Scholar unconvinced new lie-detection methods better than old ones

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“Functional magnetic resonance imaging and Brain Fingerprinting® have been hailed as the next, best technologies for lie detection in America, particularly in the context of post-9/11 anxiety,” said University of Illinois professor Melissa Littlefield. Photo by L. Brian Stauffer

(PhysOrg.com) -- When a crime has been committed, the usual modus operandi for police detectives and their fictional counterparts has been to dust the scene for fingerprints. And once they have a suspect in custody, out comes the polygraph, or lie detector.

But in today's forensically sophisticated, "CSI"-influenced world, polygraphy - which bases its results on functions of the autonomic nervous system - is increasingly dismissed as dated and unreliable. Rapidly replacing older truth-seeking technologies are new brain-based techniques such as functional magnetic resonance imaging (fMRI), and the electroencephalography(EEG)-based technology known as Brain Fingerprinting®.

Because they are "brain-based," both methods have been promoted in the media as being more precise, accurate and trustworthy.

"Functional magnetic resonance imaging and Brain Fingerprinting® have been hailed as the next, best technologies for lie detection in America, particularly in the context of post-9/11 anxiety," University of Illinois professor Melissa Littlefield says in an article published in the May issue of the journal *Science, Technology & Human Values*.

"Far from describing the brain and its functions, fMRI and Brain Fingerprinting® produce models of the brain that reinforce social notions of deception, truth and deviance," she concludes in the paper's abstract.

In other words, Littlefield is unconvinced that the new technologies are necessarily superior to the old ones. In fact, the professor of English and of kinesiology and community health believes polygraphy may have more in common with the new technologies than many scientists - particularly neuroscientists - would suggest.

"They would argue that traditional polygraphy tests the autonomic nervous system. That's respiration, heart rate, pulse, electrical skin conductance.

But, Littlefield said, using the old-fashioned lie detector, "you're not really getting deception so much as your body's reaction to the stress of deception."

"And they would argue that (with) fMRI, since it's scanning the brain, we're getting closer to the central nervous system, not dealing with the peripheral nervous system. We're dealing with what some say is 'the organ of deceit' - where the lies are happening."

But according to Littlefield, the old and the new deception-detection tools basically rely on the same three assumptions.

"The first one is that lies are somehow measurable - that you can see them in the body through increased breathing, heart rate … or by looking at the brain." In the latter case, she said, "colloquially, people say 'your brain lights up' in the fMRI scanner."

The second common assumption, she said, is that "when you look at the body and get some kind of information - whether it's pulse rate or blood oxygenation level dependent (BOLD) signals, or whatever it is that each is measuring - that somehow you're able to see the body in action without needing any interpretation."

The presumption, she said, is that those viewing results of both manners of truth-seeking "somehow see the body in action without needing any interpretation … like looking through a window, as opposed to looking at some kind of artistic picture that needs interpretation."

Finally, she said, "they share this assumption that truth and deception are somehow connected. In deception studies, if you're looking at the polygraph or you're looking at the fMRI, the assumption is that truth is the baseline - the factual, the basic, the natural. And to lie is to add a story on top of the truth."

The "good news" in all of this, she said, is that investigators can't actually track people's intentions or behavior by scanning their brains.

"You can't put someone in an fMRI scanner and read their mind or incriminate them, at least in part, because the person would have to lie so still," Littlefield said. "Protocols are such that if you didn't want to have your brain scanned, all you'd have to do is clench your teeth or move your head, and it would create artifacts in the images, and then you can't

use them - luckily."

Still, she said, those promoting the newer, brain-based deception-detection technologies have had some degree of success in convincing the media and public that new and improved does equal better/safer. And that notion that science and technology can protect us "makes us feel better," she said.

"We want science to be able to answer all our questions somehow - which it can't do. That's the long and the short of it," she said.

The U. of I. professor recently finished a yet-to-be-published book, "Tracing Truth: A Cultural History of Deception Detection." Much of the book is framed by "looking back at the cultural ideologies - those three stories: lies are measurable, the body seems so obvious, and deception and truth are intertwined."

"And I go back to all this media, debate, science fiction and scientific detective fiction from the turn of the 20th century and trace these stories all the way through to current fMRI literatures in the scientific and popular press."

Littlefield is working on another book, tentatively titled "Playing the Role of a Criminalist: Disciplining Narratives in the Forensic Sciences." Its focus is on "metadisciplinarity."

The book is based, in part, on Littlefield's own interdisciplinary life and career, and examines how a number of disciplines have come together over the past 50 years to become known as the forensic sciences - "whatever that is," she said. The book also explores what Littlefield calls forensic sciences' "interesting relationship with fiction, in particular Sherlock Holmes and 'CSI.' "

"Without these stories, without this literature, I think you'd have a much harder time trying to get the public on board with things like forensics or fMRI or lie detection," she said.

Littlefield recently returned from Denmark, where she designed an fMRI experiment for a project she plans to begin this fall with a team of international, interdisciplinary researchers.

Although Littlefield could not reveal the specifics of the fMRI study, she did say that the researchers plan to investigate the role of the brain's frontal lobes, along with the cognitive process known as executive function (which involves complex decision-making), during various stressful stimuli. She and her team hope to challenge several paradigms that have been taken for granted in both fMRI deception studies and social neuroscience.

In the meantime, Littlefield advises caution when sizing up the promises of those promoting the latest crop of brain-based truth-seeking technologies.

"This 9/11 kind of hype has allowed and fueled this desire both in scientists and the media, and in popular culture, to try to find something to hold onto for security's sake. But I don't think it's really there" - at least not yet, she said.

For now, she added, a more accurate characterization of current developments in deception detection would be to say, "there are some scientists who've done particular kinds of studies with a lot of different limitations, and they've found some preliminary things about how the brain works."

Source: University of Illinois at Urbana-Champaign (news : web)