Liars' Brains Wired Differently

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**A USC study of pathological liars shows first evidence of structural differences in the area of the brain that enables most people to feel remorse.**

By Usha Sutliff



A three-dimensional MRI image of the brain

A USC study has found the first proof of structural brain abnormalities in people who habitually lie, cheat and manipulate others.

While previous research has shown that there is heightened activity in the prefrontal cortex – the area of the brain that enables most people to feel remorse or learn moral behavior – when normal people lie, this is the first study to provide evidence of structural differences in that area among pathological liars.

The research – led by Yaling Yang and Adrian Raine, both of the USC College of Letters, Arts and Sciences – is published in the October issue of the British Journal of Psychiatry.

The subjects were taken from a sample of 108 volunteers pulled from Los Angeles’ temporary employment pool. A series of psychological tests and interviews placed 12 in the category of people who had a history of repeated lying (11 men, one woman); 16 who exhibited signs of antisocial personality disorder but not pathological lying (15 men, one woman); and 21 who were normal controls (15 men, six women).

“We looked for things like inconsistencies in their stories about occupation, education, crimes and family background,” said Raine, a psychology professor at USC and co-author of the study.

“Pathological liars can’t always tell truth from falsehood and contradict themselves in an interview. They are manipulative and they admit they prey on people. They are very brazen in terms of their manner, but very cool when talking about this.”

Aside from having histories of conning others or using aliases, the habitual liars also admitted to malingering, or telling falsehoods to obtain sickness benefits, Raine said.

After they were categorized, the researchers used Magnetic Resonance Imaging to explore structural brain differences between the groups. The liars had significantly more “white matter” and slightly less “gray matter” than those they were measured against, Raine said.

Specifically, liars had a 25.7 percent increase in prefrontal white matter compared to the antisocial controls and a 22 percent increase compared to the normal controls. Liars had a 14.2 percent decrease in prefrontal gray matter compared to normal controls.

More white matter – the wiring in the brain – may provide liars with the tools necessary to master the complex art of deceit, Raine said.

“Lying takes a lot of effort,” he said.

“It’s almost mind reading. You have to be able to understand the mindset of the other person. You also have to suppress your emotions or regulate them because you don’t want to appear nervous. There’s quite a lot to do there. You’ve got to suppress the truth.

“Our argument is that the more networking there is in the prefrontal cortex, the more the person has an upper hand in lying. Their verbal skills are higher. They’ve almost got a natural advantage.”

But in normal people, it’s the gray matter – or the brain cells connected by the white matter – that helps keep the impulse to lie in check.

Pathological liars have a surplus of white matter, the study found, and a deficit of gray matter. That means they have more tools to lie coupled with fewer moral restraints than normal people, Raine said.

“They’ve got the equipment to lie, and they don’t have the disinhibition that the rest of us have in telling the big whoppers,” he said.

“When people make moral decisions, they are relying on the prefrontal cortex. When people ask normal people to make moral decisions, we see activation in the front of the brain,” he explained. “If these liars have a 14 percent reduction in gray matter, that means that they are less likely to care about moral issues or are less likely to be able to process moral issues. Having more gray matter would keep a check on these activities.”

The researchers stopped short of asserting that these structural differences account for all lying.

“This is one of the components,” Raine said.

“The findings need to be replicated and extended to other parts of the brain. What are the other neurobiological processes?

“We haven’t had studies like this. It’s exciting to us because it’s a beginning study, but we need a lot more to flesh out this discovery.”

Yang, the study’s lead author, said the findings eventually could be used in making clinical diagnoses and may have applications in the criminal justice system and the business world.

“If [the findings] can be replicated and extended, they may have long-term implications in a number of areas,” said Yang, a doctoral student in the USC department of psychology’s brain and cognitive science program.

“For example, in the legal system they could potentially be used to help police work out which suspects are lying. In terms of clinical practice, they could help clinicians diagnose who is malingering – making up disability for financial gain.

“And also in business, they could assist in pre-employment screening, working out which individuals may not be suitable for hiring.

“But, right now, I have to emphasize that there are no direct practical applications,” she said.

In their journal article, the authors mention that separate studies of autistic children – who typically have trouble lying – have showed the converse pattern of gray matter/white matter ratios.

“The facts that autistic children have difficulty lying and also show reduced prefrontal white matter constitutes the opposite but complementary pattern of the results compared to adults with increased prefrontal white matter who find it easy to lie,” the researchers wrote.

“Although autism is a complex condition and cannot be taken as a model for lying, these results … converge with current findings on adult liars in suggesting that the prefrontal cortex is centrally involved in the capacity to lie.”

The other researchers were Susan Bihrle and Lori LaCasse, also of the USC College’s psychology department, Patrick Colletti of the Keck School of Medicine of USC’s department of radiology and Todd Lencz of Hillside Hospital’s department of research.