Study: Emotion rules the brain's decisions

By Dan Vergano, USA TODAY
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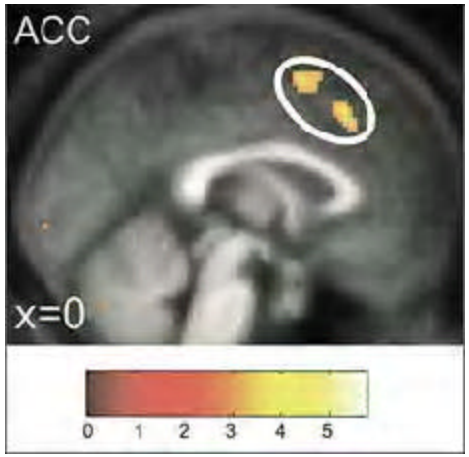
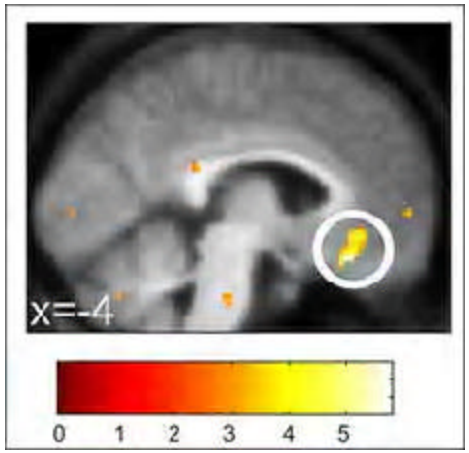


Thoughts: The "prefrontal cortex" (circled) orchestrates thoughts and actions. A study shows it also fires up to resist the "framing effect" of a question during decision making.



Conflict: Activation of the anterior cingulate cortex (circled) reflects the conflict between analytical and emotional responses when confronted with a choice to gamble or not gamble.

The evidence has been piling up throughout history, and now neuroscientists have proved it's true: The brain's wiring emphatically relies on emotion over intellect in decision-making.

A brain-imaging study reported in the current Science examines "framing," a hot topic among psychologists, economists and political hucksters.

Framing studies have shown that how a question is posed — think negative ads, for instance — skews decision-making. But no one showed exactly how this effect worked in the human brain until the brain-imaging study led by Benedetto De Martino of University College London.

De Martino and colleagues asked 20 men and women to undergo three 17-minute brain scans while being asked to gamble — or not — with an initial pot of English pounds worth about $95. When told they would "keep" 40% of their money if they didn't gamble, the volunteers chose to gamble only 43% of the time. Told they could "lose" 60% of the money if they didn't gamble, they rolled the dice 62% of the time. Their chances of winning the money were carefully explained beforehand, and participants knew the odds were identical. But the framing effect still skewed their decisions significantly.

The brain images revealed the amygdala, a neural region that processes strong negative emotions such as fear, fired up vigorously in response to each two-second (on average) gambling decision. Where people resisted the framing effect, a brain region connected to positive emotions such as empathy, and another that activates whenever people face choices, lit up as well, seeming to duke it out over the decision.

"We found everyone showed emotional biases, more or less; no one was totally free of them," De Martino says. Even among the four participants who were aware they were inconsistent in decision-making, "they said, 'I know, I just couldn't help myself,' " he says. The study comes amid a burst of research into neuroeconomics, which studies the brain's role in buying and selling decisions. Economists have embraced the idea in recent years that irrational psychology, rather than cool calculation, plays a role in such decisions. The brain study goes further and suggests that emotions rule decisions almost completely.

"The study is a very nice application of recent knowledge we've acquired about healthy cognition and emotion," says neuroscientist Antonio Damasio of the University of Southern California in Los Angeles, who was not part of the study. "As a neuroethicist, I'd urge caution about over-interpreting this elegant study," says Judy Illes of the Center for Biomedical Ethics at Stanford University. In real life, decision-making is "an extremely complex behavior with both rational and irrational components," she says, and it is hard to capture completely in a lab setting. Still, Illes calls the study intriguing and predicts it will lead to more work in the neuroeconomics arena.

De Martino acknowledges the study's limitations; the decisions described as rational in the study were simply consistent ones, not a measure of intelligence or correctness, he says. "I'm not sure you would really want someone like Mr. Spock making all your decisions." In fact, people who lack emotions because of brain injuries often have difficulty making decisions at all, notes Damasio. The brain stores emotional memories of past decisions, and those are what drive people's choices in life, he suggests. "What makes you and me 'rational' is not suppressing our emotions, but tempering them in a positive way," he says.

Though neuroeconomics is a hot field, with hundreds of researchers attending a recent meeting in Paris on the topic, Damasio says brain imaging's biggest potential lies in teaching: "Our education system ignores the role of emotion in learning and decision-making."