# The private rejection of unfair offers and emotional commitment

Toshio Yamagishi[a,1], Yutaka Horita[a], Haruto Takagishi[a], Mizuho Shinada[a], Shigehito Tanida[a], and Karen S. Cook[b]

[a]Graduate School of Letters, Hokkaido University, N10 W7 Kita-ku, Sapporo, Japan 060-0810; and [b]Department of Sociology, Stanford University, 450 Serra Mall, Stanford, CA 94305-2047

In a series of experiments, we demonstrate that certain players of an economic game reject unfair offers even when this behavior *increases* rather than decreases inequity. A substantial proportion (30–40%, compared with 60–70% in the standard ultimatum game) of those who responded rejected unfair offers even when rejection reduced only their own earnings to 0, while not affecting the earnings of the person who proposed the unfair split (in an impunity game). Furthermore, even when the responders were not able to communicate their anger to the proposers by rejecting unfair offers in a *private* impunity game, a similar rate of rejection was observed. The rejection of unfair offers that *increases* inequity cannot be explained by the social preference for inequity aversion or reciprocity; however, it does provide support for the model of emotion as a commitment device. In this view, emotions such as anger or moral disgust lead people to disregard the immediate consequences of their behavior, committing them to behave consistently to preserve integrity and maintain a reputation over time as someone who is reliably committed to this behavior.

emotion | fairness | reciprocity

Emotions, rather expressed publicly or experienced only privately in the absence of observers, may serve us well in the long run. Experimental research on economic games provides intriguing insights into this phenomenon in the context of understanding constraints on self-regarding behavior. The ultimatum game (1–5) is the game most often used in the social sciences to demonstrate the existence of preferences that are not strictly self-regarding such as inequity aversion and reciprocity. The ultimatum game is played by 2 players—a *proposer* and a *responder*. The proposer, is provided \$X by the experimenter and then given the opportunity to make a proposal concerning how to divide the money with the *responder.* The responder is given 2 alternatives—to either accept or reject the proposal. If the proposal is accepted, each player receives the amount specified in the proposal. If the proposal is rejected, neither party receives any money. In a typical experiment, the responder does not know who the proposer is and the two never meet. Furthermore, the game is played only once. As a result, it is not possible for a responder to reject an unfair offer to communicate directly to the proposer that she should behave more fairly in the future.

According to the self-regarding actor model typically used in economic game theory a rational, cognitively competent self-regarding responder should accept any proposal that provides some money, no matter how small the amount. A rational proposer who expects this response should therefore propose to give the minimal non-0 amount to the responder. However, the results of ultimatum game experiments generally do not support this prediction. The modal division proposed is a 50–50 split, and extremely unfair proposals are rare (2, 3). Furthermore, the majority of responders typically reject unfair offers that give them <20–30% of the total (2–5). These findings are not limited to student participants in industrial societies, and they do not occur only when the stakes are small. Similar results were obtained when the total amount at stake was worth a few months' earnings (6–8). These findings have been treated as clear

evidence that humans are not purely self-regarding and that they often exhibit other-regarding social preferences, such as a preference for inequity aversion (9, 10) and for reciprocity (i.e., including the desire to punish norm violators) (11, 12).

The primary goal of this study is to examine whether these social preferences (i.e., for restoring fairness and for punishing norm violators) are actually the predominant reasons that responders reject unfair offers in the ultimatum game. To pursue this goal, we investigate whether responders reject unfair offers in a variant of the ultimatum game called the private impunity game. An impunity game (13) is similar to the ultimatum game. It is played between a proposer and a responder. The proposer offers a division of money and the responder decides whether to accept or reject the offer. When the offer is accepted, the proposer and the responder receive the amount specified in the proposal. When the offer is rejected, the responder loses whatever money was allocated by the proposer. Although the responder earns nothing, the proposer keeps the money he designated for himself. A rejection of the offer by the responder thus exacerbates rather than reduces inequality. A social preference for inequity aversion, therefore, cannot explain rejection behavior in the impunity game.

