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More Is Better, But Fair Is Fair: Tipping in Dictator and Ultimatum Games

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This paper examines Allocators' willingness to reward and punish their paired Recipients. Recipients only compete in a skill-testing contest, the outcome of which determines the size of the surplus. In the dictator game, Allocators reward skillful Recipients, but punish unskillful ones only modestly. The punishment effect is mitigated by the belief held by some Allocators that *effort* is the appropriate measure of deservingness. The ultimatum game extension reveals offerers' ability to adapt to the strategic environment. Offers to skillful Recipients in the ultimatum game, however, are shown to be motivated by a taste for fairness, and not strategic considerations. *Journal of Economic Literature* Classification Numbers: C70, C91, D63. © 1998 Academic Press

1. INTRODUCTION

Bargaining typically occurs over an amount (surplus) earned by one or more of the parties involved in the negotiation. Employers negotiate with employees over salaries, with the bargaining based in large part on an assessment of the employees' contribution to firm profits. Similarly, workers in service industries generate utility for their customers, the amount of which is determined by the level of service provided. Customers then generally tip in accordance with the perceived quality of service. Previous laboratory bargaining game experiments, however, treat this surplus as exogenously given. This paper endogenizes the pie-creation mechanism by having the person receiving the offer determine or earn the size of the surplus.

Recipients compete in a general knowledge and skill-testing contest, the outcome of which determines the pie size available to be divided by their

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paired Allocators. Recipients who win the contest earn a large, $10 pie, while losing Recipients create only a small $4 surplus for the paired Allocators to divide. Two dictator game[1] treatments are first conducted and compared to measure Allocators' willingness to share an amount earned by their paired Recipients. Offers to winning Recipients in this skill treatment are found to be greater than offers to lucky Recipients in the control treatment in which a coin toss outcome of heads produced the same $10 pie. This reward of skillful Recipients contrasts with the mild punishment found of losing Recipients: losing Recipients were offered less than was offered to Recipients in the control condition in which the same $4 pie was created by a coin toss outcome of tails.

Extending the design to the ultimatum game[2] allows us to examine the extent to which Allocators' pure preferences for giving found in the dictator game are modified by strategic considerations. (Table I summarizes the 2×2 experimental design.) The reward effect is diminished in the ultimatum game extension, and the punishment effect is eliminated altogether. Still, offers to skillful Responders are shown to be motivated by a taste for fairness, and not by strategic considerations.

[1] In the dictator game, one player, the Dictator or Allocator, determines how an amount is to be divided between herself and her opponent, the Recipient. Recipients must passively accept whatever is offered to them. Strategic considerations are absent.

[2] In the ultimatum game, Recipients—to be referred to as "Responders," to distinguish them from the dictator game Recipients—choose between accepting and rejecting Allocators' offers—to be referred to as "Proposers," to avoid confusion with the Allocators of the dictator game. If a Responder accepts, then the pair of players receives amounts given by the Proposer's division. A rejection leaves both players with nothing.

TABLE I
A Summary of the 2×2 Experimental Design

Treatment	Game	
	Dictator	Ultimatum
Skill	$10, winning Recipients	$10, winning Responders
	$4, losing Recipients	$4, losing Responders
Coin	$10, lucky Recipients	$10, lucky Responders
	$4, unlucky Recipients	$4, unlucky Responders

The entries indicate the eight outcomes by pie size and by designation of the subject to whom an offer is made.

The paper is organized as follows: Section 2 reviews previous ultimatum and dictator game experiments. The experimental procedure and hypotheses are detailed in Section 3. Sections 4 and 5 present the dictator game and ultimatum game results, respectively. These results are discussed in Section 6, and are related to equity theory and other dictator and ultimatum game experiments. Applications to principal-agent problems in the domain of tipping and employee–employer relations are also explored. Section 7 concludes.

2. DICTATOR AND ULTIMATUM GAMES

Previous ultimatum game studies have established that subjects do not play their subgame-perfect equilibrium strategies in a one-shot ultimatum game: Proposers offer amounts substantially greater than zero, and Responders reject strictly positive amounts. Subsequent research on bargaining games[3] has therefore focused on the set of circumstances under which play converges to the subgame-perfect equilibrium and the nonmonetary determinants of players' preferences that may account for out-of-equilibrium play. This paper is concerned with the latter.

Nonzero offers in the ultimatum game may arise from other-regarding behavior or strategic considerations. That is, altruistic players make strictly positive offers; as well, an expected utility, material-payoff maximizer may also make a positive offer because of the threat of rejection. Out of the inherent ambiguity in the motivations behind Proposers' offers in the ultimatum game arose the dictator game. Nonzero offers in the dictator game are unambiguously motivated by considerations other than material-payoff maximization, like fairness.

