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## **Brain Mechanism Evolved to Identify Those With a Propensity to Cheat, According to UCSB Scientists**

New research by scholars at UC Santa Barbara indicates that the uncanny human ability to detect cheaters reflects the operation of a reasoning system that evolved for that narrow purpose, and cannot be explained by more general abilities to reason about conditional rules, moral violations, or social interactions. Their findings appear in the current issue of the Proceedings of the National Academy of Sciences (PNAS).

According to the authors, this system becomes activated only when detecting a violation that has the potential to reveal a specific aspect of someone's character -- his or her propensity to cheat.

The new findings, which build on research presented in a 2002 PNAS paper highlighting neuroscientific evidence of a distinct cheater detection system, specifically debunk the blank-slate theory of human intelligence. This competing view attempts to explain special abilities like cheater detection as the product of experience plus a general capacity to learn or reason.

"The thing that's startling about the results is how specialized this reasoning mechanism turns out to be," said Leda Cosmides, a co-author of the paper.

She is a professor of psychology and co-director of UCSB's Center for Evolutionary Psychology. Cosmides wrote the current PNAS paper with John Tooby, a professor of anthropology and also co-director of the Center for Evolutionary Psychology; and H. Clark Barrett, formerly of the Center for Evolutionary Psychology and now associate professor of anthropology at UCLA.

Social exchange is the form of cooperation that occurs when people trade or reciprocate favors. "Evolutionary analyses have shown that social exchange cannot evolve unless individuals are able to detect those who cheat," said Barrett. "Therefore, from an evolutionary standpoint, the function of detecting acts of cheating is to connect them to an identity -- to deduce character."

However, only some violations of social contracts are relevant to assessing character. "For example, someone can be deprived of what he or she is entitled to by an innocent mistake or when something accidentally interferes. In those cases, mentally flagging a violation would not reveal the presence of a cheater," said Cosmides.

"If this ability was produced by general learning abilities operating on experience," Tooby pointed out, "then you would expect it to detect the broad range of violations that people actually experience and suffer from -- incidents of cheating, accidents, innocent mistakes, and so on. All of these equally deprive people of what they are entitled to, and what they are motivated to recover.

Indeed, the fastest, simplest, and most informative cognitive step would be to learn to uniformly detect all violations of social contracts."

Yet that is not what the mind does.

The researchers found that the violation detection system is more complex and selective, with computational steps that respond to the intentions of the partner, whether the partner was in a position to cheat, and whether the partner could have benefited by the violation.

The system remains inactive -- that is, it tends not to notice violations -- when confronting situations where people are deprived of what they are entitled to, but for reasons that are unlikely to expose cheaters.

"This reasoning system does not respond to economic consequences per se. It focuses only on those violations that are likely to reveal cheaters -- individuals who take the benefit offered in an exchange while intentionally failing to do what the other person required in return," Cosmides said. "It ignores the others. This matches the evolutionary prediction that the system's function is sifting for people who cheat."

"The system is most strongly activated when there are cues that the violator is acting intentionally, will get the benefit regulated by the rule, and has the ability to do all of this," Barrett explained. "Take away one of these three elements and reasoning performance drops sharply; take away two and it drops to the same baseline incompetence the mind exhibits when reasoning about most conditional rules, such as moral rules." That is, only a narrow range of conditions activate the cheater detection system: "It does not search for violations of social exchange rules when these are accidental, when they do not benefit the violator, or when the situation would make cheating difficult," he said.

"These experiments were designed to rule out every alternative hypothesis that we know of about why people are skilled at detecting cheaters. No other theory predicts this pattern of results," said Cosmides.

"It takes a moment to appreciate how inconsistent these results are with traditional ways of thinking," noted Tooby.

"Learning theories, economic theories, and motivational theories all predict that skill acquisition or performance should be at least partly a function of payoff.

Here, innocent mistakes, cheating, and accidents all lead to the same payoff for the people who did not get what they were entitled to -- zero -- and detection of the violation is a necessary first step toward recovering the lost benefit. Yet, the mind tends to disregard those losses that don't expose cheaters."

"If you take away the cues that indicate a person is predisposed to cheat, the mechanism isn't activated," Cosmides added. "That's what falls out of the evolutionary theorizing. Evolutionary theory says you should be looking for people who are cheating by design, not by accident," she said.

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