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# **Anomalies**

## **Ultimatums, Dictators and Manners**

**Colin Camerer and Richard H. Thaler**

Economics can be distinguished from other social sciences by the belief that most (all?) behavior can be explained by assuming that agents have stable, well-defined preferences and make rational choices consistent with those preferences in markets that (eventually) clear. An empirical result qualifies as an anomaly if it is difficult to “rationalize” or if implausible assumptions are necessary to explain it within the paradigm. This column will resume, after a long rest, the investigation of such anomalies.

Why study anomalies? What is the purpose of detailed explorations of the failures of economic theory? Some people believe that the main goal is to annoy dogmatic economists. While conceding the pleasure to be achieved in this vein, the investigation of anomalies does have a loftier goal: providing concrete evidence that will help develop economic theory. Like a doctor poking around for sensitive spots, the point of the exercise is to assist the patient, rather than to inflict pain. To this end, it may be useful to revisit occasionally a topic previously discussed in this space to see how the patient is doing. In this spirit, the first installment of the reborn series returns to the ultimatum game, as discussed in the Fall 1988 issue of this journal. Future installments will take on new topics, and suggestions are always welcome. Write to Richard Thaler, c/o *Journal of Economic Perspectives*, Sloan School of Management, E52-555, MIT, Cambridge, MA 02139, or thaler@mit.edu.

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## Introduction

The ultimatum game could not be simpler. Two players are allotted a sum of money. The first player, now often called the Proposer, offers some portion of the money to the second player, called the Responder. If the Responder accepts, she gets what was offered, and the Proposer gets the rest. If the Responder rejects the offer, both players get nothing. This game first attracted attention because the empirical results differed so dramatically from the predictions of game theory, which assumes self-interest. If both players are income maximizers, and Proposers know this, then the Proposer should offer a penny (or the smallest unit of currency available), and the Responder should accept. Instead, offers typically average about 30–40 percent of the total, with a 50-50 split often the mode. Offers of less than 20 percent are frequently rejected. These facts are not now in question. What remains controversial is how to interpret the facts and how best to incorporate what we have learned into a more descriptive version of game theory. This column offers our view of the current status of this line of inquiry.<sup>1</sup>

## Anomaly or Artifact?

When an alleged anomaly emerges, it is good scientific practice to test whether it is robust and not an artifact of a particular experimental environment. Based on research in the last few years, it seems fair to report that the behavior observed in the ultimatum game is quite robust. That is, different variables change the average offers and acceptances significantly, but under no conditions are very small offers made and accepted. Two efforts along these lines deserve special mention.

First, a question that always arises in experimental research, and especially experimental research with anomalous results, is whether the phenomenon is simply a function of the relatively small stakes used in the laboratory. This is not to say that the stakes used in ultimatum game research have been low. The sum to be divided has usually been at least \$10 and often as high as \$20. Nevertheless it is reasonable to wonder what would happen at higher stakes, say \$100. It is one thing to turn down \$2 to punish someone who is keeping \$8 for himself, but will someone be willing to turn down \$20 when the other player is proposing to keep \$80? Decide what you think before reading the next paragraph. While forming your expectations, keep in mind that the

<sup>1</sup>This review will be *highly* selective. For a review of the early literature, see Thaler (1988) in this journal. For more details on these and on other bargaining games, see Roth's (1995) excellent chapter.

Proposers in the high-stakes experiment also should have been forming expectations. If Proposers felt that Responders would be less likely to reject 10 percent offers in the \$100 game than in the \$10 game, then those Proposers who were trying to maximize their own income should have decreased their (percentage) offers (relative to what they would have offered in a \$10 game).<sup>2</sup>

Hoffman, McCabe and Smith (in press) got tired of hearing in seminars that the ultimatum results would change if the stakes were raised, so they invested \$5000 in research funds to find out what would happen. They had 50 pairs play a \$100 version of an ultimatum game in two conditions. Some pairs played under rules in which chance determined the right to be the Proposer, while for the other pairs the outcome of a trivia contest determined the Proposer. (In this condition, the wording of the instructions was also changed somewhat to use what the authors call the language of exchange.) The experiment had been run earlier, with the same two conditions, but with a stake of \$10. This was used as a basis for comparison. The proportions offered in the \$10 and \$100 games turned out to be insignificantly different in both conditions. The most striking result was the frequency of rejections in the high-stakes/contest condition: three of the four offers of \$10 were rejected, and two of the five offers of \$30 were rejected. These Proposers were undoubtedly surprised to discover that Respondents were willing to turn down \$10, much less \$30, rather than accept an “unfair” offer. The results of this expensive experiment show that it is safe to go back to more affordable ultimatum experiments, since they generate data that are indistinguishable from high-stakes data. In fact, the amount at stake alters behavior much less than more subtle manipulations, such as the contest/exchange labeling.

