



Are Chimps More Rational than Humans?

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## The Ultimatum Game and Non-Human Primates

[Sarah Brosnan](#)

Georgia State University

Since its invention 25 years ago, the "[Ultimatum Game](#)" has become a workhorse of behavioral economics. The game (abbreviated UG) is designed to examine peoples' decisions about resource allocation in a very simple bargaining situation. The first person, labeled the proposer, receives a sum of money to divide between herself and a partner (typically anonymous). The second person, or responder, can either accept the division, in which case both will be rewarded as the proposer indicated, or refuse the division, in which case neither player receives any money.

This game has heavily influenced economists' views of rational decision-making. The most "rational" action is for the proposer to offer the least amount allowable (usually \$1 or the equivalent) and for the responder to accept it. This strategy offers an absolute gain to both individuals. According to economic theory, this arrangement should mean everyone is happy.

Yet the game rarely goes this way in practice. Although social and situational factors can affect offers, in most studies the median offer by the proposer is 50 percent (the average is about 40 percent) and responders frequently refuse offers of lesser amounts. In other words, humans - at least in the role of responder - care about relative gains (for example, their gains as compared to their partner) as much or more than absolute gains. And proposers apparently anticipate this behavior, leading them to make offers that are fair enough to be accepted.

### New Clues

The [study](#) by Keith Jensen et al attempted to play the UG with chimpanzees, which had never been done before. This choice of test subject is important for many reasons. Chimpanzees are one of our closest phylogenetic (evolutionary) relatives. By studying how chimpanzees make economic decisions, we can learn about our own evolutionary history. For instance, if both humans and chimpanzees share a certain behavior, then that behavior probably results from shared social and ecological factors affecting primate evolution prior to the human/chimpanzee split five million years ago. On the other hand, if we show a behavior that chimpanzees do not, this finding would indicate some change unique to humans. Voila! We can now explore which environmental difference led to this unique behavior. Once we know the evolutionary history of a behavior, we can more

accurately assess why the behavior is important and how the behavior will manifest in other environments.

In Jensen et al.'s study, chimpanzees do not act as humans do. They are what economists call "rational maximizers," meaning that the responders accept all offers, regardless of the relative difference in gains between proposers and responders. Given this result, it seems as if our sense of fairness in such games comes from more recent evolutionary adaptations that are likely to be uniquely human.

### **Playing the Game?**

But wait, you may be thinking, we already know one way in which humans and chimpanzees are different - only humans have language. Perhaps the chimpanzees simply did not understand the game. To ameliorate this concern, Jensen and colleagues designed a set-up based on a limited-form UG, in which only pre-set options are available to the proposer. In this case, the proposer chimpanzee used a pull cord to bring a tray with one of two distributions within reach of its partner. Then the responder had the option to use another pull-cord to bring that tray close enough for both individuals to obtain the food rewards. In this way the respondent's choice was restricted by the proposer's action in a way that did not require a language-based explanation.

Yet there is evidence that the chimpanzees may have been confused about this set-up. Fifty-six percent of the time, the responder accepted the offer (pulled in the tray) even when it received nothing at all. (In control trials, when subjects were alone, they also pulled in the tray about 36 percent of the time, indicating that some of this response is due to an inability to inhibit pulling for food.) This high rate of pulling for no particular reason indicates that the chimpanzees did not fully understand the game. Perhaps they did not realize which food was theirs to obtain. Another possibility is that the responder chimpanzee did not understand that its choices were constrained by the proposer.

This distinction is critical, as intentionality makes an enormous difference in human studies. Humans will accept quite unequal distributions if the decisions were made by a computer (which presumably has no intentions) as opposed to another person. If the chimpanzee responder was simply choosing whether to accept the available food, without realizing that its partner had constrained its choices, then this is not a true UG. A control, in which the responder's options are proscribed externally, by an experimenter or mechanical means, would resolve this question. If the responder's rate of pulling does not differ between these two conditions, then chimpanzees either do not understand the task, or they do not take intentionality into account.

There are also concerns regarding the social environment. In a typical UG, the proposer and responder are anonymous, to keep interactions that took place apart from the experiment from influencing behavior during the trial. Humans are so strongly influenced by the ability to follow up that even the opportunity to write a nasty note to the proposer increases acceptance rates among responders. Thus, other actions from the chimpanzees' daily social environment may have affected their responses.

Moreover, social context is known to strongly affect the frequency of negative responses to inequity in chimpanzees. Chimpanzees are [highly sensitive](#) to inequity, and typically refuse to continue in interactions in which they get less than a social partner. However, chimpanzees from [stable social groups](#) do not respond negatively in situations in which their partners received better rewards, whereas chimpanzees from less-established groups show rejection rates as high as 60 percent. Perhaps, as with human relationships, chimpanzees in close groups have valuable relationships that are not affected by a small difference in food rewards. In the current study, the chimpanzees appear to be from a well-established, stable social group, which may have altered their willingness to respond at all.

Experiments such as Jensen's are critically important to help to clarify the evolution of economic decision-making in humans. We know that, ultimately, we and chimpanzees have followed differing evolutionary paths. But what was it about our environment that led to these differences? Understanding these behaviors and their antecedents in our closest relatives will clarify these questions and provide a better understanding of the context surrounding our own economic systems.