The rejection of offers in the impunity game, however, may be explained as an effort to symbolically punish the proposer's unfair behavior by conveying anger directly to the proposer (1). This possibility of symbolic punishment is eliminated in a version of the impunity game that is private. In the *private* impunity game the only difference is that the proposer is **not** informed that the responder has the option to reject a proposal. Thus, the proposer would never know whether the responder rejects the offer or not. In this case, from the proposers' point of view, they are playing what is referred to as a dictator game (14). Because the responder knows the proposer does not know whether she accepted or rejected the offer, she is not able to convey her anger directly to the proposer by unilaterally rejecting the offer as unfair.

In the standard impunity game, it is predicted that the rejection rate should be substantially reduced because the social preference for inequity aversion does not lead people to reject unfair offers in this case. Although such rejection behavior may be used to symbolically punish one who proposes unfair offers by conveying the responder's anger or moral aversion, this motivation should not operate in the *private* impunity game. Neither inequity aversion nor the preference for reciprocity can explain rejection behavior in the private version of the game. If such preferences lead to the rejection of offers in the ultimatum game,
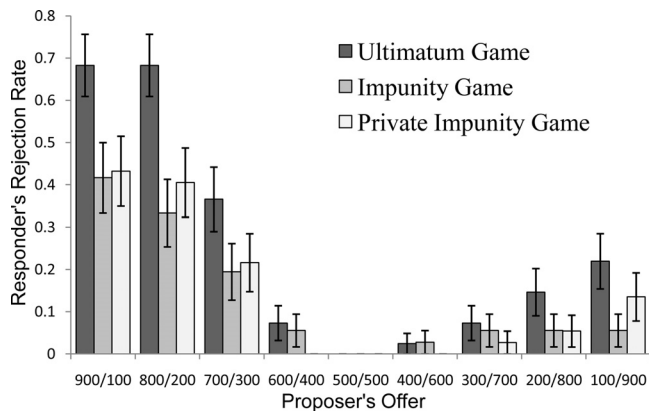
**Fig. 1.** Responder's rejection rate for each of the 9 possible offers in Study 1. Error bars, SEs.



**Fig. 2.** Rejection rate of 800/200 offers in the 3 games in the 3 studies. Error bars, SEs.

as assumed in previous work (3, 15) then the rejection rate in the private impunity game is predicted to be close to 0. We compare rejection rates in these 3 variants of the ultimatum game—the standard ultimatum game, the impunity game, and the private impunity game—to test these predictions. We use 3 different methodologies—the strategy method in Study 1, a 1-shot game in Study 2, and a repeated 1-shot game in Study 3—to demonstrate that our findings are not unique to a particular methodology.

**Study 1: The Strategy Method (16).** In the first experiment, we used the strategy method (17). Because this study has been published in Japanese, and may not be accessible to non-Japanese readers, we describe the findings of this study briefly before presenting results from our subsequent studies. The results of this study are summarized in Fig. 1. Nearly 70% of the participants rejected extremely unfair offers of 900/100 and 800/200, more or less in line with rejection rates reported in previous research (3). The proportion of such offers that were rejected was lower in the impunity and the *private* impunity games compared with that observed in the standard ultimatum game. However, even in the impunity game 30–40% of the participants rejected extremely unfair offers that gave them far less than the proposer would receive. The most interesting finding is that the rejection rates in the *private* impunity game were not much different from the rejection rates in the impunity game. These findings suggest, on one hand, that the social preference for inequity aversion plays a strong role in motivating people to reject unfair offers in the ultimatum game, and yet, that preferences for inequity aversion and reciprocity explain less than half of the rejection behavior obtained in the ultimatum game.

