that one is a tough bargainer who rejects unfair offers, and (ii) even lower when its alternative was the (10/0) distribution because it is adaptive to give the message for future interactions that one is capable to discern and will reward fair intentions.

### Method

Participants: Ninety-six first year psychology students (M age = 19.63, 62 female) at UNSW participated in the experiment as a part of their course requirement and were informed that they would be paid depending on the outcome of their choices. Four participants were tested in each experimental session and there were 24 sessions in total.

Instructions phase: First, the participants were randomly allocated to their roles, (with 2 being Proposers, and the other 2 being Responders) and warned against revealing their allocated roles to the others. Individual players were then given detailed verbal instructions (along with a written instructions document) regarding the general structure of the game play, what their roles required them to do, and what the consequences of their accept/reject decisions would be. They were specifically informed that they would play the game for more than one round with the same partner, and that their decision would be announced to other players before they switched their partners. However, the players were not given any information about how many rounds they would play in total (i.e., in order to make the 'shadow of the future' long enough), when exactly they would switch partners (i.e., in order to make the possibility of RB stronger). In order to eliminate a potential wealth effect, the participants were told that the overall amount that they would receive would be determined by a coin flip at the end of the experiment. If the coin toss came up heads, then they would get paid the amount that they earned in the first half of the experiment, and if tails, the amount earned in the second half. Afterwards, the instructions documents were collected, and the players were taken to the separate rooms to complete a short quiz measuring whether all the instructions were understood clearly.

Design: Each experimental session consisted of 4 consecutive rounds and in each round the participants played a different Mini UG game [i.e., the (5/5) game in Round 1, the (8/2) game in Round 2 and so on. Note that the allocation of the games into particular rounds was randomized]. Each player was matched with his/her first game partner (i.e., Proposer 1 with Responder 1) before

[2] The rejection rates for the alternative distributions (5/5), (2/8), and (10/0) were 2%, 6% and 82% respectively in Experiment 1.

[3] The rejection rates of the alternative distributions in the (5/5), (2/8) and (10/0) games were as follows: Nobody rejected the (2/8) distribution and only one participant rejected the (5/5) distribution. Almost 96% rejected the (10/0) distribution.

Round 1 and played two consecutive rounds (e.g., Round 1 and Round 2) with the same partner. After the completion of Round 2, they switched their partners (i.e., Proposer 1 started playing with Responder 2) and played the following 2 rounds (Round 3 and Round 4) with their new partners. At the end of each round, decisions of both players (and the resulting outcomes) were announced to the players. These announcements were done privately (i.e., only between the pairs) after Round 1 and after Round 3; but publicly (i.e., to all players) after Round 2 and Round 4. For example, the decisions of Responder 1 and Proposer 1 were announced only to these two players after they completed Round 1, but their overall decisions in Round 1 and Round 2 were announced to all players just before they switched their partners.

Game play: In all Mini UGs, the Proposer was asked to choose one of the two available distributions (see Table 1). Simultaneously the Responder, without knowing what the Proposer actually had chosen to offer, was asked to indicate his/her acceptance/rejection decisions for each of the two possible distributions. (If the Responder had accepted the offer that the Proposer had actually chosen, the amount was distributed in accordance with the proposal. Otherwise, both got nothing). Both players were informed about the outcome right after the game was over, and then they moved on to the next game. The currency in the experiment was defined in Monetary Units (MU), where 1 MU equals .5 AUD. The experiment conducted and run with z-Tree (Fischbacher, 2007). After the game play was over, both players received a questionnaire. The Proposers were asked to indicate why they offered the amount they offered and the Responders were asked why they rejected/accepted the (8/2) distribution.

### Results

All participants passed the quiz distributed before the game play, thus all responses were included in the analysis. Table 2 (the bottom row) presents the overall rejection rates of the (8/2) distribution in different games. The highest rejection rate was obtained in the (5/5) game and the lowest in the (10/0) game. These rejection rates of the (8/2) distribution were significantly different across four groups ($p = .0011$, Cochran's Q test). Interestingly, half of the participants rejected the (8/2) distribution in the (8/2) game. McNemar change tests indicated that the rejection rate in the (5/5) game was significantly higher than that in the (10/0) game, $p = .0006$ but not than those in the (2/8) and the (8/2) games, $p = .30$, and $p = .83$, respectively[3].

