

The Effect of Impression Formation on Rejection in the Ultimatum Game

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Previous studies have attempted to elucidate people's motives for rejecting unfair offers in the ultimatum game. One approach assumes that people reject unfair offers to punish ill intentions behind the offers, motivated by retribution and/or deterrence. To disentangle these two motives and investigate when each motive drives rejection, we focused on people's tendency to form moral impressions rapidly. We hypothesized that the deterrence motive would drive rejection when the negative impression of those who have made unfair offers is uncertain, while the retribution motive would drive rejection when the impression is certain. The result of an online experiment ($N = 199$) of a repeated mini-ultimatum game did not support our hypothesis; the certainty of the negative impression did not have significant effects on rejection of unfairness. We discuss the implications of this result, incorporating the results of exploratory analyses regarding self-reported motives.

Keywords

ultimatum games, rejection of unfairness, preference for fairness, deterrence, retribution, impression formation

Introduction

In the ultimatum game (UG; Güth et al., 1982), two players must negotiate the division of a sum of money. One of the players (the Proposer) is instructed to offer any portion of the money to the other player (the Responder), who can accept or reject this offer. If the Responder accepts, the money is distributed in accordance with the offer. If the Responder rejects, neither player receives any money. Based on the model of *homo economicus*, or, more specifically, on the assumption that humans behave to maximize self-interest, it is irrational to reject any positive (i.e., non-zero) offer. However, a plethora of experimental studies has revealed that low offers, that is approximately 20% of the total amount, are rejected with high probability (Camerer, 2003; Güth & Kocher, 2014).

Researchers have attempted to explain this “irrational”

behavior, or, in other words, people's preference for fairness. They have suggested various models, which can be classified into two approaches (Civai, 2013; Sandbu, 2007). One approach focuses on outcomes, suggesting that people are averse to unequal distributions per se (“inequity aversion”) (e.g., Fehr & Schmidt, 1999). The other approach focuses on intentions, claiming that people are sensitive to intentions behind unequal distributions and are willing to punish ill-intentioned Proposers (e.g., Falk & Fischbacher, 2006; Rabin, 1993). This latter approach can be divided into finer categories based on the literature on justifications or motives for punishment: retribution and deterrence (Bentham, 1843/1962; Carlsmith et al., 2002; Kant, 1787/2011).

People motivated by retribution employ punishment, assuming that norm violators should suffer in proportion to their wrongdoing. Here, punishment is an end in itself, and its severity is generally determined by how significant and intentional the wrongdoing was (Carlsmith et al., 2002; Kant, 1787/2011). In the UG, Responders motivated by retribution reject unfair offers to reduce the Proposer's payoff to zero. For example, Yamagishi et al.'s experiments (2009) showed that people rejected unfair offers more often when they could reduce the Proposer's payoff than when they could not (see also Eriksson et al. [2017] for the role of a motive for reducing the Proposer's payoff).

People motivated by deterrence punish norm violators to prevent them from future transgressions. Here, punishment is a means to increase the cost of wrongdoing and make wrongdoing a disadvantageous option (Bentham, 1843/1962). In the UG, this utilitarian or consequentialist motive has been studied as “reputation building” or “strategic teaching” (Camerer, 2003; Cooper & Dutcher, 2011; Nowak et al., 2000). Responders motivated by deterrence reject unfair offers to establish a reputation as a tough bargainer or to teach the Proposer to make higher offers in the future. Indeed, several studies showed that Responders rejected unfair offers more often when they had a chance to change the Proposer's future behavior than when they did not (e.g., Abbink et al., 2004; Güney & Newell, 2013; Slembeck, 1999).

Although previous studies on the UG have revealed that both retribution and deterrence motives drive rejection of unfairness, they have paid little attention to when each motive is employed. To better understand why Responders reject unfair offers in the UG and, by extension, why people sacrifice available resources to avoid unfairness in various contexts, the effect of these motives must be disentangled. This can be accomplished by examining situations in which each motive plays a different role. In the present research, we focus on the certainty of moral impression (that Responders form about the Proposer) as a factor that determines which motive would drive rejection of unfairness.

