

Research Article

Reciprocity Is Not Give and Take

Asymmetric Reciprocity to Positive and Negative Acts

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ABSTRACT—*Unlike economic exchange, social exchange has no well-defined “value.” It is based on the norm of reciprocity, in which giving and taking are to be repaid in equivalent measure. Although giving and taking are colloquially assumed to be equivalent actions, we demonstrate that they produce different patterns of reciprocity. In five experiments utilizing a dictator game, people reciprocated in like measure to apparently prosocial acts of giving, but reciprocated more selfishly to apparently antisocial acts of taking, even when the objective outcomes of the acts of giving and taking were identical. Additional results demonstrate that acts of giving in social exchanges are perceived as more generous than objectively identical acts of taking, that taking tends to escalate, and that the asymmetry in reciprocity is not due to gaining versus losing resources. Reciprocity appears to operate on an exchange rate that assigns value to the meaning of events, in a fashion that encourages prosocial exchanges.*

In economic exchange, trading is enabled by the shared understanding that a good or service will be provided in exchange for its market value. In social exchange, “trading” is enabled by the universal norm of reciprocity—the shared understanding that resources given or taken will be recouped (Gouldner, 1960; Leakey & Lewin, 1978). Benefit tends to be reciprocated positively, and harm provokes retribution (Heider, 1956; Vidmar, 2000). Reciprocity makes social exchange possible by allowing one person to initiate giving without fear of losing the initial “investment” (Axelrod & Hamilton, 1981; Cialdini, 2001; Nowak, 2006; Ridley, 1971; Tiger & Fox, 1989; Wedekind, 1998). Social exchange involves the trading of any resource “that can be transmitted from one person to another” (Foa & Foa, 1975, p. 3), including everything from love, to money, to insults. Reciprocity is therefore central to many areas of social

life, and is crucial for maintaining social order by enabling cooperative exchanges and by punishing antisocial behavior (Alexander, 1987). Understanding the dynamics of reciprocity is critical for understanding the building blocks of social organization.

According to the American Heritage Dictionary (1992), to reciprocate is to “give or take mutually, interchange” (p. 1509). This definition reflects the common belief that the positive action of giving and the negative action of taking elicit comparable reciprocity: “You scratch my back, and I’ll scratch yours”; “an eye for an eye, a tooth for a tooth.” But unlike resources traded in an economic exchange, which have a market value, often identified by a price tag, resources traded in a social exchange are imbued with value by the social meaning of the action itself (Brown, 1986). How people reciprocate one another’s actions will therefore depend critically on how those actions are interpreted, rather than simply on their objective features. Much is known about the power of the norm of reciprocity to elicit behavior in social exchanges (Cialdini & Goldstein, 2004). But much less is known about how subjective interpretations can influence how much people choose to reciprocate for another person’s action. Although giving and taking are colloquially seen as equivalent, we propose that acts of giving should produce more generous and stable reciprocity than acts of taking that yield identical outcomes, and that acts of taking should produce more selfish, escalating reciprocity.

We base these predictions on existing theories of social exchange that suggest different functions of reciprocity for positive and negative actions. These theories suggest that reciprocating a positive behavior encourages and maintains prosocial behavior (Cialdini, 2001), whereas reciprocating a negative behavior punishes and discourages antisocial actions (Schroeder, Steel, Woodell, & Bembenek, 2003; Vidmar, 2000). Norms of reciprocity should therefore encourage positive behavior but strongly discourage negative behavior. This implies an inherent asymmetry between reciprocating to giving versus taking. Positive actions, such as giving, should elicit reciprocity in equivalent measure, whereas negative actions, such as taking, should produce more selfish reciprocity.