Hoffman, McCabe, Shachat, and Smith (HMSS) (1994) and Hoffman, McCabe, and Smith (1996) dispute the fairness interpretation of positive offers. By manipulating the anonymity conditions of dictator games and by altering certain procedural details, they show that offers are sensitive to framing effects and to their degree of observability by other subjects and the experimenter. In the absence of observability of specific offers by the experimenter or other subjects, they report that 64% of the subjects claimed the entire pie. Only 8% of the Allocators offered $4 or more of the $10 pie. All sessions in this experiment were conducted double blind to eliminate experimenter observability of offers.

[3] See Roth (1995) for a comprehensive survey.

Grossman and Eckel (G & E) (1996) maintain subject–experimenter anonymity, but replace the anonymous recipient with a ''worthy'' one, the American Red Cross. By directing the offer to a needy or deserving recipient, G & E are able to increase altruistic giving. Still, 13/48 Allocators kept the entire $10 amount, with only 15/48 offering half or more to the charity.

This experiment involves a different twist on the notion of the deservingness of the Recipient. Recipients are potentially deserving, not because they are needy, but because their skill and general knowledge produce a large amount for their paired Allocators to divide. Similarly, they may be undeserving because their lack of skill and general knowledge earn only a small amount to be divided.

Hoffman and Spitzer (1985) and HMSS can be viewed as attempts to increase the perceived deservingness of the Allocator. Either by playing a game in which the winner earns the right to be Allocator, or by informing the randomly chosen Allocator that she has earned her entitlement, these experiments have aimed at making the Allocator feel deserving of her position. Not surprisingly, they find that disproportionate rewards accrue to the bestowed Allocator. This experiment contrasts with previous ones in that it is the *Recipients* who may be perceived as more deserving. Yet in a dictator game, the Dictator need not reward her counterpart's deservingness—if it is perceived at all.

3. EXPERIMENTAL PROCEDURE AND DESIGN

3.1. *Subject Pool and Payments*

A total of 108 subject pairs participated in dictator games run on April 23, April 25, and May 2, 1995, at Princeton University. Each participant played a single game in a single role as either Allocator or Recipient. Subjects were each paid a $3 showup fee plus additional amounts of money according to the decisions made. The coin toss sessions took no more than 20 minutes, and the contest sessions required about 30 minutes, because of the taking and grading of the quizzes.

3.2. *Procedure*

The sets of instructions given to participants in both the dictator and ultimatum games are provided in Appendix A. All sessions were conducted double blind, so that subject–subject and subject–experimenter anonymity

were maintained throughout the experiment. All subjects' decisions and payments were thus made anonymously.[4]

In the skill condition, Recipients had 3 minutes to answer 10 general knowledge and skill-testing questions. The top half of the Recipients (with the greatest number of correctly answered questions on the quiz) produced a pie of size $10 for their paired Allocators to divide. Recipients in the bottom half of the grade distribution generated a $4 pie to be divided by their paired Allocators.[5] In the control condition, a coin was tossed for each pair by a monitor in the Recipients' room. An outcome of heads generated a $10 pie for Allocators to divide between themselves and their paired Recipients. If the outcome was tails, $4 was generated to be divided between the pair. In both treatments, the Allocators (and Recipients) learned the outcome of the contest or coin toss.

Allocators indicated their choice of offers on record sheets and were subsequently asked to indicate the offer they would have made had the contest or coin toss outcome been the opposite. At the same time that Allocators were contemplating their offers, hypothetical offers were solicited from the Recipients. Recipients were asked to suppose that the roles were reversed, that they were the Allocators and their paired Recipients had also won/lost the contest (the coin also came up heads/tails); how much would they offer to their paired Recipients from the hypothetical pie?

3.3. *Main Hypotheses*

Comparing the offer distributions in the skill and coin samples, my two main hypotheses are as follows:

(1) Reward hypothesis: Offers to winning Recipients will be higher than offers to lucky ones (for whom the coin came up heads). Allocators matched with winning Recipients will feel grateful to them for their ability to produce the larger pie. Feeling grateful to their successful Recipients, Allocators will offer more than in the case where the same pie size is

[4] For a detailed explanation of the double-blind procedure employed here and a comparison with that used in HMSS, G & E, and Bolton and Zwick (1995), consult the original version of this paper, Ruffle (1996).

[5] Allocators did not see the set of questions answered by the Recipients. Doing so would have introduced an unobservable variable upon which Allocators may have conditioned their offers, namely, their perceptions about the level of difficulty of the quiz. To control for this, Allocators simply knew that all Recipients answered the same set of general knowledge and skill-testing questions, with the quiz outcome to determine the amount available to be divided.

randomly generated, even when under no obligation or external pressure to do so.

(2) Punishment hypothesis: Offers to losing Recipients will be lower than offers to unlucky ones (for whom the coin came up tails). Punishment for having lost the contest, thereby generating a smaller pie, incites Allocators to offer less to losing Recipients than to those who were merely unlucky.