Another possible artifact is cultural: does the nationality of the subjects make a difference? With great care given to issues of comparability, Roth, Prasnikar, Zamir, and Okuno-Fujiwara (1991) ran ultimatum games in four locations: Jerusalem, Ljubljana (in Slovenia), Pittsburgh and Tokyo. The similarities were again striking. In all four countries, the modal offers were in the range of 40 to 50 percent. Still, there were some intriguing differences. For example, Israeli Proposers gave somewhat lower offers (the mode was 40 percent compared to 50 percent in the United States), and the Israeli Responders were willing to take lower offers. It is tempting, but premature, to attribute this difference in behavior to what has to be the highest per capita concentration of game theorists in the world. Still, 40 percent is still a long way from epsilon, so even in Israel we may need to improve the predictive power of game theory.

<sup>2</sup>However, if Proposers are risk averse, then the increase in stakes may induce them to be cautious. At a conference a few years ago, several leading game theorists and experimentalists introspected about how they would play a \$1 million version of the ultimatum game. Most of the participants settled on an offer in the range of \$50,000 to \$100,000, but Robert Aumann insisted that he would offer half the pot, purely out of risk aversion. He pointed out that you never know what lunatic you might be paired up with.

## Information

If we accept that the basic empirical data on the ultimatum game is capturing a real phenomenon, then we can ask what is going on. One way of getting some insights into the causes for the behaviors we observe is to manipulate the information available to the two players and see what happens. Varying information may tell us why Responders reject low offers in the standard game. Several investigators have taken this tack, and we summarize just one effort here.<sup>3</sup>

If Responders reject small offers because they deem them to be unfair, then their willingness to reject should depend on what they think the Proposers are keeping for themselves. To investigate this, Kagel, Kim, and Moser (in press) use a design in which players divided 100 chips. The experiments manipulate both the value of the chips (each chip is worth either 10 cents or 30 cents) and who knows what about relative values. Players always know their own chip valuation, but in some conditions they do not know the other player's value. Who knows what is common knowledge. There are ten repetitions of the game, always under the same informational conditions, against ten different opponents. (One round is picked at random to count for the actual monetary payoff.)

In the case when both players have the same payoff, and this is known to both, we have a standard ultimatum game, and offers tend to converge to 50 percent. In the more interesting cases, information is asymmetric. For example, when the Proposer knows that the chips are worth 30 cents to him but only worth 10 cents to the Responder, an equal division of money would imply an offer of 75 percent of the chips to the Responder. However, if only the Proposer knows that he has the higher valuation, he can offer 50 percent and still seem fair. Do Proposers want to *be* fair or *seem* fair? The data imply that the appearance of fairness is enough; offers in this condition are close to 50 percent, and since Responders have no reason to think that the 50 percent offer is anything but fair, rejections are rare. These results serve as an important reminder that self-interested behavior is alive and well, even in ultimatum games.

Compare the previous situation to one where only the Responder knows that she has the lower value. Here offers start out (in the early rounds) around 40 percent and drift up to about 50 percent in reaction to rejection rates of 34 percent. In this case, the Responders are upset at getting only one quarter of the pie, and Proposers gradually react to that anger. When both players know that the Proposer has the higher value, offers start out at 50 percent of the chips, but very high rejection rates (50 percent in period 1) drive up the offers

<sup>3</sup>Two other noteworthy studies along these lines are Croson (1994) and Mitzkewitz and Nagel (1993).

to 64 percent in period 10. When the Responder has the higher rate, and only she knows, offers are only about 30 percent.

## **Context Effects**

Subjects in interpersonal experiments like the ultimatum game may be influenced by all kinds of factors: the wording of the instructions, the identity of the experimenters, whether the experiment is thought to be “economics” or “psychology,” and so forth. This means that initial results should be interpreted cautiously. At this point in ultimatum game research, enough independent studies have now been carried out with original designs and instructions to be confident that the basic phenomena are robust. The closely related “dictator game,” however, turns out to be very sensitive to design issues.