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We tested this prediction of asymmetry between giving and taking in five experiments. Although social exchange involves a wide array of goods and resources, we used simple exchanges of money to allow maximum experimental control and a clear interpretation of the findings. These experiments utilized a *dictator game* (Forsythe, Horowitz, Savin, & Sefton, 1994; Kahneman, Knetsch, & Thaler, 1986), in which one person decides how to split a sum of money with the other player. To contain cost, we did not award all participants the money they accrued, except in Experiment 5. Instead, we informed them that one participant would be selected randomly to receive the amount he or she accrued. We added a twist to make this either a game of giving or a game of taking. In the giving game, the experimenter provided one player (“the dictator”) with \$100, and that player decided how much to give to the other player (“the reciprocator”) and how much to keep. The roles were then reversed, and the reciprocator received a new pot of \$100 and decided how much to give to the original dictator. The taking game was identical, except that the experimenter gave the reciprocator \$100, and the dictator decided how much of that money to take. The reciprocator then decided how much to take from the dictator’s new pot of \$100. Experimenters never used the words “dictator” or “reciprocator” in any of the experiments.

The give and take decisions were formally identical because the deciding player in both cases controlled the entire sum and its final distribution. Our experiments therefore are the first to compare reciprocity across giving and taking conditions while holding the objective outcome of the exchange constant. If giving and taking trigger different patterns of reciprocity, then objectively identical outcomes should produce different patterns of reciprocity depending on whether they result from taking or from giving. We predicted that the same outcome would trigger more selfish reciprocity when it resulted from the negative action of taking than when it resulted from the positive action of giving, and that taking would lead to escalation.

EXPERIMENT 1: THE ASYMMETRY

Method

Participants

Fifty University of Chicago undergraduates participated in Experiment 1. Ten participants were excluded because they did not believe that they were playing with a real dictator.

Procedure

Participants used a computer to communicate with a “second participant,” presumably present in the adjacent room. To allow a free decision, the experimenter explained that all participants would remain anonymous. In actuality, there was no second player. Participants were randomly assigned to the giving or the taking game. Initially, the “other player” had full control over the money (i.e., all participants were reciprocators). In the

giving game, participants learned that the other player had received \$100 and would decide how much to give them. In the taking game, participants learned that the experimenter had given them \$100 and the other player could decide how much to take away from them. Then, participants in the giving game were informed that the other player decided to give them \$50, whereas participants in the taking game were informed that the other player decided to take \$50 from them, leaving them with \$50. The roles then reversed, and participants decided how to divide a new sum of \$100. Participants in the giving game received \$100 and decided how much to give to the other player, whereas participants in the taking game decided how much out of \$100 to take from the other player. The reciprocator’s decision was the dependent measure.

Results

Although the outcomes of the dictators’ actions were objectively identical in the giving and the taking conditions, we observed the predicted asymmetry in reciprocation. Participants in the giving game gave back more to the other player ($M = \$49.50$) than participants in the taking game left to the other player ($M = \$42.00$), $t(38) = 2.45$, $p_{\text{rep}} = .95$, $d = 0.79$. Even though dictators initiated the game according to an equality norm by splitting the sum in half, this outcome elicited more selfish reciprocity when it resulted from taking than when it resulted from giving.

EXPERIMENT 2: REPEATED EXCHANGES

Experiment 1 involved a one-time reciprocation, but social exchange often occurs over repeated interactions. Experiment 2 investigated whether the asymmetry between giving and taking is sustained when participants anticipate multiple exchanges. The procedure was identical to that of Experiment 1 except that each participant was paired with another real participant and played the game over seven rounds.

Method

Participants

Forty University of Chicago students and community members participated in pairs. Pairs were randomly assigned to play the giving game or the taking game. The analysis excluded 4 pairs who failed to follow the experimenters’ instructions.