4. ANALYSIS OF DICTATOR GAME DATA

4.1. *Offer Distributions*

The entire data set of Allocator and Recipient offers and statistical tests performed on the offer distributions appears in the original version of the paper and is available from the author upon request. Figures 1 and 2 of Appendix B display the offer histograms. The first point to note is that the data substantiate the reward hypothesis.

OBSERVATION 1. *Winning Recipients are rewarded by their paired Allocators*: *offers to winning Recipients are significantly higher than offers to lucky ones*.

The mean offer in the \$10 skill outcome was \$4.50 compared to \$3.37 in the \$10 coin case. Observe that no Allocator offered more than half (\$5) in the \$10 coin outcome, and the distribution appears to be bimodal at 0 and 5. The \$10 skill outcome offer distribution, in contrast, appears to be unimodal at 5 and has 21% (6/28) of the offers greater than half the pie size. One Allocator even consciously gave away the entire pie. A comparison of the two sample distributions using the Epps–Singleton test leads to a rejection of the null hypothesis that they are the same at the 4% level.

The punishment effect gains some support from the data.

OBSERVATION 2. *Losing Recipients are mildly punished*: *the offer distributions to losing and unlucky Recipients are not significantly different* ($p = 0.65$). *However, when we pool the real and hypothetical offers from the* \$4 *skill and* \$4 *coin outcomes, the difference between the two offer distributions turns out to be weakly significant* ($p = 0.052$).[6]

[6] Pooling the real and hypothetical offers seems reasonable, even desirable. A comparison of the real and hypothetical offer distributions in the \$4 skill and \$4 coin outcomes gives p values of 0.651 and 0.539, respectively.

The punishment effect appears to have been mitigated by the belief held by some Allocators that in taking the quiz, the Recipients did more work and therefore deserve an equal share of the pie. Interestingly, this sentiment was particularly prevalent among the losing Recipients themselves.

OBSERVATION 3. *Losing Recipients perceive themselves to be much more deserving than their paired Allocators do. As a result, losing Recipients' hypothetical offers are much greater than the real offers made to them.*

Recall that Recipients were asked to indicate the (hypothetical) offer they would have made if they were in the position of Allocator facing the same pie size. The Recipients' mean offer in the $4 skill outcome was $1.67 (compared with a mean of $0.93 offered to them). It is especially noteworthy that losing Recipients would have offered substantially more than their paired Allocators offered to them (p value = 0.03), since in all other dictator game outcomes (winning, lucky, and unlucky), Recipients' hypothetical offer distributions are practically identical to those of their paired Allocators. Furthermore, the losing Recipients' mean offer of $1.67 is 43% higher than the unlucky Recipients' mean offer of $1.17. Recipients in the $4 outcome actually display the reward effect!

5. ULTIMATUM GAME DATA

The previous section has elucidated Allocators' pure preferences for giving under different conditions of pie creation. Extending this experimental design to the ultimatum game permits the interaction between strategic considerations and the revealed preferences for giving found here.

A total of 102 subject pairs participated in ultimatum games conducted on September 27, 28, and October 1 and 2, 1995, at Princeton University. No subject in the previous dictator game experiments was eligible to participate in the ultimatum game version. This was enforced to control for learning effects. The double-blind experimental procedure duplicated that of the dictator game. The only change was, of course, the active role played by the Responder, in whether to accept or reject the Proposer's offer.

Proposers' actual offers and Responders' rejections appear in Fig. 3 of Appendix B in the form of histograms. One qualitative difference between the two games is the level of specificity of offers. All of the actual dictator

game offers were integer amounts. In contrast, 11/102 (10.8%) of the Proposers' offers involved fractions of a dollar. Ranges of amounts offered are therefore required in the presentation of the data to include the noninteger offers. The fact that some Proposers ''bothered'' to involve fractions of a dollar in their amounts offered is suggestive. Perhaps the threat of rejection causes Proposers to refine their offers, or to make them more precise. Allocators, on the other hand, suffer no consequences from being ''off'' by $0.50 or so.

The most pervasive observation from the data is the Proposers' ability to adapt to the strategic environment of the ultimatum game. In the outcomes where Allocators' offers were previously the lowest as a fraction of the total amount available, Proposers responded with the largest increases in their amounts offered. Proposers offered significantly more in all ultimatum game outcomes than Allocators in the dictator game, except the $10 skill outcome, where winning Recipients had already been voluntarily rewarded.

OBSERVATION 4. *The threat of rejection failed to further increase offers to winning Responders. That is to say, the extent to which Proposers' offers to winning Responders are generous is motivated by a taste for fairness rather than strategic considerations.*

The mean offer to winning Responders was $4.88, a mere $0.38 (8.4%) increase over the already generous offers of Allocators to their winning counterparts in the dictator game. Inspection of the relevant histograms reveals that the offer distributions from the $10 skill outcomes in the ultimatum and dictator games are strikingly similar (p value = 0.655). In fact, eliminating the two offers of $0 in the dictator game data renders the two offer distributions indistinguishable. Nonetheless, winning Responders appeared content with these offers from the pie that they earned: only two offers of 28 were rejected. The only Proposer bold enough to offer an amount ($1) ''close'' to the subgame-perfect equilibrium prediction was rejected. Of the three $3 offers, one was rejected. No offer above $3.50 was rejected.