In the dictator game, the first player, called the Allocator, makes a unilateral decision regarding the split of the pie. The second player, the Recipient, must accept the result. The original dictator game experiments by Kahneman et al. (1986b) and Forsythe et al. (1994) were used to help determine the extent to which generous offers in ultimatum games occurred because Proposers were fair-minded or because Proposers feared having low offers rejected. The answer was this: both factors mattered. Offers in the dictator game are lower than in ultimatum games, but (in most variations) are still positive.

Hoffman et al. (1994a, b) used several different versions of the dictator game to help refine this conclusion. They ran a set of experiments where the following six components of the design were varied, one at a time, in an attempt to manipulate the perceived “social distance” between Allocators and Recipients. First, the instructions used by other researchers in which subjects were told that their task was “to divide \$10” were altered. In the new instructions the Allocator was called a “seller” and was told he could set a price that divided surplus between himself and a buyer (Recipient) purchasing an unidentified object. Second, most allocators received an envelope containing ten \$1 bills and ten slips of paper and were told to put some combination of ten bills and slips of paper in an envelope to be given to the Recipient. Third, two of the Allocators received an envelope that contained only slips of paper. Thus, a Recipient would not know whether a zero offer was intentional or the result of getting one of the “null” envelopes. Fourth, the role of the Allocator was sometimes determined by winning a trivia contest rather than by random assignment. Fifth, the subjects were assured, using a complicated procedure, that the experimenter would not know the actions of any individual subject. Sixth, one subject was chosen to be a paid monitor and was paid \$10 for doing so.

When all six of these conditions were in force, including choosing the Allocator by contest, about 65 percent of the subjects kept all the money for

themselves, compared to less than 20 percent in one experiment by Forsythe et al. (1994). However, no single factor of the six seemed crucial; each change in design had an effect. The authors concluded that as the “social distance” between the Allocator and the Recipient grows, the offers shrink. We agree and offer some additional thoughts along these lines in the commentary.

## Theory

How can the empirical results obtained so far be used to develop a more descriptive version of bargaining theory? Theorists need to keep their eyes on the behavior of both players. Proposers seem to have some willingness to give away some of their new-found money, even in dictator games, but that willingness seems to be context dependent. In ultimatum games Proposers act very much like sophisticated profit maximizers. They are sophisticated because they realize that very unfair offers are likely to be rejected by the Responders. In the ultimatum game, it is the Responders’ behavior that presents the trickier (and more interesting) modeling problems. We will discuss three efforts at tackling this theoretical question.

In Bolton’s (1991) model, players maximize utilities that include social comparison. Responders have a utility function with two arguments  $u(x_r, x_r/x_p)$ :  $x_r$  is the absolute amount received by the Responder, and  $x_r/x_p$  is the ratio of the Responder’s share to the Proposer’s share. (The index is set to 1 if both players get nothing.) A subject who rejects \$2 out of \$10, for example, simply has  $u(\$2, 0.25) < u(0, 1)$ ; she is willing to give up \$2 to avoid worsening her relative standing. Bolton then employs several auxiliary assumptions about the utility function. For example, he assumes that if a player gets less than half ( $x_r < x_p$ ), then utility is increasing in relative comparison; this implies an envy in which I prefer to get \$2 from a \$5 pie, leaving you \$3, than to get \$2 from a \$10 pie. But if a player gets more than half, then she is satisfied in relative standing, and her utility can only be increased if she earns more. Combining these assumptions predicts an asymmetric attitude toward fairness in which relative comparison matters a lot when I feel unfairly treated, but matters very little when I feel fairly treated.

Formal models like this are extremely useful, but Bolton’s has an important shortcoming. His relative comparison model does not distinguish a distaste for uneven allocations per se from a willingness to punish a player who has behaved unfairly by making an uneven offer. In Bolton’s model, a Responder is as likely to reject a very small offer if the offer was selected by the Proposer or if the offer was selected at random. This is true because the measure of social comparison (the ratio of the payoffs) is the same in either case. But Blount (in press) finds that subjects are more likely to accept small (uneven) offers if they come from a random device than if they are chosen by the Proposer. People are punishing unfairness, not rejecting inequality.