**Study 2: 1-Shot Games.** Although we observed a significant level of rejection behavior in the impunity and the private impunity games in the first study, the use of the strategy method prevents us from drawing firm conclusions. Participants were asked to *imagine* they were facing a range of offers from the proposer and they had to decide whether to accept or reject each of the *possible offers*. This situation differs substantially from the situation in which they face a single offer that has actually been proposed by another participant. For this reason, we conducted the second study using a 1-shot game between 2 participants, instead of using the strategy method.

As shown in Fig. 2, the rejection rates for the 800/200 offer in the 3 games largely replicated the findings from Study 1. The rejection rate in the standard ultimatum game (48.65%) was higher than that in the impunity game (34.25%) and the private impunity game (33.78%). As in Study 1, there was no difference between the rejection rates in the 2 variants of the impunity game
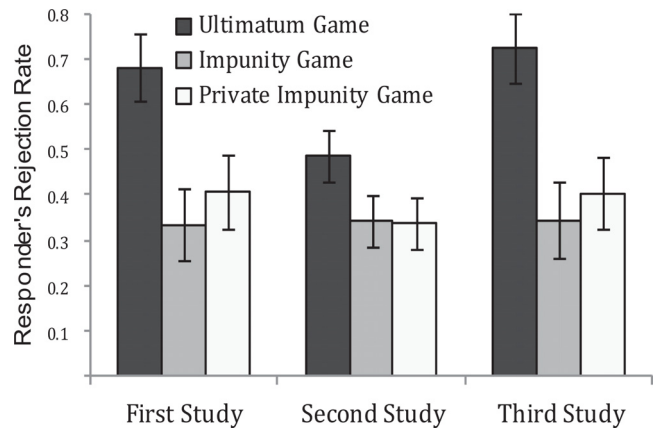
$[\chi^2 (1) = 0.00, P = 0.95]$, and the rejection rate in the ultimatum game was significantly different from that observed in the 2 types of impunity games $[\chi^2 (1) = 4.44, P = 0.04]$.

**Study 3: Repeated 1-Shot Games.** The findings from the first 2 studies are consistent, and the rejection rates observed in the impunity game are also consistent with the rejection rates found in some previous research (18, 19). However, these rejection rates differ markedly from the finding of almost no rejection in the impunity game reported by Bolton and Zwick (13). There are 2 important differences between the methodology used by Bolton and Zwick (13) and ours that may be responsible for variance in the findings. First, there is at least 1 major difference in the nature of the games. In our first study, we used the strategy method, and in the second study, we used the 1-shot game design, whereas Bolton and Zwick (13) used a repeated one-shot design. That is, participants in the Bolton and Zwick study played the game many times, each time with a new partner. The second key difference that may account for the divergent findings is how the participants' choices were framed in the experimental instructions. The instructions we used in our studies clearly told the participants about the nature of the choices. It was made clear that the nature of B's choice (the responder) is whether to accept or reject a proposal. Bolton and Zwick's (13) instructions simply presented the outcomes of the 4 combinations of the proposer's and responder's choices, in the format: "if A chooses X and B chooses Y, then A *receives* \$α and B *receives* \$β." It is not intuitively obvious in this case that B has a choice between accepting and rejecting a fair or unfair offer. In Study 3, we used a repeated 1-shot game design, equivalent to the game used by Bolton and Zwick (13). If the pattern of findings from the third study is consistent with the first 2 studies, the difference between their findings and ours should be attributed to the difference in instructions.