OBSERVATION 5. *Offers to lucky, unlucky, and losing Responders are dramatically higher than offers to the corresponding Recipients in the dictator game. This has the impact of diminishing the reward effect and eliminating the punishment effect altogether.*

Recall that the offer distribution to lucky Recipients is bimodal at 0 and 5. In contrast, the lowest offer made to lucky Responders was $2. Pro-

posers who might have chosen to keep the entire pie in the absence of the threat of rejection offered at least \$2 or \$3 in the ultimatum game version[7] in an attempt to maximize their expected payoff.[8]

The \$0.68 increase in the mean offer to lucky Responders compared to their dictator game cohorts diminishes the reward effect, the difference between the offer distributions to skillful and lucky Responders (p value = 0.131). However, when the hypothetical offers are pooled with the real ones to increase the number of observations, the reward effect resumes its importance (p value = 0.004).[9]

On the other hand, the punishment effect disappears completely. To the Proposers' credit (as strategists if nothing else), their offers to losing Responders were considerably less stingy than those made to losing Recipients in the dictator game (p value = 0.0001). The mean offer to losers rose from \$0.93 in the dictator game to \$1.73 in the ultimatum game. This fell only \$0.07 short of the mean offer to unlucky Responders.

Despite the near doubling of Proposers' offers to losing Responders, there still exists a shred of evidence that the players' asymmetric perceptions of the deservingness of losing Responders persists. Nine Proposers offered merely \$1 to their paired losing Responders, compared to only three Proposers who offered \$1 to unlucky Responders. Of the nine offers to losers, three were rejected. By contrast, none of the three \$1 offers to unlucky Responders was refused. Furthermore, the hypothetical offers solicited from losing Responders remain \$0.12 above those actually made to them.

[7] In fact, we can do better than speculate on their behavior: the dictator game was explained to all Proposers on one of the questionnaires they completed. They were asked to indicate the offer they would have made in the absence of the threat of rejection. Of the seven Proposers who offered between \$2 and \$3 to their paired, lucky Responders, all indicated lower dictator game offers, with 4/7 choosing to claim the entire \$10. Interestingly, two Proposers who divided the \$10 amount evenly with their lucky Responders would have left \$0 in the identical dictator game outcome. This and previous ultimatum game data suggest that these ''disguised'' material-payoff-maximizing Proposers were overly risk-averse in their true offers. If they really wanted to maximize their own material payoffs, a \$3 offer would suffice to induce acceptance.

[8] Based on the observed rejection rates, \$2 is not payoff-maximizing in the \$10 coin outcome. With probability 2/3, \$2 offers were rejected in this outcome, therefore yielding an expected payoff to the Proposer of $1/3 \times \$8 = \$8/3$, whereas all offers of \$3 or more were accepted. (Note that the histogram labeled \$10 Ultimatum Coin Offers'' indicates a single rejection between \$2.01 and \$3. In actual fact, this was a rejection of a \$2.50 offer.)

[9] For both the \$10 skill and \$10 coin outcomes, real and hypothetical offer distributions cannot be rejected as being the same, p values are 0.612 and 0.645, respectively, and hence the justification for pooling.

6. DISCUSSION

6.1. *Explanation of Results*

What underlies Allocators' willingness to reward successful Recipients in the skill condition? We may rule out several usual explanations for strictly positive offers in bargaining games. The double-blind dictator game treatments conducted here control for strategic behavior, subjects' concerns about how they are perceived by others, and altruism, as defined by the desire to help out someone in need, someone less well off than yourself.

The most plausible account of the observed fairness toward winning Recipients in the skill condition is that subjects are concerned with how they perceive themselves. Allocators in the skill condition understand that the \$10 pie with which they are faced is due to the efforts and abilities of their paired Recipients. Most felt that a just person should reward such effort and ability. To shirk this moral imperative would be an admission for most that they are not just people. Giving up a few or 5 or 6 dollars to continue to think of themselves as fair or just people is thus a worthy tradeoff for them.

Theories of equity and distributive justice[10] explain the reward and punishment effects by arguing that equitable exchanges are characterized by rewards (or outputs) commensurate with an individual's investment (or inputs) in the exchange. In this experiment, the reward to subjects is given by the amount they earn. The skill-condition Recipients' inputs consist of both effort and ability.[11] Since the inputs are multidimensional and noncomparable, the weighting of the different attributes is a subjective task left to the Allocator. Constraining her from claiming the entire pie is the tension or distress an individual experiences by causing inequity. Individuals are motivated to reduce or eliminate inequity to the extent that the distress exists. Allocators avoid such distress by offering an amount they view as congruent with some weighted average of the ability and effort put forth by their paired Recipients. The high ability and extra effort exhibited by winning Recipients is undeniable, and thus their observed reward. Losing Recipients, on the other hand, have exerted more effort than their

[10] In the social psychology literature, Homans (1961) and Walster et al. (1978) provide detailed expositions of equity theory, whereas Güth (1988) offers a simple model of equity theory and examines behavior in past bargaining game experiments in light of the model.