Rabin (1993) offers a more sophisticated model of fairness inspired by experimental findings in social psychology. In Rabin's model, agents in normal-form games differentiate between an intentional act of meanness, which they will punish, and an inadvertently mean act, which they will tolerate. Rabin introduces a new equilibrium concept, called a "fairness equilibrium." To see how it works, consider the standard prisoner's dilemma game in which the Nash equilibrium is for both players to defect. This outcome is also a fairness equilibrium, since both players are punishing the other's uncooperative action. However, there is an additional fairness equilibrium: cooperate-cooperate. This is a fairness equilibrium because both players are willing to sacrifice something to reward the other player's cooperative act.

A model like Rabin's (1993) adds several interesting features to simple relative comparison. It can accommodate both positive altruism (helping friends through mechanisms like gift exchange and trust) and negative envy (punishing enemies at a cost to oneself). By focusing on the importance of how each player views the intentions of the other, such a perspective can explain why Responders reject unequal offers made by Proposers, but accept equally uneven offers made by a computer. The demonstration that intentions matter paves the way to incorporate what psychologists call "attributions" into economic analysis.<sup>4</sup> Finally, the reciprocal fairness view allows consideration of the set of available choices a player has, since this helps in judging intentions. We conjecture that Respondents will be more likely to accept the short end of an (8, 2) offer when the Proposer was choosing between this allocation and one that was worse (such as (10, 0)) than in a situation where the Proposer could have chosen the even split (5, 5).

A third theoretical approach explains ultimatum outcomes as the combination of initial distributions of offer and rejection thresholds—which may vary across subject pools, contexts, and so on—and simple evolutionary or reinforcement models of learning (Roth and Erev, in press; Binmore and Samuelson, 1993). In these models, unlike Bolton's and Rabin's, subjects have no underlying concern for other's payoffs. Proposers learn to make generous offers because they discover that Responders reject stingy offers. Responders also learn to accept low offers, but more slowly, since the cost to them of rejecting a small offer is less than the cost to the Proposer of having a small offer turned down. Models of learning and evolution are important in economics. But these models cannot easily explain why we see both fair offers (predicted to result from learning) *and* rejections of unfair offers (predicted to disappear with learning) in one-shot and repeated laboratory trials.

<sup>4</sup>Attribution theory describes how people attribute cause to events and how attributions influence reactions to events. For example, "procedural justice" researchers have found that the way in which job layoffs were determined by firms and communicated to workers makes a substantial difference in how both laid-off "victims" and retained "survivors" behave toward the firm afterward.



These three kinds of models represent a good start. However, none can explain the dictator game data, nor the information-varying experiments. There is more to do and plenty of observations to work with.

### **Commentary: The Economics of Manners**

Why does game theory fail as a predictive model in ultimatum and dictator games? These games are so simple that we can rule out rationality as the source of any problem, so the difficulty presumably has something to do with the assumption that the players are income maximizers. One obvious strategy in trying to fix up economic theory to deal with this problem is to allow for some kind of altruistic utility function, where the utility to one player depends on the payoffs to other players. But this formulation presents two immediate problems. First, based on behavior displayed in these experiments, it is not possible to say whether the average participant puts a positive or negative value on the other subject's payoffs! In dictator games, the Allocators act as if they put a positive value on the Recipient's payoff. But in the ultimatum game, Responders who receive small offers turn them down, an act that implies a negative relationship between their own utility and the other player's payoffs. Apparently, a player does not care about the other's welfare *per se*, but desires some kind of equity in the context of this particular interaction. We conclude that the outcomes of ultimatum, dictatorship and many other bargaining games have more to do with manners than altruism.

Consider first the simple dictator game. Subjects are handed \$10 in manna from experimental heaven and asked whether they would like to share some of it with a stranger who is in the same room. Many do. However, if the first player is made to feel as if he earned the right to the \$10, or the relationship with the other player is made less personal, then sharing shrinks. Etiquette may require you to share a windfall with a friend, but it certainly does not require you to give up some of your hard-earned year-end bonus to a stranger.<sup>5</sup>

In the ultimatum game, the Responder is primarily reacting to the manners of the first player. The Responders are willing to turn down rude offers, even at a cost to themselves. Rabin's (1993) model, which captures this notion neatly, incorporates etiquette into economics. Though most economists have ignored manners and etiquette in their research—and, some would say, in their behavior—such factors can be very important. The perceived norms of fairness, investigated by Kahneman et al. (1986a), can be thought of as rules of

