

# Brain imaging study provides new insight into why people pay too much in auctions

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Auctions are an old and widely used method for allocating goods that have become increasingly common with the advent of internet auctions sites such as Ebay. Previous economic research has shown that in an auction people tend to bid "too high," or overbid, given the value of the item for sale. By combining brain imaging techniques with behavioral economic research, neuroscientists and economists at New York University were able to provide new insight into this tendency to overbid. Specifically, they show that the fear of losing the social competition inherent in an auction may, in part, cause people to pay too much. The research, which suggests an expanded role for neuroscience in understanding economic behavior, appears in the latest issue of the journal *Science*.

The goal of the study was to provide insight into the neural circuitry of experimental auctions, and then to use this insight to generate and test a novel economic approach to understand overbidding. It was conducted by a team of NYU neuroscientists and economists. The neuroscientists were NYU Professor Elizabeth Phelps and Mauricio Delgado, now an assistant professor at Rutgers University in Newark, N.J. The economists were Andrew Schotter, a professor in NYU's Department of Economics, and Erkut Ozbay, a former NYU doctoral student and now an assistant professor in the University of Maryland's Department of Economics.

The researchers used functional magnetic resonance imaging (fMRI) to examine patterns of brain activation as participants played either an auction game with a partner or a lottery game. In both games participants

could win money, but in the auction game winning depended on outbidding a partner. An examination of activation in the striatum, part of the brain's reward circuitry, showed the primary difference when winning or losing in the auction vs. lottery games was an exaggerated response to losses in the auction game. The magnitude of this exaggerated loss response in the striatum during the auction game correlated with the tendency to overbid, suggesting the intriguing hypothesis that perhaps the prospect of losing the social competition inherent in an auction may lead people to bid "too high."

To confirm this hypothesis, a follow-up behavioral economic study was conducted. Three groups of participants played an auction game against a partner under different circumstances. The control group was simply given values and asked to make bids. The Bonus-Frame group was told that if they won the auction, they would also receive a bonus of 15 experimental dollars. The Loss-Frame group was given 15 experimental dollars prior to the auction, but participants were told they would lose the 15 dollars if they failed to win the auction. In both the Loss and Bonus-Frame conditions, only the winners would get an additional 15 experimental dollars, so the auctions were strategically identical. The difference was simply the way it was framed to emphasize losing or winning. Consistent with the hypothesis that contemplation of loss may, in part, drive overbidding, participants in the Loss-Frame condition consistently bid higher than the other two groups, resulting in a greater potential profit for a hypothetical auctioneer.

According to Schotter, "such a result would not have been predicted by existing economic theory. While there have been investigations of overbidding which have attributed the phenomenon to either risk aversion or the 'joy of winning,' it was the use of imaging data which allowed us to distinguish between these conflicting explanations and actually arrive at a new and different one, the 'fear of losing.' Our results provide evidence of how an understanding of the neural systems of

economic behavior might inform economic theory."

"These results highlight a role for the contemplation of social loss in understanding the tendency to bid 'too high' in auctions and emphasize the importance of considering social factors in economic decisions," Phelps explained. "By combining neuroeconomic and behavioral economic techniques we were able to provide novel insight into a classic economic problem."

"Although there have been a number of neuroeconomic studies that have used economic games to further our understanding of brain function, the benefits to traditional behavioral economics as a result are unclear," Delgado added. "Because of recent advances in neuroeconomics and our knowledge of the neural circuitry related to reward, we were able to use neuroimaging results to highlight the importance of framing, and specifically the contemplated loss, as an explanation for overbidding during experimental auctions."

Source: New York University

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