[11] Berg et al. (1995) conduct "trust" games in which player 1 receives \$10 and offers an amount \$$x$ to player 2, keeping \$$(10 - x)$. The \$$x$ triples and player 2 dictates a split from the \$3x. Their results show that the reward to player 1 is proportional to his input of trust, the amount, \$$x$, he risks giving to player 2.

paired Allocators by taking the quiz, but have been unsuccessful in their task. How an Allocator balances these two dimensions determines whether she feels losing Recipients deserve to be punished. Enough Allocators appear to have viewed effort as sufficiently important that the aggregate data did not unequivocally support the punishment hypothesis.

The fact that the Recipients in the $4 outcome not only did not punish losing Recipients, but actually rewarded them, can be explained by a self-serving bias.[12] That is, the $4 skill outcome provides two divergent variables upon which to base offers, skill and effort. Of the 27 losing Recipients, 21 made self-serving offers of half or more of the $4 pie, apparently in the belief that it is the ''effort that counts.'' Self-interest was similarly displayed by the 13/28 Allocators who offered $0 to losing Recipients, evidently on the basis that skill is the relevant variable.

6.2. *Applications*

The relationship between the Allocator/Proposer and Recipient/Responder in the skill treatment of these games resembles that between a principal and an agent in principal–agent problems. The offerer, the principal, decides how to compensate the person receiving the offer, the agent. The contest outcome provides the principal with a (noisy) measure of the agent's effort level and ability. Yet there exists no contract, that is, no opportunity for the agent to share the risk he bears and no insurance that his compensation will reflect the surplus he creates. Despite the absence of an enforceable contract for sharing, principals in this setting voluntarily reward effort and ability and punish modestly inability and lack of effort. Thus, although the absence of a contract introduces risk for the agent, principals' observed offers are encouraging, for they provide agents with the incentives to perform well.

This result has applications to certain employee–employer relationships and to tipping. The endogenous pie creation mechanism explored in these dictator and ultimatum games parallels the relationship between an employee and an employer in firms where employees undertaking the same task are differentiated in their abilities or productivity levels and these productivity levels are measurable. When high-ability workers contribute to the profit of the firm more than low-ability types, the reward effect suggests that employers will voluntarily reward such ability, even if not legally compelled to do so, and even in the absence of strategic considera-

[12] For a recent paper on the role of self-serving biases in negotiations, see Babcock and Loewenstein (1997).

tions. Whatever the bargaining power of the employee, equity alone appears sufficient to guarantee skilled workers higher compensation than their lesser skilled cohorts. Most employee–employer relationships are characterized by repeated interaction. Strategic incentives are therefore likely to magnify this intrafirm wage differential. Bonuses, afternoons off, salary raises, and promotions typically go to those who are perceived as meritorious of them.

People generally tip in accordance with the quality of service provided. Quality service brings the client utility. After the service has been rendered, the client is in the position of dictator. She may offer any amount at all, or nothing. Employers in service industries where tipping is commonplace are able to pay their employees so little in salary thanks to the goodwill of clients to reward quality service. The results suggest that a low hourly wage supplemented by tips provide employees with the right incentives to offer good service to customers. Dictators (clients) modify their offers (tips) according to the perceived ability and effort of the Recipient (server).

7. CONCLUSIONS

''Other-regarding behavior is primarily an expectations phenomenon . . . rather than the result of an autonomous private preference for equity'' (HMSS, p. 348). The results here contrast starkly with this claim. Particularly when one's earnings are the product of someone else's ability, other-regarding behavior is the norm, even in the absence of expectations and social pressures.

The dictator game results suggest that giving is a function of how deserving Allocators perceive the Recipients to be. Skillful Recipients who exert effort to create a large pie are unambiguously deserving. Allocators recognize and reward their efforts and abilities. On the other hand, Recipients whose efforts fail to create a large surplus for Allocators are mildly punished. This contrasts with the losing Recipients themselves, who felt that effort and not ability was the appropriate determinant of deservingness. When the Recipients are empowered with the ability to reject proposed divisions, Proposers respond strategically. To avoid rejection, offers that were the smallest as a fraction of the available surplus in the dictator game were increased the most dramatically. The end result is what looks like an equalization of the relative-payoff division between players across ultimatum game outcomes. Mean dictator game offers ranged from 23% of the pie (to losing Recipients) to 45% (to winning Recipients). By contrast, in all four ultimatum game outcomes, Responders received roughly 45% of the pie on average. This has the effect of diminishing the

reward to winning Responders and eliminating altogether the punishment of losing ones.

