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“LIE TO ME” MEETS “MINORITY REPORT”

**IMPROVING LIE DETECTION IN PRE-EMPLOYMENT
SCREENING**

by

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The Command College Futures Study Project is a FUTURES study of a particular emerging issue of relevance to law enforcement. Its purpose is NOT to predict the future; rather, to project a variety of possible scenarios useful for strategic planning in anticipation of the emerging landscape facing policing organizations.

This journal article was created using the futures forecasting process of Command College and its outcomes. Defining the future differs from analyzing the past, because it has not yet happened. In this article, methodologies have been used to discern useful alternatives to enhance the success of planners and leaders in their response to a range of possible future environments.

Managing the future means influencing it—creating, constraining and adapting to emerging trends and events in a way that optimizes the opportunities and minimizes the threats of relevance to the profession.

The views and conclusions expressed in the Command College Futures Project and journal article are those of the author, and are not necessarily those of the CA Commission on Peace Officer Standards and Training (POST).

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IMPROVING LIE DETECTION IN PRE-EMPLOYMENT SCREENING

If it were possible to Google someone’s brain, what might we find? In his book *1984*, George Orwell wrote, “Nothing was your own except the few cubic centimeters inside your skull.” Even Orwell couldn’t fathom the ability to scientifically read one’s mind.

In just the last ten years, neurotechnology has evolved to the point where scientists can examine many physiological operations of the brain. This technology is in its infancy, much like DNA in the 1960s. There is a remarkable potential, though, for it to have profound impacts on the law enforcement world. Imagine, for instance, being able to detect lies with 100% accuracy. Although current technologies don’t yet allow “downloading” all information stored in the human brain; it’s no longer beyond the realm of possibility in the future with the fMRI.

What is fMRI?

Most of us are familiar with Magnetic Resonance Imaging (MRI) as a common diagnostic tool for doctors evaluating soft tissue injuries. MRI images have been commonly used since about 1973 (Tesla p. 1). Since that time, advances in computer speed and processing have allowed MRI technology to evolve to the point where it can now be used to examine and record real-time live events, like the heart beating or blood moving through veins. When used to record these functions, the technology is referred to as functional magnetic resonance imaging, or fMRI.

An easy way to understand the difference between MRI and fMRI is to think of the difference between a photograph and a movie. fMRI is like a movie, and it has been refined to the point where it is now capable of providing images of minute changes in blood oxygen levels. Scientists have mapped out the brain dividing it into three dimensional sections called voxels. The scientists have identified that certain voxels require more oxygen when a person is lying. The ability to examine these specific portions of the brain in response to a question enables scientists to make an accurate finding of whether the test subject's response is truthful or not. These advances in technology mean fMRI could soon be used for truth verification/lie detection in the pre-employment background process.

Preventing future problems

All too often after a police corruption scandal surfaces, the problem can be traced back to a breakdown in the hiring/screening processes. Recent examples illustrating this include the Rampart Scandal at LAPD in 2001 (Drug Policy Alliance, p. 2), and the case involving 11 New Orleans Police Officers convicted of protecting a cocaine supply warehouse containing 286 pounds of cocaine (Drug Policy Alliance, p. 5). Certainly, law enforcement administrators must work even harder at the front end of the employment process to assure applicants have the high standards communities continue to expect in police employees.

According to the California Commission on Peace Officer Standards and Training, ideal police candidates must exhibit the highest standards moral character, and should be judged on their honesty, impartiality, trustworthiness, ability to protect confidential information, and on their level of moral and ethical behavior (Spilburg, pps.

30-32). While no deception detection device can assure 100% validity when measuring a candidate's suitability for employment given the dimensions above, lie detection and truth verification technologies, in conjunction with a complete background investigation, play an important role in the pre-employment screening process. The stakes are high; unfortunately, the current technologies used to verify truth are lacking.

Current truth verification process

During the background process, peace officer applicants are often subjected to a polygraph examination to verify the truth of the information reported and discovered during the application period/background process. This is a critical phase of the hiring process, and one that has the least amount of proven scientific certainty for the intended outcome of determining truthful responses to queries. There has been a great deal of debate about the validity of polygraph examination results, and questions about the accuracy of the results have prevented widespread acceptance and use of this technology as a bona-fide truth verifying technique (*Frye v. U.S.*), even though the polygraph has been used since John Larson invented the device in 1921 (Gordon p. 73).

The polygraph consists of two components. One is the set of physical parameters being measured; the other is the model used to produce the target behavior in a standardized fashion (Wolpe, Foster, & Langleben, 2005, p. 40). The polygraph machine measures physiological correlates of behavior that, taken together, can be assessed by a trained individual to determine if a person is being deceptive. These correlates include one's breathing rate, blood pressure, heart rate, and galvanic skin response.