Procedure

Two experimenters approached 2 potential participants who were far enough apart that they could not see each other (and therefore remained anonymous). The experimenters randomly assigned the initial roles of dictator and reciprocator to the participants and explained the game. One experimenter then confided to the dictator that we “needed help” to achieve a “balanced design” and asked him or her to start by either giving

\$50 or taking \$50, depending on condition, but then to continue in any way he or she wished. The dictator then made his or her decision, and the experimenter communicated it via walkie-talkie to the other experimenter, who then informed the reciprocator. The reciprocator then decided how to split a new sum of \$100, and the original dictator learned of this decision in the same way. This back-and-forth constituted one round of the game. The experimenters stopped the game after seven complete rounds. Participants understood that their roles would alternate and knew in advance that there would be multiple rounds, but they did not know how many rounds they would play.

Results

Figure 1 shows the average sum per round that participants gave the other player in the giving game or left the other player in the taking game. We excluded the first round, which was constrained by the experimenter, and submitted the remaining six rounds to a 2 (frame: giving vs. taking) \times 6 (round: 2–7) mixed-model analysis of variance (ANOVA). This analysis yielded only a frame effect ($M_{\text{giving}} = \$55$, $M_{\text{taking}} = \$33$), $F(1, 14) = 5.81$, $p_{\text{rep}} = .91$, $\eta^2 = .29$; there was no effect of round, $F(5, 14) = 1.57$, $p_{\text{rep}} < .7$, and no interaction ($F < 1$). Even though dictators started the game by dividing the sum evenly, people reciprocated more selfishly in the taking game than in the giving game, and this difference persisted over time.

EXPERIMENT 3: UNEVEN SPLITS

In Experiment 3, we investigated whether the asymmetry generalizes to uneven opening distributions, by adding objectively selfish (giving \$30, taking \$70) and objectively generous (giving \$70, taking \$30) conditions. Participants in this experiment played only one round of the game.

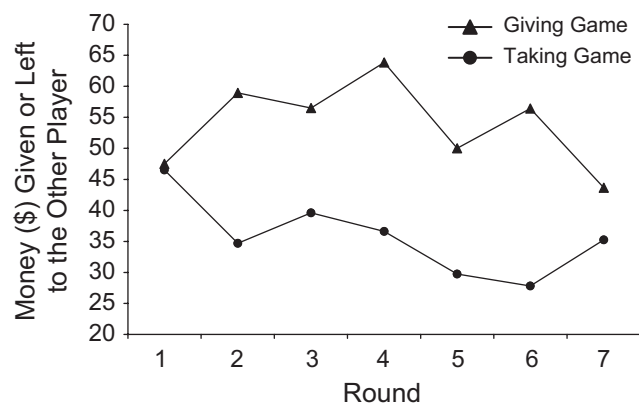


Fig. 1. Players' decisions in Experiment 2 as a function of round. Results are shown separately for the giving and taking games.

Method

Participants

One hundred twenty University of Chicago students participated in the experiment as either dictators or reciprocators. Two pairs were excluded because the dictator did not follow the experimenter's suggestion to give or take a specific sum, leaving 58 pairs.

Procedure and Design

As in Experiment 2, dictators were "encouraged" by the experimenter to offer a specific sum. In this experiment, they were encouraged to make a decision that was objectively selfish (give \$30 or take \$70), objectively fair (give \$50 or take \$50), or objectively generous (give \$70 or take \$30). The roles then reversed, and reciprocators decided how to act on a new \$100 pot. Pairs were randomly assigned to one of six cells of the 2 (frame: giving vs. taking) \times 3 (objective outcome: selfish, fair, or generous) between-participants design.

Results and Discussion

We found the predicted asymmetry for the entire range of objective outcomes (see Fig. 2): People reciprocated more selfishly after the dictator took from them ($M = \$37$ left for the other) than after the dictator gave to them ($M = \$51$). A 2 (frame) \times 3 (objective outcome) ANOVA revealed a significant main effect of frame, $F(1, 52) = 5.79$, $p_{\text{rep}} = .93$, $\eta^2 = .10$, and no interaction between frame and objective outcome ($F < 1$). Objective outcome also had a significant effect, $F(2, 52) = 3.41$, $p_{\text{rep}} = .89$, $\eta^2 = .12$. People reciprocated more generously as the other player left or gave them more money (M s = \$34, \$45, and \$53 for the selfish, fair, and generous conditions, respectively).

