

[LIES WIDE OPEN](#)
[Researchers say technology can show when and how a lie is created inside the brain](#)

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One in an occasional series

Imagine a day when a machine can perform a search and seizure of your mind, pronouncing judgment on whether you are telling the truth -- in court, at your job interview, to your boss or to your lover. A world in which lying has become passe.

That day may be closer that you think.

[\[Podcast: Legal and ethical issues involved in No Lie MRI's services.\]](#)

Next week, a San Diego-area company with the crass-but-catchy name No Lie MRI will begin offering clients in California a new high-tech lie-detection service, based on neuroscience that is zeroing in on the "Pinocchio Reflex."

Ensclosed in an MRI machine in Newport Beach, these customers will answer questions while a slew of images reveals when and where there is heightened activity in their brains -- theoretically indicating the creation of deception. The company claims 50 prospective customers already, including wives who want to assure their husbands of their sexual fidelity, fathers fighting accusations of child molestation in child-custody disputes, and one California defendant the company won't identify who faces the possibility of a death penalty unless he can convince a jury of his innocence.

No Lie MRI's high-tech "truth tester," which relies on functional magnetic resonance imaging, is based on research done at the University of Pennsylvania. It is one of several new methods entrepreneurs hope will supplant the established but not-too-reliable polygraph. Other techniques include analyzing brain waves by strapping electrodes to a subject's head, measuring heat around the eye area via thermal imaging, and recording facial micro-expressions that leak emotion (the latter is the work of the renowned Paul Ekman, professor emeritus of psychology at UCSF).

How effective are such tests? Is using them ethical? Could forcing people to take them become acceptable?

The possibility of foolproof lie-detector tests should give pause to anyone who cherishes the idea of the mind as a sanctuary protected from outside "thought drilling."

Skeptics already complain that No Lie MRI and another company, Cephos Corp. of

Massachusetts, are rushing to market with technology that has not been rigorously tested to know how reliable it is. (The Cephos system is based on similar MRI research at Medical University of South Carolina.) Other lie-detector technologies are in various states of development.

"The worst thing to come of all this would be widespread inaccurate lie-detector testing -- and that's a very, very real fear," said Hank Greely, law professor at Stanford University. "The wild card is the intelligence community, which everyone believes is actively pursuing research in this area. ... This is a debate that has got to be conducted in the open."

The American Civil Liberties Union, concerned about potential abuse in the name of the war on terror, has filed a Freedom of Information Act request to disclose any government research and applications of MRI and other cutting-edge lie detectors.

"There are certain things that have such powerful implications for our society -- and for humanity at large -- that we have a right to know how they are being used so that we can grapple with them as a democratic society," said Barry Steinhardt, director of the ACLU's Technology and Liberty Project. "These brain-scanning technologies are far from ready for forensic uses, and if deployed will inevitably be misused and misunderstood."

The method generating the greatest stir is the MRI. Unlike the polygraph and some other detectors that measure anxiety about the lie -- irregular breathing, sweating, faster pulse, etc. -- the brain scan produced by functional magnetic resonance imaging theoretically captures the lie itself, at its source.

To do this, University of Pennsylvania researchers placed volunteer subjects inside the MRI machine, which enables the capture of brain images and the mapping of which regions of the brain are "activated" by a rush of oxygenated blood. The volunteers, college students, were promised \$20 if they were able to successfully lie about the face value of a playing card.

It turned out the proverb "it's easier to just tell the truth" is correct. Researchers discovered that people telling lies give more of a workout to the prefrontal cortexes of their brains -- the area where cognitive reasoning occurs. Further tests enabled them to pinpoint specific zones that are filled with more oxygen during the telling of lies.

The chief executive officer of No Lie MRI, Joel Huizenga, claims an accuracy rate of 90 percent -- although that is derived from studies in which the sample size was quite small.