Yet Proposer giving was by no means entirely strategically motivated. In all four dictator game outcomes, Dictators' offers were more than half those of the Proposers' corresponding ultimatum game offers. More exactly, mean offers to skilled, unskilled, lucky, and unlucky Recipients in the dictator game constituted 92.2%, 53.8%, 83.2%, 68.9%, respectively, of the observed ultimatum game mean offers to corresponding Responders. The extent to which offers to winning Responders in the ultimatum game were generous can be attributed to the sense of distributive justice or fairness of their paired Proposers, and not to strategic motivations.

The voluntary reward of successful Recipients occurred despite the absence of expectations or social pressures. If HMSS are correct in their evaluation of the importance of subject–subject and subject–experimenter anonymity, then these findings underestimate the extent to which the deservingness of the Recipient affects offers. For few real-world institutions operate in a double-blind setting. Givers typically know the identity of their Recipients, or at least their general characteristics, and Recipients often know the identity of the potential givers. When anonymity does not exist and gift amounts are observable and attributable to specific givers, then social pressures, moral imperatives, and the warm glow of giving are likely to magnify the reward to skillful or deserving Recipients.

APPENDIX A: INSTRUCTIONS

The dictator game instructions are provided below for both the contest and coin treatments, with the differences between them as indicated. Because the Recipients did not need to know the procedure by which the Record Sheets were distributed, filled out, and collected, their instructions were abbreviated versions of those designated for the Allocators. The changes in the ultimatum game instructions follow.

[Dictator Game]

INSTRUCTIONS FOR PARTICIPANTS

WELCOME!

This experiment involves decision-making. You will be paid $3 just for arriving on time. As well, you may earn an additional amount of money. All amounts will be paid in cash at the end of the experiment.

You have been randomly assigned to a role (either person A or B) according to the slip of paper you drew from the bin upon arriving.

Everyone in this room is a person A. The number you drew upon entering the room indicates your pair number. Each of you is paired with a different person, a person B, who is in another room. You will not learn the identity of your paired person B, nor will he/she learn your identity. You will not be paired with anyone in this room during the experiment. Also, you will be paid according to your pair number so that no one, including the experiment monitor, will know the choices you make.

The experiment proceeds as follows:

[**contest**] All person Bs (who are located in an adjacent room) will be given 3 minutes to answer the same set of 10 general knowledge and skill-testing questions. The number of correctly answered questions will determine a person's score. The top half of the person Bs (those with the highest scores) will win the contest and the other half (those with the lowest scores) will lose the contest. You will learn the contest outcome of your paired person B.

[**coin**] For each person B (all of whom are located in an adjacent room) a coin will be tossed by a monitor. You will learn the outcome of the coin toss.

RECORD SHEETS will be placed on the front desk. You will each go to the front desk and choose the RECORD SHEET with your pair number on it. After you have taken your RECORD SHEET return to your seat.

[**contest**] The RECORD SHEET indicates whether your paired person B won or lost the contest. If your paired person B won the contest, then $10 is produced for you to divide between you and your paired person B. If your paired person B lost the contest, then you have $4 to divide between you and your paired person B.

[**coin**] The RECORD SHEET indicates the outcome of the coin toss. If the outcome of the coin toss is heads, then you have $10 to divide between you and your paired person B. If the outcome of the coin toss is tails, you have $4 to divide between you and your paired person B.

You have 3 minutes to decide how much you wish to offer to your paired person B out of this amount. You may offer your paired person B any amount between 0 and the amount produced from the contest (coin toss), $10 or $4. You keep whatever you don't offer to person B. Write in the amount you wish to offer in the space provided and deposit the RECORD SHEET in the bin as the monitor comes by.

Sealed envelopes will be placed on the front desk with your pair numbers on them. Proceed to the desk to collect the envelope with your pair number on it and then return to your seat. The envelopes contain

your earnings from the experiment. After everyone has collected his/her envelope the experiment is over.

Are there any questions?

[Ultimatum Game]

INSTRUCTIONS FOR PARTICIPANTS

WELCOME!

[The first three paragraphs are identical to the dictator game instructions.]

RECORD SHEETS will be placed on the front desk. You will each go to the front desk and choose the RECORD SHEET with your pair number on it. After you have taken your RECORD SHEET return to your seat. The RECORD SHEET indicates

[**contest**] whether your paired person B won or lost the contest. If your paired person B won the contest, then $10 is produced for you to divide between you and your paired person B. If your paired person B lost the contest, then you have $4 to divide between you and your paired person B.

[**coin toss**] the outcome of the coin toss. If the outcome of the coin toss is heads, then you have $10 to divide between you and your paired person B. If the outcome of the coin toss is tails, you have $4 to divide between you and your paired person B.