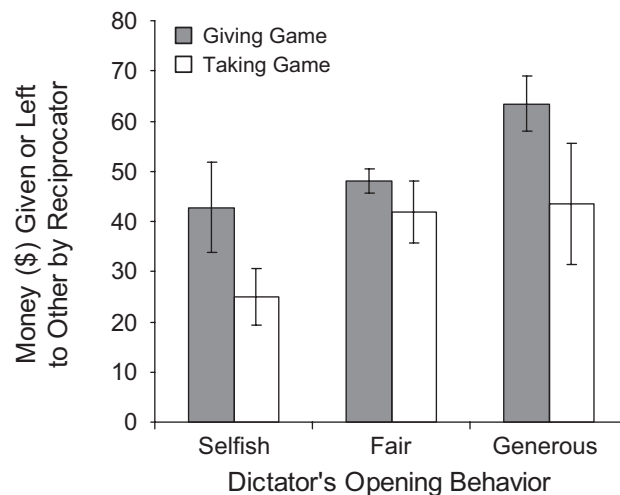


Fig. 2. Amount of money given or left to the dictator by reciprocators in Experiment 3, as a function of game (giving vs. taking) and objective outcome (i.e., the dictator's previous decision: selfish vs. fair vs. generous). Error bars represent standard errors of the means.

These results clearly demonstrate an asymmetry in reciprocity between giving and taking, not only for objectively fair behavior, but for objectively selfish and generous actions as well. One possible cause of this asymmetry is that giving is perceived as more generous than taking, even when the objective outcome is identical. We examined this possibility in a follow-up experiment that was identical to Experiment 3 ($N = 60$ pairs¹) except that reciprocators evaluated the dictator's generosity on a scale from -5 (*very selfish*) to $+5$ (*very generous*). The pattern of generosity ratings paralleled the reciprocators' behavior in Experiment 3: The dictator was perceived as more generous when giving ($M = 2.4$) than when taking ($M = 0.4$), $F(1, 54) = 13.98$, $p_{\text{rep}} = .99$, $\eta^2 = .21$. This was true when the dictators were selfish ($M_s = 1.0$ vs. -1.3), fair ($M_s = 3.4$ vs. 0.8), and generous ($M_s = 2.8$ vs. 1.7). There was no interaction between frame and objective outcome ($F < 1$).

The impact of the frame in this follow-up study was so strong that subjective perceptions of generosity sometimes trumped objective generosity: Dictators were perceived as less generous when they took only \$30 from the other player than when they gave the other player \$50 ($M_s = 1.7$ vs. 3.4 , respectively); $t(21) = 3.02$, $p_{\text{rep}} = .97$, $d = 1.32$. This means that reciprocators perceived the dictator as more generous when they themselves banked \$50 in a giving game than when they banked \$70 in a taking game. Because giving appears to be inherently more generous than taking, an objectively more selfish giver can sometimes be seen as more generous than an objectively selfless taker.

EXPERIMENT 4: BEGINNING AND ESCALATING

If social reciprocity tends to punish negative actions, then people might be averse to taking large amounts when they begin a social exchange. As a result, takers who initiate an exchange should be more generous to another person than should givers who initiate an exchange. To test this hypothesis, we asked participants in Experiment 4 to play four rounds of either a giving or a taking game. Unlike in the preceding experiments, the experimenter did not suggest an offer for the starting move, and dictators freely chose how much to give or take in the very first exchange. If taking is perceived as inherently negative, then dictators should be averse to taking and should leave other players with larger amounts than do dictators who give. Even though we expected takers to begin more generously than givers, we expected takers to be perceived as less generous than givers, so that selfishness would escalate in the taking game. In contrast, we predicted that givers would reciprocate in equivalent measure over the rounds.