A large body of work has shown that people form moral impressions automatically, a practice that is adaptive

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in that it helps people avoid being exploited by bad or uncooperative agents (Cosmides & Tooby, 1992; Fiske et al., 2007). People are especially sensitive to signs of bad character and form fast and accurate impressions about it (e.g., Baumeister et al., 2001; Öhman et al., 2001; Verplaetse et al., 2007; Yamagishi et al., 2003). However, this does not mean that impressions about bad character are fixed readily; rather, such negative impressions are volatile and revised more rapidly than positive impressions so that people do not miss out on future interactions with good or cooperative agents (Siegel et al., 2018).

Responders in the UG would also form moral impressions of the Proposer effortlessly, thereby affecting their motives for rejection. We predicted the effect of impression formation as follows. When the Proposer has made an unfair offer, the Responder must form a negative impression of the Proposer, but the impression would still be volatile; the Responder would infer that the Proposer might change their behavior in future interactions. With this belief (i.e., the possibility of the Proposer learning to make higher offers in the future), the Responder could reject unfair offers due to the deterrence motive. However, when the Proposer has made unfair offers repeatedly and the negative impression has become certain, the Responder could reject unfair offers due to the retribution motive. Repeated unfair offers indicate the significance of the wrongdoing and imply the Proposer's intention behind it.

Based on this reasoning, we hypothesized that the volatility or certainty of the negative impression of the Proposer would have opposite effects on the Responder's motives for rejecting unfair offers. When the impression is uncertain, the deterrence motive would drive rejection; when it is certain, the retribution motive would do so. To examine this hypothesis, we conducted an online experiment, programming it with oTree (Chen et al., 2016).

Methods

We recruited 199 participants (mean age 43.89 years, 25.13% women) through a crowd-sourcing platform provided by Yahoo! Japan. Participants received 100 Japanese yen as compensation for participation. Some of them ($n = 82$ people) received 15 Japanese yen as a bonus in addition to compensation for participation when they were able to gain more than a predetermined number of "coins" (i.e., 1599 coins) in the experiment.

The experiment used a mini-UG (Falk et al., 2003). In the standard UG, Proposers can offer any portion of the money to the Responder, whereas in this mini-UG, Proposers have to choose one of two offers. In our mini-UG, Proposers had two options for distributing 1000 coins: a fair offer (500 coins each for the Proposer and the Responder) or an unfair offer (800 coins for the Proposer and 200 coins for the Responder). We used the mini-UG instead of the standard UG because the former makes it easier to infer the Proposer's intention (Güney & Newell, 2013).

After reading the instructions for the mini-UG, participants were led to believe that they would be paired with another participant, take the role of either the Proposer or the Responder, and play the game with their partner for 11 rounds (including one practice round and ten paying rounds). However, participants played

the mini-UG alone; all participants took the role of the Responder and responded to a computer partner's (i.e., the Proposer's) offers, which were programmed to behave unfairly. See Appendix 1 in Supplementary Material for the experimental instructions.

The experiment incorporated a between-participant 2 x 2 design, with factors of the certainty of the negative impression of the Proposer (certain vs. uncertain) and the possibility of deterrence (possible vs. impossible). For the former factor, we manipulated the Proposer's decisions. In both conditions, the Proposer behaved unfairly, but while the Proposer in the *impression-certain conditions* chose the unfair offer for all ten rounds, the Proposer in the *impression-uncertain conditions* chose the unfair offer for eight rounds and the fair offer for two rounds (the fourth and eighth rounds).

Participants assigned to the *deterrence-possible conditions* were told that the Proposer and the Responder would take turns making decisions. Thus, they believed that they could deter the Proposer from choosing the unfair offer in future interactions. Participants assigned to the *deterrence-impossible conditions* were told that the Proposer would make decisions for all ten rounds at the beginning of the game, meaning that participants' decisions could not affect the Proposer's decisions. Note that retribution, reducing the Proposer's payoff to zero by choosing rejection, was possible in both conditions.

At the end of each round, participants rated their impressions of the Proposer on a scale ranging from "nice (-50)" to "nasty (50)" and rated how certain they were about the impression on a scale ranging from "uncertain (0)" to "certain (100)" (adopted from Siegel et al. [2018]). These values were multiplied and divided by 100 to create a new value called *belief certainty of the negative impression* ("absolutely nasty [50]" to "absolutely nice [-50]"), where zero indicates that the impression is uncertain).

