Surfing Brain Waves: fMRI for Lie Detection

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I have a personal interest in fMRI because my wife, Dr D. N. Black, MDCM, FRCP(C), a neuropsychologist for 25 years, has turned me into what we describe as “that most useless of hobbyists, an amateur neurologist.” She often describes patient symptoms and asks me to come up with a diagnosis – a bizarre but enjoyable version of 20 questions. Sometimes I’m even right. . . . I’ve actually had the privilege of serving as her statistician in some of her papers, but my favorite is our 1987 letter in the Canadian Medical Association Journal about a new sleep disorder.< http://www.pubmedcentral.nih.gov/picrender.fcgi?artid=1267342&blobtype=pdf >

fMRI is yet another development in the evolving study of brain function. Martha J. Farah and Paul Root Wolpe have an excellent overview of these technologies in their article, “Monitoring and Manipulating Brain Function: New Neuroscience Technologies and Their Ethical Implications” from the Hastings Center Report (May-June 2004) pp 35-45 < http://www.bioethics.upenn.edu/pdf/wolpe_hastings.pdf > Using strong external magnetic fields, fMRI systems measure blood flow – and thus the level of neuronal activity – with a resolution of a millimeter or less and a response time of about 1 second.

One interesting application of fMRI has been to identify patterns of brain activity associated with truthful statements compared with lies. Kozel et al. reported in 2004 (Journal of Neuropsychiatry and Clinical Neuroscience 16(3):295-305)< http://neuro.psychiatryonline.org/cgi/reprint/16/3/295.pdf > Early results were inconclusive: “Specific brain regions were activated during deception, but the present technique lacks good predictive power for individuals.”

Reporting on later research by Faro et al., reporter Beth W. Orenstein wrote in an article entitled, “Guilty? Investigating fMRI’s Future as a Lie Detector”(Radiology Today 6(10):30 < http://www.radiologytoday.net/archive/rt_051605p30.shtml >) that “The fMRI study found that when the subjects were telling lies, more areas of their brains activated than when they were being truthful.” She quoted Dr Scott Faro, MD, Professor and Vice Chair of Radiology at Philadelphia’s famous Temple University School of Medicine: “Indeed, what we found was that approximately twice as many areas of the brain—14 vs. seven—are activated when one is lying as compared to when one is telling the truth.”

Steve Silberman’s 2006 article in Wired Magazine, “Don’t Even Think About Lying,”< http://www.wired.com/wired/archive/14.01/lying_pr.html >, the author describes his experiences being scanned and discusses some of the growing controversy about the ethical implications of equipment that scans brain activity in the service of the state:
So what began as a neurological inquiry into why kids with ADHD blurt out embarrassing truths may end up forcing the legal system to define more clearly the inviolable boundaries of the self.

“My concern is precisely with the civil and commercial uses of fMRI lie detection,” says ethicist Paul Root Wolpe. “When this technology is available on the market, it will be in places like Guantanamo Bay and Abu Ghraib in a heartbeat.

“Once people begin to think that police can look right into their brains and tell whether they’re lying,” he adds, “it’s going to be 1984 in their minds, and there could be a significant backlash. The goal of detecting deception requires far more public scrutiny than it has had up until now. As a society, we need to have a very serious conversation about this.”

At a symposium entitled “Will brain imaging be lie detector test of the future?” held at Harvard University in February 2007, several participants expressed skepticism about fMRI’s applicability and reliability. For example, critics pointed out that some of the studies of reliability failed to use realistic scenarios involving stressful situations; they also ignored well-established “countermeasures for defeating the fMRI, like performing mental arithmetic – or simply fidgeting…”

No Lie MRI, Inc. offers fMRI lie-detection services; their overview pages offer a number of interesting details, including this list of restrictions on the Process Overview page:

Currently the only known limitations to the technology developed by No Lie MRI are:

- Individuals can not have metal inside their body
- Individuals can not be claustrophobic
- Individuals can not be brain damaged
- Individuals can not move around during the MRI scanning process

No Lie MRI provide a video showing a simulated test.

CEPHOS Corporation also offers fMRI services. In their discussion of the legal admissibility of the new technology, the company predicts that “Cephos fMRI lie detection evidence are [sic] likely admissible in court ….” and provides a number of arguments on why the technology is likely to pass the Daubert Test on admissibility of expert testimony on scientific evidence.

Security practitioners will want to continue monitoring (no pun intended) developments in fMRI to see if the technology can provide useful, reliable indications of truthfulness and deception in our investigations.

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