¹We analyzed data from only 60 of the 80 original pairs because 20 dictators did not follow our request to offer a specific amount. The specific amount was a precondition for inclusion in a particular cell of the design. Selecting pairs for inclusion on the basis of the dictator's behavior could not affect our results because the data of interest are the reciprocators' ratings.

Method

Participants

One hundred forty-two University of Chicago students and Hyde Park residents participated in the experiment. Participants were randomly assigned within pairs to the role of dictator or reciprocator, and pairs were randomly assigned to the giving or taking game.

Procedure

The procedure was identical to that of Experiment 2, with two exceptions. First, the experimenter did not suggest to the dictator an amount for the opening round. Second, the game lasted four complete rounds.

Results

As predicted, dictators showed an initial aversion to taking. Dictators in the taking game left the other player with more money in the first exchange ($M = \$49$) than did dictators in the giving game ($M = \$32$), $t(69) = 2.78$, $p_{\text{rep}} = .97$, $d = 0.67$.

Although the dictators were objectively more generous in the opening round when they took than when they gave, we expected escalation of selfishness over time in the taking game, but a stable pattern in the giving game. Figure 3 shows exactly this pattern. Averaging across pairs, we found that players in the taking game left the other player with \$47 in the first round, and became progressively more selfish in each round, leaving the other player only \$31 in the last round. Dictators were reluctant to take from another person early on, but took more and more after the reciprocator had taken more from them. In contrast, players in the giving game reciprocated in like measure, and no escalation emerged. To analyze the data, we first made pairs the unit of analysis, by averaging the two partners' actions. We then submitted these means to a 2 (frame: giving vs. taking) \times 4 (round: 1–4) mixed-model ANOVA. This analysis yielded a significant interaction, $F(3, 207) = 3.69$, $p_{\text{rep}} = .94$, $\eta^2 = .05$. We then tested for an effect of round on giving and taking separately. Round influenced taking, $F(3, 105) = 3.32$, $p_{\text{rep}} = .92$,

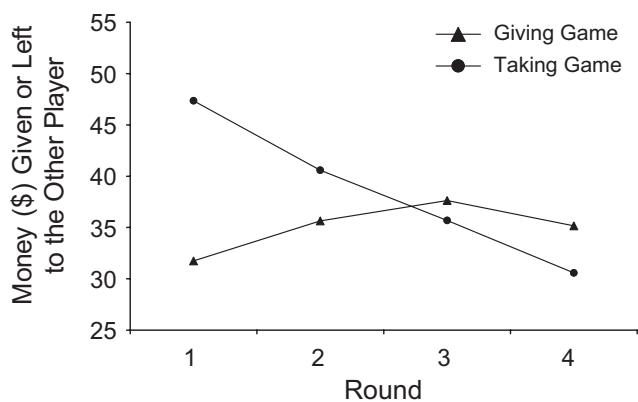


Fig. 3. Players' decisions in Experiment 4 as a function of round. Results are shown separately for the giving and taking games.

$\eta^2 = .09$, with people becoming increasingly selfish over rounds, but did not influence giving, $F < 1$. Ironically, the relatively generous behavior in the opening round of the taking game disappeared because of selfish escalation, whereas the less generous behavior in the opening round of the giving game led to more stable reciprocity.

EXPERIMENT 5: TAKING VERSUS LOSING

We argue that the findings of Experiments 1 through 4 are the product of the social act of reciprocity. A possible alternative explanation is that the systematic differences between giving and taking reflect the difference between losing something versus gaining something (Kahneman & Tversky, 1979), or the enhanced impact of negative events relative to positive events (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001). This interpretation suggests that the asymmetry is not an interpersonal phenomenon of reciprocity, but rather an intrapersonal phenomenon of reacting to gaining versus losing. Having money taken away may be perceived as a loss and may therefore be experienced more strongly than a comparable gain (but see Kermer, Driver-Linn, Wilson, & Gilbert, 2006). Participants may therefore have reacted to the negativity of a perceived loss relative to a perceived gain, rather than to the intentional act of taking as opposed to giving. In Experiment 5, we tested whether the asymmetry between giving and taking is due to an asymmetry between gaining and losing or, as we suggest, to the fundamentally social aspect of reciprocity. We tested this by comparing how people react to giving and taking by another person with how they react to gaining and losing due to nonsocial acts. If the asymmetry exists following giving and taking, but not following gaining and losing, then the results of our experiments truly reflect reciprocity in social exchange.