You have 3 minutes to decide how much you wish to offer to your paired person B out of this amount. You may offer your paired person B any amount between 0 and the amount produced from the contest (coin toss), $10 or $4. You keep whatever you don't offer to person B, as long as your paired person B accepts your offer. That is, after you have indicated your offer on the RECORD SHEET, the RECORD SHEET will be brought to room B and given to your paired person B. He/she may accept or reject your offer. If person B accepts your offer, you receive whatever amount you didn't offer to person B and person B receives the amount of the offer. If person B rejects your offer, you and your paired person B both receive nothing (except the $3 showup fee).

Write in the amount you wish to offer in the space provided and deposit the RECORD SHEET in the bin as the monitor comes by. The RECORD SHEET will then be distributed to the appropriate person B. Each person B will be given the chance to accept or reject the offer made by his/her paired person A. If person B wishes to accept the offer he/she should circle ''ACCEPT'' on the form. Persons A and B will then be paid according to this division. If person B wishes to reject the offer he/she should circle ''REJECT'' on the form. If person B rejects the offer, then both A and B will be paid nothing (except the $3 showup fee).

[The last two paragraphs are identical to the dictator game instructions.]

APPENDIX B: OFFER HISTOGRAMS

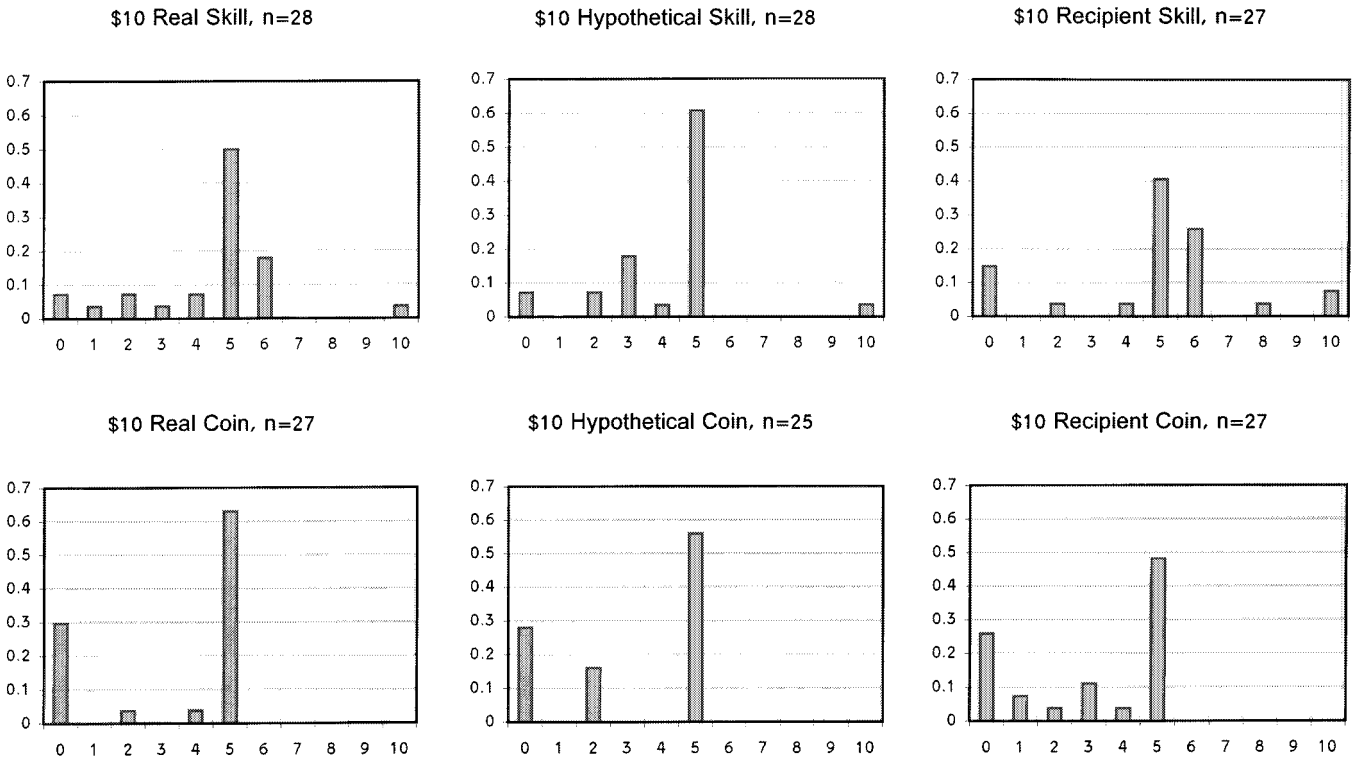

FIG. 1. Dictator game offers from the $10 skill and coin outcomes.