<sup>5</sup>In some hotels, the person who cleans the room signs a card, presumably to increase tips. We suspect this ploy works. If so, perhaps offers in the dictator game would increase if the Allocator knew that the Responder's name was Pat (though not which Pat). This is related to the well-known phenomenon that people are willing to pay more to save a "known" life than a statistical life. At the societal level, leaving a girl in a well to die is beyond rude, but doing nothing about an unsafe highway is acceptable behavior.

polite business practice. It is rude to raise the price of snow shovels after a blizzard, and firms who are in business for the long term have the good sense to eschew short-run profits to protect the relationship they have built up with their customers. Similarly, firms that treat their workers fairly (politely) will be rewarded by greater effort as some gift-exchange and efficiency wage models predict (for example, Akerlof and Yellen, 1990). In a laboratory experiment, Fehr et al. (1993) find that “firms” who pay more than they have to are rewarded with voluntary effort contributions by their “workers.”

A good general theory of fairness predicts that fair-minded players behave self-interestedly in some situations. Two experiments show that competition can push ultimatum offers closer to zero, in ways consistent with fairness. Schotter et al. (1994) created competition among Proposers. Eight Proposers made offers in a first stage. The four who earned the most in the first-stage game could then play a second-stage game (with a different player). Sensible fairness theories would say that Proposers now have an excuse for making low offers—they must compete for the right to play again<sup>6</sup>—so low offers are not as unfair, and Responders will accept them more readily. That is what happened.

Another study in Roth, Prasnikar, Zamir, and Okuno-Fujiwara (1991) used market-like games to create competition among Responders. Nine Responders simultaneously announced the lowest offers they would take from a single Proposer, who then consummated the deal with the Responder offering the best terms. The Responders’ minimum acceptable offers started around typical ultimatum levels, averaging 30 percent, but within ten rounds most players were willing to take 10 percent or less. Again, a sensible model of fairness can explain this reduction in the willingness to punish unfair offers. First, in this game Responders do not have the power to punish single-handed an unfair Proposer. Even if I refuse an offer of 15 percent, the Proposer does not suffer if you are willing to accept even less. Second, since the Proposer does not suggest an offer, there is no attribution of unfairness associated with a low offer. In this game, the Proposer is merely accepting the best deal available, and there is nothing unfair in that. Indeed, Responders may even feel that it is other Responders (rather than the Proposer) who are misbehaving by accepting such low offers, and they may decide to punish that behavior by accepting even less.

An ultimatum study with children further illustrates our idea about manners. Playing ultimatum games for a dollar or for a pile of M & M candies, kindergartners accepted minimal offers (one penny or one M & M) about 70 percent of the time, compared to about 40 percent for third- and sixth-graders (Murnighan and Saxon, 1994) and probably much less for the typical college student subjects. Besides discovering the group of Respondent subjects who behave *most* like pure income maximizers—kindergartners—the study shows that perhaps the tendency to reject insulting low offers is learned, as manners are.

<sup>6</sup>Kahneman et al. (1986a) referred to this pressure as the need to “stay in business.”

Our goal in stressing manners is to distinguish this explanation from one based on altruism or other interdependent utility functions. Our view is similar to that of Hoffman et al. (1994a, b), who prefer to describe the behavior as a manifestation of rules of reciprocity that people learn in everyday life. In repeated encounters, it is rational to treat others fairly and punish those who behave unfairly, because long-run concerns outweigh the short-run costs. Of course, there are no long-run concerns in a one-shot ultimatum game, but Hoffman et al. (1994a, b, forthcoming) argue that subjects in such experimental settings cannot curb their repeated-game impulses. We find this view troubling for experimentalists. It says that subjects cannot accept a situation as being one shot, even when there is \$100 at stake. We prefer to think that people have simply adopted rules of behavior they think apply to themselves and others, regardless of the situation. They leave tips in restaurants that they never expect to visit again not because they believe this is really a repeated game, but because it would be rude to do otherwise.

We are excited by Rabin's attempt to incorporate fairness (or manners) into game theory. His model takes the experimental evidence seriously and tries to come to grips with it, rather than making excuses for it. We hope other game theorists will follow Rabin's lead and continue to develop models of how real people interact. And if a theorist is wondering how someone will play a certain game and no experiment has been run, we suggest asking Miss Manners.

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