After the game, participants were asked to report on why they rejected unfair offers by rating three items on a 5-point scale ranging from "totally disagree (1)" to "totally agree (5)." The three items measured the *retribution motive* ("Did you reject unfair offers to retaliate against the Proposer?"), the *deterrence motive* ("Did you reject unfair offers to prevent the Proposer from making another unfair offer in future rounds?"), and the motive to avoid inequity per se (i.e., *inequity aversion*) ("Did you reject unfair offers to keep the Proposer from gaining more coins than you do?"). These self-reported motives were measured for exploratory analyses.

To test our hypothesis (i.e., when the impression is uncertain, the deterrence motive would drive rejection, and when it is certain, the retribution motive would do so), we examined the interaction effect between the possibility of deterrence and the certainty of the negative impression of the Proposer. If the hypothesis is valid, the certainty should have a positive effect on rejection in the deterrence-impossible conditions (i.e., when only retribution is possible). In the deterrence-possible conditions (i.e., when both deterrence and retribution are possible), on the other hand, the certainty should have a smaller or no effect. This is because the certainty in the deterrence-possible conditions would have both positive (through increasing the retribution motive) and negative effects (through

decreasing the deterrence motive) on rejection, and these effects would cancel each other out.

We used two variables to examine the effect of the certainty of the negative impression of the Proposer: objective and subjective certainty. The objective certainty was the percentage of the Proposer’s fair offers in the current and previous rounds (*cumulative percentage of fair offers*); in the impression-certain conditions, the value was always zero, while in the impression-uncertain conditions, the value ranged from zero to 25% (e.g., the value of the fifth round in the impression-uncertain conditions was 20% because the Proposer has chosen the fair offer once out of five times). The subjective certainty was belief certainty of the negative impression, which was measured at the end of each round as noted above.

The study received ethical approval from the institutional review board of the Department of Social Psychology, Graduate School of Humanities and Sociology, the University of Tokyo, Japan (IRB_SP2019_009/ UTSP-19009).

Results

Figure 1 presents the average levels of rejection over time in all conditions. In the impression-uncertain conditions, the Proposer chose the fair offer in the fourth and eighth rounds, so the rejection rate was approximately zero in those rounds. Figure 2 depicts the mean levels of belief certainty of the negative impression. As expected, after the fourth round (i.e., when the Proposer in the impression-uncertain conditions chose the fair offer for the first time), participants in the impression-uncertain conditions were more uncertain about the Proposer’s impression than those in the impression-certain conditions (see Appendix 2 for details).

To examine the hypothesis, we applied generalized linear mixed models with a binomial distribution, using R software version 4.0.2 (R Core Team, 2020) and the R package lme4 (Bates, et al., 2020). We entered the possibility of deterrence, the certainty of the negative

impression of the Proposer, and the interaction term between them into our models as fixed effects, and intercepts for participants as random effects (Table 1). As described above, we used two variables to examine the effect of the certainty of the negative impression of the Proposer. Models 1 and 2 examined the objective and subjective certainty, respectively.

In Model 2, we examined both the between- and within-participant effects of belief certainty of the negative impression. In other words, we entered the participant-specific mean (averaging across rounds of a participant but not across participants) and the participant-mean centered variable (subtracting the participant-specific mean from each round score of the participant) as independent variables (see Wang & Maxwell, 2015).

In conducting the analyses, we removed data from the first and last rounds because participants were not used to the game in the first round and demonstrated the end-game effect in the last round. We also removed data from the fourth and eighth rounds, in which the Proposer in the impression-uncertain conditions made the fair offers, while the Proposer in the impression-certain conditions made the unfair offers. We removed this data because the models did not converge when we used it and included the Proposer’s offer as an independent variable.

The results showed the significant effect of the possibility of deterrence: Responders rejected unfair offers more often when they believed that they had a chance to change the Proposer’s behavior in future interactions. This result implies that people do have the deterrence motive when they reject unfair offers in the UG, as suggested in previous studies (e.g., Abbink et al., 2004; Güney & Newell, 2013; Slembeck, 1999). However, the interaction effect between the possibility of deterrence and the certainty of the negative impression of the Proposer was not significant in both models, counter to our hypothesis.