Method

Participants

One hundred two adults recruited from public areas in downtown Chicago served as participants. Two participants were excluded because of experimenter error during the procedure.

Procedure and Design

One experimenter approached a potential participant, explained the nature of the game, and said that there was another experimenter recruiting “another player” nearby. The other experimenter did not actually recruit a second player, but pretended to have done so. Experimenters communicated relevant information throughout the experiment via walkie-talkie.

Participants were randomly assigned to one of four experimental conditions: giving, taking, gain, or loss. All participants played as reciprocators, and the ostensible second participant was the dictator. The experimenter first showed participants an envelope with 10 real \$1 bills. In the taking and loss conditions,

the experimenter gave the envelope with the \$10 to the participant. In the taking condition, the experimenter then informed the participant that the dictator would decide how much of the money to take away. In the loss condition, the experimenter explained that she would draw a number from a bag, and that this number would determine the amount that would be taken away from the participant for the dictator. In the giving and gain conditions, the experimenter explained that the envelope with the \$10 belonged to the dictator. In the giving condition, she informed the participant that the dictator would decide how much of the \$10 to give to the participant. In the gain condition, she explained that a draw from the bag would determine how much the participant would receive from the dictator. In the taking and giving conditions, the dictator always took or gave \$5. In the gain and loss conditions, by sleight of hand, the experimenter always drew \$5 in view of the participant. After the decision was purportedly made or the number was drawn from the bag, the experimenter made the appropriate transaction. Thus, all participants were left with \$5 in hand. All participants then decided how to divide a new sum of \$10. Participants in the giving and gain games decided how much to give the dictator, whereas participants in the taking and loss games decided how much to take from the dictator.

Unlike in the previous experiments, all participants in this experiment kept the money they accrued during the experiment. Participants always received \$5 from the first move, plus the amount they took from the other player (or the amount they left for themselves).

Results

As predicted, results for the giving and taking games mirrored the pattern of reciprocity demonstrated in Experiments 1 through 4, but results for the gain and loss games did not (see Fig. 4). Although the outcomes of the ostensible dictator’s actions were objectively identical, reciprocators were more

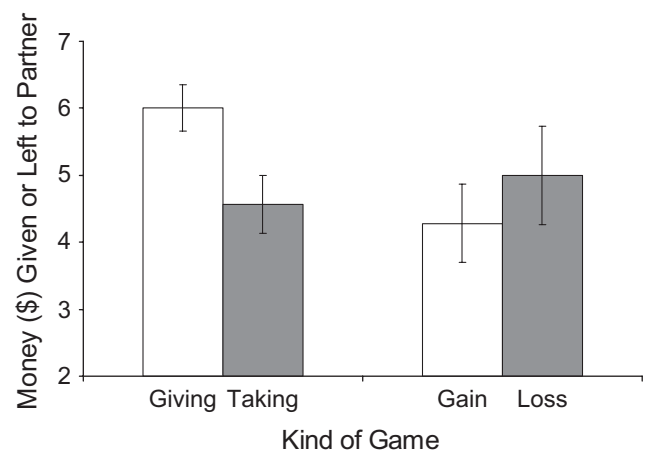


Fig. 4. Amount of money (out of a \$10 pot) given or left to the dictator by reciprocators in Experiment 5, as a function of game. Error bars represent standard errors of the means.

generous after the dictator gave money to them than after the dictator took money from them, $t(49) = 2.61$, $p_{\text{rep}} = .95$, $d = 0.75$. In contrast, participants were, if anything, somewhat less generous after gaining than after losing, giving away \$4.28 after gaining and leaving the other player with \$5.00 after losing, $t(47) < 1$, n.s. An ANOVA yielded a significant interaction between the source of the outcome (intentional vs. random) and the valence of the action (positive vs. negative), $F(1, 96) = 4.04$, $p_{\text{rep}} = .88$, $\eta^2 = .04$. The asymmetry between giving and taking appears to be a function of the social difference between giving versus taking, rather than simply the nonsocial difference between gaining versus losing.

