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Economic Scene; Looking inside the brains of the stingy and the openhanded.

By VIRGINIA POSTREL

HERE's a game economists play: Player 1 has $10 and can give any dollar amount to Player 2. Player 2 can either accept or reject it. If Player 2 accepts, they both keep the money. If Player 2 rejects it, neither player gets anything.

What should the players do? Arguably, Player 2 should accept whatever is offered, since some money is better than none. Player 1 should thus offer as little as possible: $1. That strategy is the standard game-theory equilibrium.

But that's not necessarily what happens when real people play this ''ultimatum game'' in laboratory settings with real money on the line. Faced with low-ball offers, many Player 2's reject them. And many Player 1's make more generous offers, often nearly half the money.

''About half the subjects that we observed played according to the way the game theory said people should play, and about half didn't,'' said Kevin McCabe, an economist and director of the Behavioral and Neuroeconomics Laboratory at George Mason University.

The Player 1's who do not follow the presumably rational strategy often wind up better off. Even without communicating with fellow players, they are able to cooperate for mutual benefit.

Why do people react differently to the same situation? And why do so many people give up money to punish anonymous cheapskates?

Experimental economists have mapped out these anomalies and tested how much they affect economic interactions. Now a new field, called neuroeconomics, is using the tools of neuroscience to find the underlying biological mechanisms that lead people to act, or not act, according to economic theory.

In neuroeconomics, volunteers go through exercises developed by experimental economists studying trust or risk. Instead of simply observing subjects' behavior, however, researchers use imaging technologies, like M.R.I.'s, to see which brain areas are active during the experiment.

Researchers at Princeton, for instance, have found that receiving low-ball offers stimulates the part of the brain associated with disgust. ''They can predict with good reliability, from looking at the brain, what a person will do,'' said Colin F. Camerer, an economist at the California Institute of Technology. ''People whose brains are showing lots of disgust will reject offers.''

Professor Camerer says looking inside the brain's ''black box'' is like looking inside a company. Traditionally, economists treated a company as a largely automatic ''production function'' that turns labor, capital and resources into output. Over the last several decades, however, many economists have turned their attention to understanding companies' internal workings. Most prominently, ''agency theory'' examines how companies can be governed to encourage employees (the ''agents'') to pursue the goals of the owners, rather than their personal agendas.

This research hasn't replaced the production-function approach, but it has enriched economists' understanding of company behavior. Neuroeconomists want to do something similar for how individuals make economic choices.

''Neuroeconomics could be to consumer theory what agency theory is to the production-function approach,'' Professor Camerer said.

While many economists remain skeptical, neuroscientists have welcomed the interest.

''Anyone working with the brain likes this approach because economists have these nicely defined behavioral models,'' said Paul Zak, an economist and director of the Center for Neuroeconomics Studies at Claremont Graduate University.

Neuroscientists do experiments like looking at which parts of the brain are active when someone looks at photographs and decides which faces are trustworthy. Neuroeconomists don't just ask people to use their imaginations, though -- they have subjects play laboratory games to find out what happens in real interactions.

Professor Zak and his colleagues study trust with a variation of the ultimatum game. Each player receives $10. Player 1 gets an additional $10. Players interact anonymously over computers. Player 1 can send any whole-dollar amount to Player 2. Whatever he sends is tripled, so a $5 gift turns into $15. Finally, Player 2 can return some of the money to Player 1.

If Player 1 expects Player 2 not to send any money in return, Player 1 will keep the initial stake. That's the game's standard equilibrium.

''In fact,'' Professor Zak said, ''most people send about half of their stake to Player 2. They're signaling that they want to trust them.'' In response, about 75 percent of the Player 2's return some money, making both better off.

''Even though we can't see each other and we don't know each other, we understand the other person as a human being,'' Professor Zak said. Extrapolating from animal results, he hypothesized that the hormone oxytocin, which is associated with social bonding, might play a role.

''When you read the studies on lower mammals,'' he said, ''everything suggests that this is a candidate to induce trustworthiness because it's something that you would not consciously be aware of and yet it would influence decision making.''

Researchers tested each subject's blood for eight different hormones right after the person made the decision about whether to send money. For Player 1, no hormone appeared to make a difference. But the more money the Player 2's received, the higher their oxytocin, even after controlling for factors like age, sex and menstrual cycle timing. The higher the oxytocin, the more money each Player 2 returned.

That response didn't correlate with various personality measures. "It's not that these people who returned more money are just nicer," Professor Zak said.

Neuroeconomists caution that their research is just starting. But that does not reduce their enthusiasm.

"For me, it's just an extremely exciting area in terms of potential," Professor McCabe said. "There's always new findings every day."

Virginia Postrel is the author of "The Future and Its Enemies." Her book on the increasing economic and cultural importance of aesthetics will be published in September by HarperCollins. E-mail: vpostrel@dynamist.com.