APPENDIX B: OFFER HISTOGRAMS

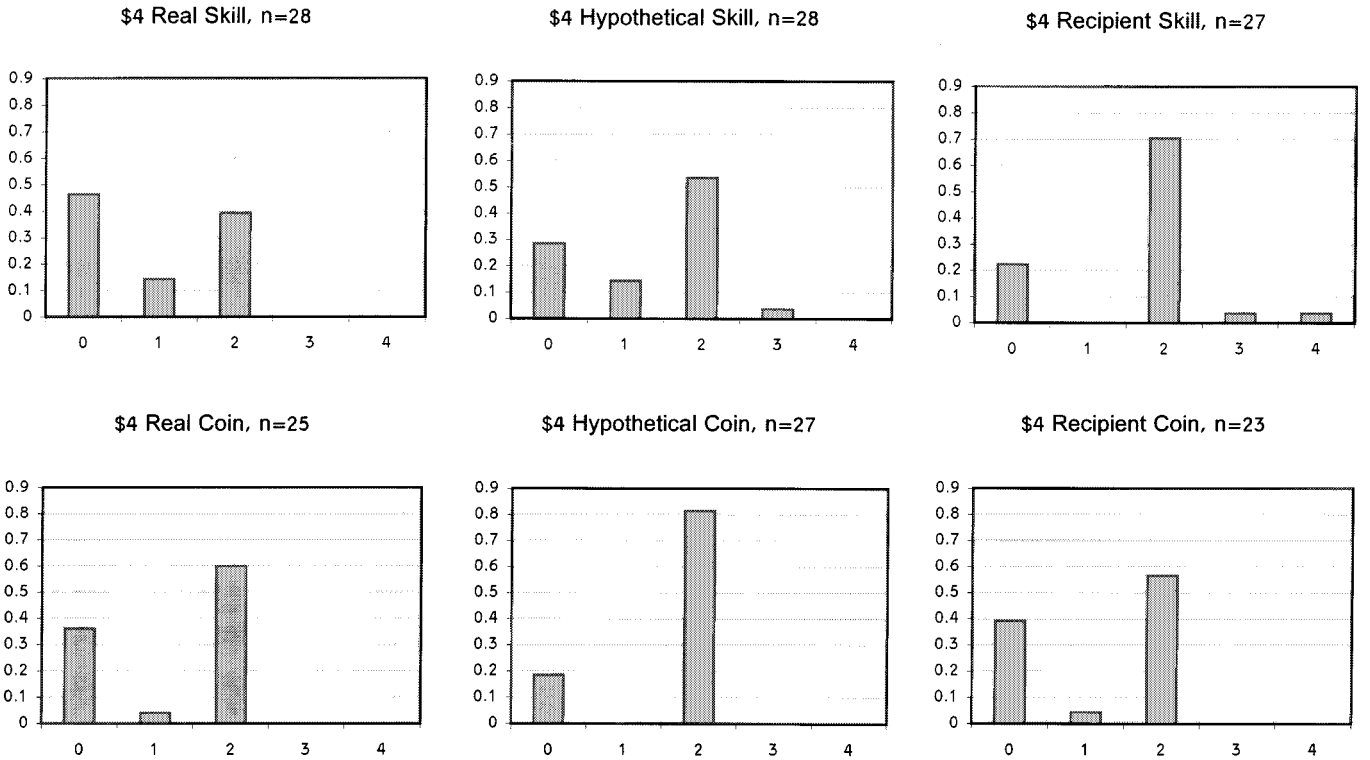

FIG. 2. Dictator game offers from the $4 skill and coin outcomes.

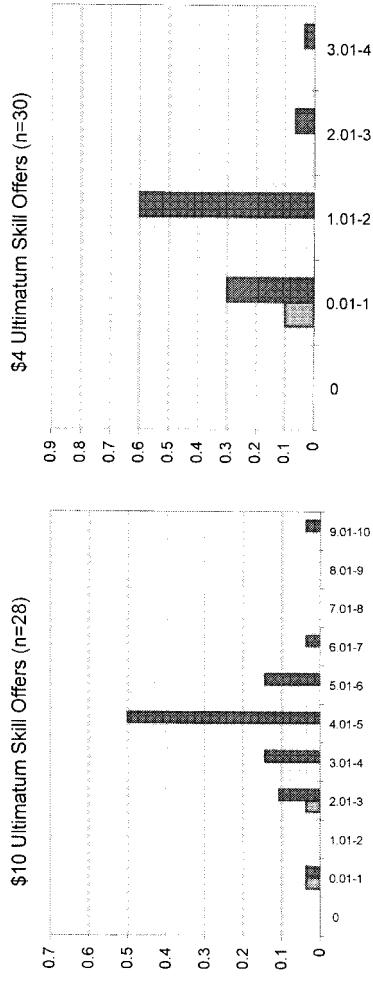

FIG. 3. Ultimatum game data. The Proposers' offer frequencies are indicated by the heavily shaded bars. Rejection frequencies are given by the lightly shaded bars to the left of the offer frequencies.

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