"We want to franchise this out, go global," said Huizenga. He foresees locations at labs that already use MRIs for other medical purposes and want to squeeze maximum profit out of the pricey equipment. The questioner and analyzer could be somewhere else, in Internet space. At \$30 per minute, a two-hour session including set-up would cost \$3,600.

"If you consider anything to do with sex, power or money, there's kind of a lie involved," said Huizenga, who described the market potential as "vast."

He said there are no government contracts yet, although talks are under way with the intelligence and military agencies. He stresses that the franchise agreements will dictate that its use be confined only to subjects who agree to be tested.

Other neuroscience experts stress that isolating a lie zone isn't as easy as a game of "Where's Waldo?" in the brain. They believe that a lie is formulated the way a spider's web is spun, weaving many intricate threads of brain involvement.

Nor are all lies alike. The work of Harvard Psychology Professor Stephen Kosslyn, for example, indicates that the lies the Penn researchers captured were spontaneous lies keyed to activity in certain parts of the brain's frontal lobe. But rehearsed lies activate different parts of the brain, correlating to the right anterior frontal cortex. Kosslyn told the New York Times Magazine earlier this year that trying to combat terrorism by seeking a lie zone in the brain is rather like trying to get to the moon by climbing a tree: Your progress upward creates the illusion of progress, but in the end you're still in the tree and the moon is still in the sky.

There's also a difference between the lab and the field ... between low-stakes experiments and checking out high-stakes crime ... between asking students to lie about the five of spades for a few bucks and asking an accused serial murderer where the bodies are buried. Nor is there any guarantee that psychopaths will exhibit brain activity similar to the research subjects.

Daniel Langleben, the assistant professor of psychiatry at Penn who conducted much of the MRI research into lying, agreed there is a need for large-scale studies. The problem, he said, is that although the drug industry is quite willing to underwrite the cost of very large clinical trials on promising pills, nobody is yet willing to fund widespread testing of truth testers.

But the allure of a foolproof lie detector is not just the stuff of Orwellian paranoia. Faced with the threat of apocalyptic terrorism, some see it as a moral imperative.

Our craving for a machine capable of stripping lies bare is traceable to the device invented in the 1920s by Harvard Professor William Marston, who also gained fame as the creator of "Wonder Woman" and her "lasso of truth." This crude early polygraph was designed to expose liars by registering increases in blood pressure, but contemporary polygraphs measure other physiological changes, including perspiration and pulse.

Federal agencies including the FBI and CIA use the polygraph now more than ever, both in criminal investigations and to screen job applicants -- despite the fact that the polygraph generates a high number of false results and was criticized in 2002 by the National Academy of Sciences.

"The new stuff will sell, I fear, because this is 'technology.'" Greely said. "The polygraph is just some guy with needles. Part of the appeal is the sexiness of the science -- if you're conducting an MRI then you have scientists doing the test, not some retired police guy running a polygraph. And unlike the polygraph, nobody can say it's not admissible in court because nobody's tried it yet."

Beyond the question of accuracy, even more profound issues are at stake.

Say that scientists do refine lie-detection technology to the point of near perfection. What then?

Those falling under the protection of the U.S. Constitution presumably could refuse a high-tech lie detector under two grounds: the Fourth Amendment protection against unreasonable searches and seizures and the Fifth Amendment protection against self-incrimination. But the former can be satisfied if a judge issues a search warrant, and the latter might not apply if the questions are aimed at the prosecution of others, not the subject.

As more sophisticated lie-detection tools become available, they might appeal to people with significant control over the lives of others: parents worried about their teenagers' possible drug use, employers trying to identify an in-house thief, a government agency

trying to expose a leaker, a tyrant trying to root out malcontents.

Even No Lie MRI's Huizenga acknowledges his product would have been a boon to Joseph Stalin: "He killed a lot of people needlessly who probably were really loyal to him because he didn't have a reliable way of determining who was and who wasn't. But remember the potential upside, too. Say we wanted to figure out who our friends are in Iraq. ..."

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