GENERAL DISCUSSION

Our experiments demonstrate that social exchange is based largely on the meaning of social actions, rather than on the objective value of those actions. Positive actions of giving are reciprocated in comparable measure, whereas negative actions of taking are reciprocated more selfishly, and may be followed by escalation.

We used a particular resource, money, to document the asymmetry between giving and taking. This allowed us to tightly control aspects of the situation, but may narrow the generalizability of the results. It is therefore uncertain that the same pattern of results would be found in the case of social exchanges of other resources, such as love or status (Foa & Foa, 1975). We see no reason to doubt that the asymmetry demonstrated in this study represents a basic element of reciprocity that occurs more generally for positive versus negative actions, from compliments versus insults, to rewards versus punishments, to helping versus hurting.

The asymmetry in reciprocity may provide insight into the apparent ease with which conflict escalates, and the tendency for generosity and compassion to merely sputter. Existing theoretical accounts are consistent with the idea that the escalation we documented in the taking game might have been fueled by a presumed asymmetry between actors and reciprocators (e.g., Rubin, Pruitt, & Kim, 1994; Schroeder et al., 2003; Shergill, Bays, Frith, & Wolpert, 2003). Especially in cases of negative social exchange, an action that is perceived to be generous by an actor is likely to be perceived as less generous by a receiver and therefore deserving of a more selfish response. This could explain the escalating selfish reciprocity to taking in Experiment 4. Whereas takers began by dividing the pot in half, reciprocators may have viewed this action less favorably than the takers did, and responded by taking more when it was their turn to take. The original takers might have perceived this response as ungrateful, which may have fueled escalation even further. This pattern of differential perceptions is considered a hallmark of social conflict (Ross & Ward, 1996; Rubin et al., 1994; Schroeder et al., 2003; Tyler, Boeckmann, Smith, & Huo, 1997),

and this possible mechanism is well worth further empirical attention.

The asymmetry between giving and taking also suggests that the harm of taking away something cannot be undone by simply giving something comparable in return. This may explain why violence and aggression are likely to escalate much faster than kindness and cooperation. For instance, one unresolved issue in the 2000 Camp David summit between Israel and the Palestinians may have been related to this phenomenon. The parties considered the possibility that Israel would give the Palestinians territories in exchange for some of the West Bank territory it had conquered in 1967. This proposal might have failed partly because giving back an object equivalent to what was taken is not perceived as sufficient restitution. Clearing the balance sheet in negative social exchanges is likely to require that people be more generous than their intuitions suggest.

These experiments provide the first empirical demonstration of the asymmetry between reciprocating to giving and reciprocating to taking, as well as of the escalation that is unique to taking. These data suggest that reciprocity functions to maintain prosocial actions, but to quickly suppress antisocial actions via escalating retaliation. Although firmly entrenched, the culturally conferred wisdom about reciprocity appears to be miscalibrated and in need of revision: “You scratch my back, and I’ll scratch yours, but if you take my eye, I’ll take both of yours.”

Acknowledgments—We thank Elizabeth Brown, Lisa Brownstone, Daniel Carlton, James Holden, Annie Huang, Erica Kees, Jasmine Kwong, Entzu Lin, Heidi Liu, Carlos Lozano, Erin Luboff, Elizabeth Majka, and Abbe Rose for technical help; Linda Ginzel, Noah Goldstein, and Robin Hogarth for conceptual help; and the National Science Foundation, the National Institute of Mental Health, the Templeton Foundation, and the Chicago Graduate School of Business for financial help.

