

Prefrontal white matter in pathological liars. British Journal of Psychiatry 2005. 187;320-325

From MedPage today. Liar, Liar, Brain's On Fire

LOS ANGELES, Sept. 30-"Any fool can tell the truth," wrote British author Samuel Butler, "but it requires a man of some sense to know how to lie well."

Not so, according to a new study. All it takes to lie well -- or at least consistently and deliberately -- is a slightly abnormal brain, one with more white matter and less grey matter in the prefrontal cortex than the rest of us.

"Their brains are different," said Yaling Yang, MS, a doctoral student at the University of Southern California here.

"They have more connections between the nerve cells, which gives them a better ability to lie," Yang said in an interview, "and (because) they have **decreased grey matter, which is associated with impulsivity and inhibition**, they can't inhibit their tendency to lie."

To conduct the study -- published in the current edition of the British Journal of Psychiatry -- the researchers interviewed 108 volunteers from five temporary employment agencies in Los Angeles. A series of psychological tests and interviews found 12 people -- 11 men and one woman -- who had a history of repeated lying.

Additionally, the researchers found two control groups -- 15 men and one woman who exhibited signs of antisocial personality disorder but were not pathological liars and 15 men and six women who were normal controls.

The "liars" met the criteria for pathological lying or for conning and manipulative behavior on a standard psychopathy checklist, the deceitfulness criterion for antisocial personality disorder on the American Psychiatric Association's DSM-IV diagnostic manual, or admitted telling lies to obtain sickness benefits.

"We looked for things like inconsistencies in their stories about occupation, education, crimes and family background," said Adrian Raine, D.Phil, a psychology professor at the university and a co-author of the study.

Then the subjects underwent structural MRI imaging, Dr. Raine said. The MRI examinations found that the liars had significantly more white matter and slightly less grey matter than the other groups.

Specifically:

* On average, the liars had 25.7% more prefrontal white matter, compared to the

antisocial controls, and 22.2% more than the normal controls.

* The liars showed a 35.7% decrease in ratio of grey to white matter in the region, compared to antisocial controls, and a 41.7% decrease in the ratio, compared to controls.

* On an absolute scale, the liars had 14% less grey matter than the normal controls.

The theory that Yang and colleagues have developed is the extra connections between nerve cells give liars a greater ability to lie. Dr. Raine put it this way: "Lying takes a lot of effort." For example, "You have to be able to understand the mindset of the other person (and) to suppress your emotions or regulate them because you don't want to appear nervous."

Their theory is partly based on two observations, Yang said:

* Young children do not lie well and their prefrontal cortex has less white matter proportionately than it will later in life.

* Autistic people, whose prefrontal cortex has the "converse pattern of grey/white ratio to that shown by the liar group," also do not lie easily.

Previous studies have shown that moral decisions involve the prefrontal cortex. "If these **liars have a 14 percent reduction in grey matter**, that means that **they are less likely to care about moral issues or are less likely to be able to process moral issues,**" Dr. Raine said.

The British novelist Jerome K. Jerome once wrote: "It is always the best policy to speak the truth -- unless, of course, you are an exceptionally good liar."

But, says Dr. Raine, the people in the liar group in this study aren't especially good. Often "they can't tell the truth from falsehoods and contradict themselves in an interview," he said.

And, says Yang, they often lie for the fun of it. "They admit that **they like lying,**" she said.

The researchers said the study doesn't account for all forms of lying, such as to escape punishment or to be polite.

Yang said she and her colleagues believe that the **abnormal brain structure causes the lying behavior**, not the other way round, but she added the study still needs to be replicated by other investigators.

In the long run, she said, the structural differences might be useful for diagnostic purposes or to help the police determine which suspects are likely to be lying. "But right now there are no practical applications," she said.

This study is the latest in a long line of inquiries aimed at ferreting out the roots of dishonesty. The philosopher Diogenes was reputed to wander the streets of Athens with a lamp, searching for an honest man.

In modern times, the polygraph has been promoted as an effective tool for identifying liars. But the lie-detector, as it is popularly known, simply measures heart rate, respiration rate, blood pressure, and galvanic skin response (or sweatiness).

Liars, the theory goes, will have physiological responses that will betray them and the polygraph will pick that up. But polygraphs can't differentiate between changes in heart rates brought on by the stress of taking the test from changes triggered by bald-faced lies.

A more high-tech approach uses functional magnetic resonance imaging. Scott Faro, Ph.D., of Temple University in Philadelphia, reported last year that fMRI can tell when a person is lying, more areas of the brain become active.

Lying caused activity in the frontal lobes, as well as the hippocampus and middle temporal regions and the limbic areas, Dr. Faro said at the annual meeting of the Radiological Society of America. During a truthful response, parts of the frontal lobe, temporal lobe and cingulate gyrus were active, he said.

Several limitations to the study pointed out by the authors include the small sample and relatively few women.

Primary source: British Journal of Psychiatry Source reference: Yang Y et al. Prefrontal white matter in pathological liars. British Journal of Psychiatry 2005. 187;320-325