Fig. 3 presents the average rejection rates of a fair offer and 3 levels of an unfair offer for study 3. Fig. 2 compares the rejection rates of the 800/200 offer in this study with that of the previous 2 studies. As shown in Fig. 2, the rejection rates of 800/200 offers in the third study were consistent with the results of the first 2 studies. Furthermore, the pattern of rejection shown in Fig. 3 almost completely parallels the findings reported in the left half of Fig. 1. The rejection rate in the impunity game ($M = 0.317$) and the rate in the private impunity game ($M = 0.323$) were practically identical (Mann–Whitney test, $z = 0.28$, $P = 0.78$). And, the rejection rate in the 2 impunity games combined was significantly different ($z = 3.84$, $P = 0.0001$) from the rejection rate in the ultimatum game ($M = 0.632$).
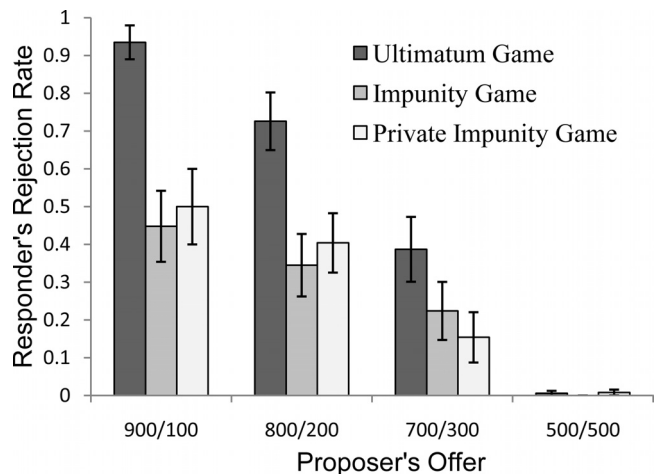
**Fig. 3.** Responder's rejection rate for each of the 4 possible offers in Study 3. Error bars, SEs.

## Discussion

The results were consistent across all 3 studies. First, a high rate of rejection of unfair offers (900/100 or 800/200) was observed in the standard ultimatum game, replicating findings from many previous studies (3). Second, the rejection rate was substantially reduced in the impunity game, but is still far from 0. The 30–40% rejection rate of unfair offers in the impunity game may be explained as the result of symbolic punishment (i.e., rejection as symbolic punishment for the lack of fairness). However, this potential reason for the residual level of rejection in the impunity game was not supported by the fact that this rejection behavior was not further reduced in the *private* impunity game when the responder's behavior is never known to the proposer. In addition, it should be noted that the 3 main findings we report are consistent across all 3 studies despite differences in methodology.

What remains to be explained is the substantial level of rejection of unfair offers even in the private impunity game. Such behavior is unexpected based on the standard accounts of rejection behavior in the ultimatum game—the social preference for inequity aversion and for reciprocity (i.e., the punishment of unfair proposers). The commitment model of emotion, originally developed by Frank (20) partly to explain rejection behavior in the ultimatum game, can provide an explanation for the rejection behavior we observed in the *private* impunity game as well. The core idea of Frank's model is that emotion can provide a solution to what Elster calls a commitment problem (21) that a rational individual cannot solve. If a responder in an ultimatum game is known to be "rational," self-regarding proposers will give him or her only the minimum offer, assuming that any rational individual would accept it. However, if a responder is known to be "hot tempered" and likely to disregard his or her immediate interest in response to unfair treatment, self-regarding proposers will give him or her an offer they believe will not generate anger. The reputation for being easily angered and for disregarding one's immediate self-interest when confronted by unfair treatment is thus actually an asset for responders who may be given unfair offers in ultimatum games. Although one may pretend to be hot-tempered by behaving as if angry in the presence of observers, while behaving rationally in the absence of observers, such a strategy may fail when one's behavior is unwittingly revealed to observers. Being emotional and behaving emotionally without regard to its immediate reputational implications is thus the surest way to acquire such a reputation. A recent study using EMG measures of facial muscles found that the responder who faced an unfair offer experienced the emotion of disgust (22),

and another study using brain scans (fMRI) demonstrates that rejection behavior in ultimatum games is accompanied by activities in the brain areas associated with negative emotions (23).