We conducted linear regression analyses as exploratory analyses regarding self-reported motives for rejecting unfair offers. We examined between-participant effects (i.e., not within-participant effects). As can be seen in

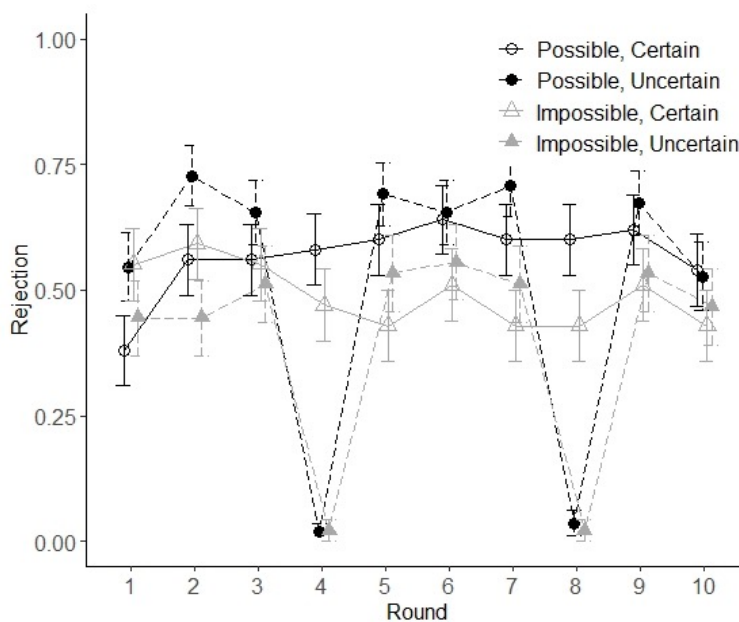


Figure 1. Mean levels of rejection according to condition.
 Note. Error bars represent standard errors.

Table 2, we found small but significant effects consistent with our hypothesis on the retribution motive and previous studies on the deterrence motive (e.g., Abbink et al., 2004; Güney & Newell, 2013; Slembeck, 1999). First, those who were certain about the negative impression of the Proposer during the experiment reported a stronger retribution

motive. Second, those who had a chance to change the Proposer's behavior reported a stronger deterrence motive. As to inequity aversion, the independent variables showed no significant effect.

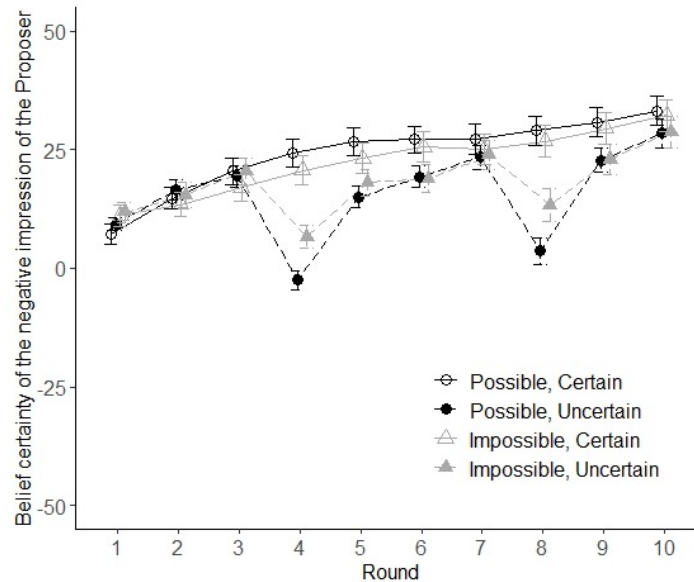


Figure 2. Mean levels of belief certainty of the negative impression according to condition.

Note. Error bars represent standard errors.