A cross-experimental comparison demonstrated that the rejection rates of the (8/2) distribution between Experiment 1 and Experiment 2 did not significantly differ in the (5/5) games [$\chi^2(1, N=98)= .62$, $p = .43$], the (2/8) games [$\chi^2(1, N=98)= .00$, $p = .97$], and the (10/0) games [$\chi^2(1, N=98)= .01$, $p = .92$]. Contrary to our expectations, the rejection rates of the (8/2) distribution did not increase when the alternative distribution was (5/5), and did not decrease when the alternative distribution was (10/0). However, the (8/2) distribution was rejected in the (8/2) game much more frequently in Experiment 2 than Experiment 1, $\chi^2(1, N=98) = 13.12$, $p = .0003$. To explore the pattern of results obtained in the (8/2) game in detail, we examined round by round rejection rates. The rejection rates of the (8/2) distribution were especially high in Round 1 and Round 3 in which the first encounters with the game partners took place (see Figure 1). Possible reasons for this special pattern are addressed in the General Discussion section.

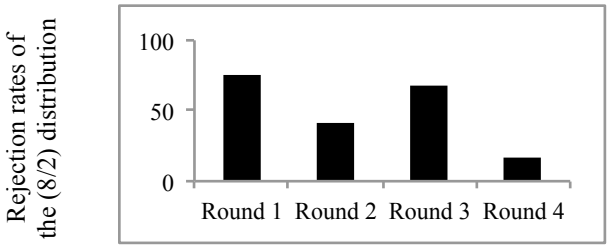


Figure 1. Rejection rates of (8/2) distribution in the (8/2) game across rounds.

## General Discussion

In Experiment 1, we (re)established the phenomenon that people (negatively) respond to intentional unfairness in a Mini UG at a cost to their own material payoff. Contrary to our predictions, results of Experiment 2 indicated that the additional effect of possibility of RB and FI did not lead to an increase in altruistic cooperation [i.e., rejection rates of the (8/2) distribution did not change especially when the Responders were expected to punish unfair offers (i.e., the 5/5 game) or to reward fair offers (i.e., the 10/0 game)]. Two potential but competing explanations could be made. One possibility is that the possibility of RB and FI is indeed (mis)perceived in one-shot and anonymously played games, and thus did not lead to any differences in the pattern of responses when it was explicitly incorporated into the context (Haley & Fessler, 2005; Bateson, Nettle, & Roberts, 2006). The other possibility is that the explicit incorporation of the possibility of RB and FI did not have any additional effect on the responses in the presence of the influence of fairness considerations (that are already effective enough to determine the rates of rejection).

Unexpectedly high rejection rates observed in the (8/2) game in Experiment 2 provide supporting evidence for the latter explanation. The possibility of RB and FI changed the responses only in a particular game where the intention of the Proposer was not assessable (the 8/2 game), but not in the other games in which the intentions were assessable (i.e., the 5/5, the 10/0, and the 2/8 games). This pattern of results supports the governing role of fairness considerations in two ways. First, rejection rates of the (8/2) distribution may have already reached a maximum level in the (5/5) game or a minimum in the (10/0) game even in one-shot and anonymously played

Mini UG just as a result of the perceived fairness of the distribution. Thus there was no room for an additional effect induced by the possibility of RB and FI. This is an indication of how dominant the fairness concerns are in determining the level of altruistic cooperation.

Second, finding no evidence for pronounced levels of altruistic cooperation in respective games [i.e., the (5/5), (2/8) and (10/0) games] might be an indication of the effect of RB and FI being too weak to overcome the effect of fairness considerations. The Responders might only be taking the perceived intentions of the Proposers into consideration as a determinant of their accept/reject decisions for an unequal offer, and thus might not need to have additional reasons/concerns to change those decisions even when RB and FI are possible. However, once the fairness consideration is weakened as a result of the removal of the possible intentions behind an offer in the (8/2) game, the effect of RB and FI becomes effective in changing their responses/concerns: It makes the Responders (negatively) react against the unfairness of the *outcome* of the (8/2) distribution, most likely, in order to increase the possibility of being treated fairly in the future (Hertel et al., 2002; Kiyonari et al., 2000). The round-wise analysis of the (8/2) game (see Figure 1) confirmed that the increase in rejections (in response to unfair distribution) was indeed resulting from the effect of the possibility of RB and FI. Round 1 and Round 3, in which the highest rejections were observed, were particularly important for the Responders to convey their message for the future encounters. The implicit message given under such condition could be that they don't like to be offered an unequal distribution. The Responders' self-reports collected after the game play also indicate that the main purpose of the rejections in this game was indeed to tell the Proposers that 'I will reject again if you ever propose such an unequal distribution'.

The current set of studies explicitly reveals the importance of fairness considerations in determining the level of altruistic cooperation, especially in the presence of other dominant factors such as the possibility of RB and FI. Demonstrating that these other factors may become effective only in the absence of an important aspect of the fairness concerns [i.e., (un)fairness of intentions] provides a new avenue for the investigation of economic behavior in interactive environments.

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