Nowak, Page, and Sigmund (24) used computer simulations to show that rejection behavior can evolve if proposers have access to information concerning which offers responders have accepted or rejected. Burnham (25) adopted the interpretation of rejection behavior in ultimatum games as the product of emotion as a commitment device (20, 21), and demonstrated that those who rejected unfair offers had a higher level of testosterone than those who accepted such offers. In many species including humans, a high level of testosterone is related to aggressive responses to a challenge. When a low offer is interpreted as a challenge to the responder's integrity, that is, as a sign of being regarded as one who can be taken advantage of without much resistance, those who have higher levels of testosterone will behave in a more aggressive manner than those with lower testosterone levels. According to Burnham (25), rejection behavior in the ultimatum game can be viewed as, at least partly, an aggressive response to such a challenge. Straub and Murnighan (26) suggest a similar logic and call it the "wounded pride hypothesis."

The key to success in solving a commitment problem is to allow the emotional response to dominate and to disregard the immediate incentives. Emotional responses to unfair treatment as a commitment device seem strong enough to dictate that one's behavior be consistent regardless of the consequence of the behavior. Whether the emotion is only internally experienced or externally expressed (1), from this perspective the rejection of unfair offers in the *private* impunity game may represent an emotional response to an insult or to the characterization imposed by another party of being an easy target for exploitation and unfair treatment. To acquire the reputation of being someone who never accepts this attribution one should consistently reinforce one's reputation by refusing any attempt to impose such a characterization even in private settings in which one's response is not made public. The fact that rejection behavior in the ultimatum game is reduced when responders communicate their anger through written messages (1) demonstrates the reputational implications of rejection behavior, the ultimate goal of which is to convince others, including the transgressor, that one is not a person who faint-heartedly accepts unfair treatment. The emotion of anger thus constrains a short-sighted rational actor from accepting an unfair offer and incurring a long-term reputational loss when such behavior becomes known. The role of emotion in this respect is to facilitate the disregard of immediate gain in the interest of consistency, which has longer-term reputational payoff. Thus, one should reject an unfair offer, insofar as it is regarded as an insult, regardless of the impact that behavior has for the proposer. This would explain the fact that rejection rates do not differ significantly in public or private impunity games.

Our findings consistently show that a substantial proportion of our participants refuse to accept an unfair outcome even when they cannot restore fairness or punish the proposer by doing so. This unexpected finding is consistent, however, with the commitment model of emotion (20, 21) according to which the rejection of unfair offers is a by-product of emotion (typically anger or moral disgust) that provides a solution to the commitment problem by restraining people from responding to the immediate incentives in the situation to preserve integrity and protect their reputations that may in the long run be more valuable.

## Methods

**Study 1.** One hundred fourteen undergraduates (82 men and 32 women) at Hokkaido University in Sapporo, Japan participated in the experiment, playing the role of responder. Although the same number of participants played the role of proposer, their behavior is not reported here. Students interested

in obtaining monetary rewards for their involvement in the study were recruited and scheduled for appointments. The 3 types of ultimatum game were manipulated as a between-participant factor and participants were randomly assigned to 1 of the 3 games ($n = 41$ in the ultimatum game, 36 in the impunity game, and 37 in the private impunity game). The proposers (whose behavior is not reported here) made proposals concerning how to divide a total of 1,000 yen ($\approx$ US $10). Specifically, all participants including both proposers and responders were told: ''A (proposer) decides how to divide the 1,000 yen that has been given to the two of you.'' The responders then decided whether to accept or reject the offer using the ''strategy method'' (17). That is, they decided whether to accept or reject each of the 9 possible divisions, ranging from 900 yen to the proposer and 100 yen to the responder to 100 yen to the proposer and 900 yen to the responder. The actual outcome of the game was determined by whether a responder accepted or rejected the proposed division. All participants received 300 yen as a fee for showing up in addition to the money they earned in the game.