Table 1. Generalized linear mixed models predicting rejection.

| Fixed effects | Model 1 | | Model 2 | |
|---|----------|-----------|----------|-----------|
| | <i>b</i> | <i>SE</i> | <i>b</i> | <i>SE</i> |
| Intercept | -0.04 | 0.60 | 0.17 | 0.59 |
| Possibility of deterrence (1 if possible, 0 if impossible) | 2.40 | ** 0.89 | 2.30 | ** 0.87 |
| Certainty of the negative impression | | | | |
| Cumulative percentage of fair offers | 3.43 | 2.42 | | |
| Belief certainty of the negative impression (PMC) | | | 0.01 | 0.01 |
| Belief certainty of the negative impression (PSM) | | | 0.06 | 0.04 |
| Possibility of deterrence x Certainty of the negative impression | | | | |
| Possibility of deterrence x Cumulative percentage of fair offers | -3.51 | 3.28 | | |
| Possibility of deterrence x Belief certainty of the negative impression (PMC) | | | 0.02 | 0.02 |
| Possibility of deterrence x Belief certainty of the negative impression (PSM) | | | -0.04 | 0.05 |
| Random effects | Variance | <i>SD</i> | Variance | <i>SD</i> |
| Intercept | 21.66 | 4.65 | 22.07 | 4.70 |
| Akaike Information Criterion | 963.5 | | 958.1 | |

Note. PMC = participant-mean centered. PSM = participant-specific mean.

** *p* < .01

Table 2. Linear models predicting self-reported motives for rejection.

| Dependent variable | Retribution (<i>M</i> = 2.57, <i>SD</i> = 1.86) | | Deterrence (<i>M</i> = 2.84, <i>SD</i> = 1.97) | | Inequity aversion (<i>M</i> = 2.64, <i>SD</i> = 1.88) | |
|---|---|-----------|--|-----------|---|-----------|
| | <i>b</i> | <i>SE</i> | <i>b</i> | <i>SE</i> | <i>b</i> | <i>SE</i> |
| Intercept | 2.46 | *** 0.19 | 2.38 | *** 0.20 | 2.66 | *** 0.19 |
| Possibility of deterrence (1 if possible, 0 if impossible) | 0.21 | 0.25 | 0.88 | ** 0.27 | -0.04 | 0.27 |
| Belief certainty of the negative impression | 0.03 | ** 0.01 | 0.02 | 0.01 | 0.02 | 0.01 |
| Possibility of deterrence x Belief certainty of the negative impression | 0.00 | 0.02 | -0.00 | 0.01 | -0.01 | 0.02 |
| <i>R</i> ² | 0.08 | | 0.06 | | 0.03 | |

*** *p* < .001, ** *p* < .01

Discussion

To investigate when each of the retribution and deterrence motives drives rejection of unfairness in the UG, we examined the interaction effects between the possibility of deterrence and the certainty of the negative impression of the Proposer. Against our prediction, the certainty did not have a significant effect on rejection, whether deterrence was possible or not. However, as the exploratory analyses showed, those who were certain about the negative impression of the Proposer reported a stronger retribution motive. Thus, although we could not find any significant effect of the certainty on behavior in the present research, the certainty may have an impact on emotion or cognition. Future research should elaborate on our hypothesis to examine the effect of the certainty on non-behavioral outcomes.

Another limitation of the present research is that we asked participants the impressions of the Proposer at the end of each round; this querying might have affected their behavior. For instance, Samahita (2017) found that people who received unfair offers in the UG accepted them slightly more frequently when they had a chance to express their feelings to an experimenter (not the Proposer). In our experiment, participants reported their impressions of the Proposer to the experimenters, which might have decreased their rejection rate. Future research is necessary to examine the effect of the querying.

The contributions of the present research are twofold. First, we conceptually replicated previous studies on the UG (e.g., Abbink et al., 2004; Güney & Newell, 2013; Slembeck, 1999), demonstrating the deterrence motive for rejection. This finding indicates that costly rejection is driven partly by strategic thinking; people are sometimes willing to incur a cost to earn a reputation as a tough bargainer and deter their partner from exploiting them in future interactions. Second, and most importantly, the present research provided a new perspective by relating people's tendency to reject unfair offers and their inclination to form moral impressions. Although unfairness aversion and impression formation have generally been studied separately, they may be strongly related to each other, as suggested in the introduction. We hope that our questions and findings will stimulate future research to further examine people's motives for rejection of unfairness.

Supplementary Material

Data, R code, experimental instructions (Appendix 1), and additional exploratory analyses (Appendix 2) can be found in the Open Science Foundation through this link: <https://osf.io/tkcvx/>

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