REFERENCES

- Alexander, R.D. (1987). *The biology of moral systems*. London: Aldine.
- American heritage dictionary*. (1992). Boston: Houghton Mifflin.
- Axelrod, R., & Hamilton, W.D. (1981). The evolution of cooperation. *Science*, *211*, 1390–1396.
- Baumeister, R.F., Bratslavsky, E., Finkenauer, C., & Vohs, K.D. (2001). Bad is stronger than good. *Review of General Psychology*, *5*, 323–370.
- Brown, R. (1986). *Social psychology*. London: Free Press.
- Cialdini, R.B. (2001). *Influence: Science and practice*. Boston: Allyn & Bacon.
- Cialdini, R.B., & Goldstein, N.J. (2004). Social influence: Compliance and conformity. *Annual Review of Psychology*, *55*, 591–621.
- Foa, U.G., & Foa, E.B. (1975). *Resource theory of social exchange*. Morristown, NJ: General Learning Press.
- Forsythe, R., Horowitz, J.L., Savin, N.E., & Sefton, M. (1994). Fairness in simple bargaining experiments. *Games and Economic Behavior*, *6*, 347–369.

- Gouldner, A.W. (1960). The norm of reciprocity: A preliminary statement. *American Sociological Review*, 25, 161–178.
- Heider, F. (1956). *The psychology of interpersonal relations*. New York: Wiley.
- Kahneman, D., Knetsch, J.L., & Thaler, R. (1986). Fairness as a constraint on profit seeking: Entitlements in the market. *American Economic Review*, 76, 728–741.
- Kahneman, D., & Tversky, A. (1979). Prospect theory: Analysis of decision under risk. *Econometrica*, 47, 263–291.
- Kermer, D.A., Driver-Linn, E., Wilson, T.D., & Gilbert, D.T. (2006). Loss aversion is an affective forecasting error. *Psychological Science*, 17, 649–653.
- Leakey, R., & Lewin, R. (1978). *People of the lake*. New York: Anchor Press/Doubleday.
- Nowak, M.A. (2006). Five rules for the evolution of cooperation. *Science*, 314, 1560–1563.
- Ridley, R.T. (1971). *The origin of virtue: Human instincts and the evolution of cooperation*. London: Penguin Books.
- Ross, L., & Ward, A. (1996). Naive realism in everyday life: Implications for social conflict and misunderstanding. In T. Brown, E. Reed, & E. Turiel (Eds.), *Values and knowledge* (pp. 103–135). Hillsdale, NJ: Erlbaum.
- Rubin, J.Z., Pruitt, D.G., & Kim, S.H. (1994). *Social conflict: Escalation, stalemate and settlement*. New York: McGraw-Hill.
- Schroeder, D.A., Steel, J.E., Woodell, A.J., & Bembenek, A.F. (2003). Justice within social dilemmas. *Personality and Social Psychology Review*, 7, 374–387.
- Shergill, S.S., Bays, P.M., Frith, C.D., & Wolpert, D.M. (2003). Two eyes for an eye: The neuroscience of force escalation. *Science*, 301, 187.
- Tiger, L., & Fox, L.R. (1989). *The imperial animal*. New York: Holt.
- Tyler, T.R., Boeckmann, R.J., Smith, H.J., & Huo, Y.J. (1997). *Social justice in a diverse society*. Boulder, CO: Westview.
- Vidmar, N. (2000). Retribution and revenge. In J. Sanders & V.L. Hamilton (Eds.), *Handbook of justice research in law* (pp. 31–63). New York: Kluwer Academic/Plenum.
- Wedekind, C. (1998). Game theory: Give and ye shall be recognized. *Science*, 280, 2070–2071.

(RECEIVED 2/20/08; REVISION ACCEPTED 6/9/08)