In both the ultimatum game and the impunity game, participants were further told the following: ''B chooses to 'inform A that he/she has accepted A's decision' or 'inform A that he/she has rejected A's decision.' If B chooses to 'inform A that he/she has accepted A's decision,' A will be informed that B has accepted A's decision. Then, the two of you will receive the amount of money according to A's decision.'' After these sentences, participants in the ultimatum game were told: ''If B chooses to 'inform A that he/she has rejected A's decision,' A will be informed that B has rejected A's decision. As a consequence, both receive no money.'' Participants in the impunity game were told: ''If B chooses to 'inform A that he/she has rejected A's decision,' A will be informed that B has rejected A's decision. As a consequence, B will not receive any money (i.e., B earns nothing). However, A will receive the amount of money that he/she has allocated him/herself.''

In the private impunity game, proposers and responders were both given the following instructions: ''A decides how to divide the 1,000 yen that has been given to the two of you. A gets the amount of money he/she has allocated him/herself, and the experiment is over. B receives the money allocated by A.'' In addition to these common instructions, responders were told:''Although we have not told you in the previous instructions, you will also make a decision. You have to decide whether to 'accept' or 'reject' the decision made by your partner. If you choose to 'accept' your partner's decision, you will receive the amount of money allocated by him/her. If you choose to 'reject' your partner's decision, you will not receive the money allocated by him/her. (That is, you will earn nothing.) Your partner does not know that you have a choice between 'accept' and 'reject.' He/she decides how to allocate the 1,000 yen without knowing whether you will 'accept' or 'reject' his/her decision.'' Similar instructions were used in all 3 studies.

**Study 2.** Two hundred twenty-one undergraduates (149 men and 72 women) from Hokkaido University participated in Study 2. The 3 game conditions were manipulated as a between-participant factor ($n = 74$ in the standard ultimatum game, 73 in the impunity game, and 74 in the private impunity game).

Every student received 700 yen as a fee for showing up for the study in addition to the money they earned in the game. Participants did not meet each other and were assured of the complete anonymity of their decisions. The ultimatum game used in this study was a truncated version (13, 15, 27). That is, the proposer was given a pair of alternatives to choose from, one of which was 800/200 and the other was 500/500. Participants who played the role of the proposer (whose presence was required to avoid using deception in the study) made the proposal many times (20–30 times) and were told they would be paid only for some of the games. How the offers would be selected for actual payment was not specified to the proposer. Only the games in which the proposer made unfair offers were actually selected. In this way, all responders received an unfair offer of 800/200 while they expected that the proposer was free to choose any division of the 1,000 yen. Data from the proposers are not reported here.

After receiving initial instructions, participants who played the role of the responder were asked to wait for the proposer's decision. After a brief delay, the decision of a proposer was brought in by an experimenter in a sealed envelope. The participant was then asked to indicate whether to accept or reject the proposer's offer. The participant then put her decision into an envelope and called the experimenter to hand in the sealed envelope. The envelopes were collected by the experimenter and passed to an assistant who could not identify the participants to protect their anonymity. The assistant calculated the outcomes and enclosed the relevant pay in envelopes for each participant. Participants received the sealed envelopes including their pay from a secretary who knew nothing about the experiment.

**Study 3.** Eighty-six students (49 men and 37 women) participated in the third study as responders. Each participant played 1 of the 3 games 10 times ($n = 31$ in the standard ultimatum game, 29 in the impunity game, and 26 in the private impunity game), each time with a new proposer. Among the 10 games they played, they were presented with a fair offer of 500/500 five times, 700/300 two times, 800/200 two times, and 900/100 one time in a randomized order. No real proposers were involved in the third experiment, although participants who played the role of responder were told that they would deal with a different proposer in each game. Participants were told that the outcomes from 2 of the 10 games would be used as the basis for actual payments. Two games were selected as the basis for pay in such a way to guarantee a payment of at least 700 yen to the responder, although participants were not aware of this arrangement.

The laboratory consisted of 16 small rooms. In all 3 studies, participants worked privately in each room. These studies were approved by the Ethics Committee of the Department of Behavioral Science, Hokkaido University. For more information, please see *SI Appendix*.

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