The exact reliability of polygraph results is unknown, and some would argue unknowable. Gary Ridgway, the Green River Killer, and CIA Double Agent Aldrich Ames each passed polygraphs (Silberman, 2006, p. 142). A 2003 report on polygraph use by the National Research Council in Washington, D.C. concluded the device yields results that are better than chance, but its modest accuracy and susceptibility to countermeasures mean that reliance on it should be limited (National Research Council, pps. 214-216). This is the age of information, and anyone can do fairly extensive research on the Internet, as well as purchase books that describe how to “beat” a polygraph.

Because polygraphs measure physiological responses, they are subject to manipulation by the test subject(s). In lie detection technology, these manipulation strategies are known as countermeasures. Polygraph countermeasures tend to focus on increasing an individual’s response to the control questions to mitigate the difference between the control questions and relevant questions. Some strategies used as countermeasures are biting the tongue, pressing the toes to the floor, counting backwards by 7, etc. (Wolpe, Foster, & Langleben, 2005, p. 44). In fact, if one Googles “Beating the polygraph,” there are 222,000 hits on the Internet.

Although our focus is pre-employment screening and not criminal investigation, standards of admissibility in court often set guideposts for the acceptance of emerging technologies. In fact, one court case which is often cited when lawyers argue for admissibility of scientific evidence is called the Frye rule. This rule is based on Frye v. United States, which determined in 1923 that polygraph evidence was not admissible in court. In most but not all jurisdictions, the Frye standard has been superseded by the

Daubert standard. The Daubert standard basically states that for scientific evidence to be admissible in court it must be testable, have an established error rate, be subjected to scientific peer review and publication, and be generally accepted (Daubert v. Merrell Dow Pharmaceuticals, 516 US, 869 (1993)). The polygraph will probably never meet the Daubert standard, and its future as a valid technology is bleak, but fMRI technology might meet the challenge for the level of reliability needed. FMRI is currently undergoing scientific peer review, and it's only a matter of time before it is tested against the Daubert Standard in court.

FMRI Technology

Magnetic Resonance uses magnetic energy and radio waves to create cross-sectional images or "slices" of the human body. Functional MRI uses a technique called Blood Oxygenated Level Dependent, or BOLD fMRI. With this technique, the local change in the concentration of oxygenated hemoglobin in the brain is used as an indicator of neuronal activity (Wolpe, Foster, & Langleben, 2005, p. 43). This can be depicted like a movie using fMRI which shows changes in the blood oxygenation level as a bright spot in certain regions of the brain. The experimental finding that there is more oxygen use in the prefrontal and anterior cingulate regions of the brain when one lies is the basis of fMRI lie detection . Recent research indicates there may also be activation in the limbic region of the brain when one lies (Hakun, p. 522).

Scientists know that parts of the brain that are working require more oxygen from the blood that is passing through it Through the years, scientists and doctors have mapped different regions of the brain, and broken the brain down to very small 3 dimensional areas called voxels (think pixels in a fax machine). Scientists have developed an

understanding of the relationship between certain voxels, and certain brain functions.

The current challenge as it relates to fMRI research is to identify with a high degree of certainty exactly which portions of the brain are involved when someone is lying.

Further, scientists would ideally like to be able to differentiate which regions light up during different types of lies--actual lies, made up lies, verification lies, denial lies, etc.

If functional brain mapping can be refined, this emerging technology has great promise. It homes in on the source of the lie, rather than the outward manifestations of it (Kittay, 2007, p. 1365). FMRI provides a high resolution 3 dimensional product, differentiates in millimeters, holds no risk factors for healthy individuals, can provide a real time analysis of the data, and can be stored digitally. Steven Laken, founder of Cephos, Inc., may have said it best. "FMRI lie detection is where DNA diagnostics were 10 or 15 years ago. The biggest challenge is that this is new to a lot of different groups of people.I view it as no different than developing a diagnostic test." (Silberman, 2006, p. 142). There are, though, some drawbacks with fMRI.

Drawbacks

There are three major drawbacks with fMRIs: 1. They are expensive, 2. If a test subject moves as little as 4 millimeters, the test may be invalidated, and 3. There are a limited number of MRI machines available, and there are already long waits for people with compelling medical needs to use them. But we are in the golden age of neuroscience. Although current MRI machines are big, bulky, obtrusive and conspicuous, future generations of MRI machines promise to be smaller. There are also variables that have not been screened for their impact on test reliability.

The baseline brain activity, and thus fMRI signals of subjects varies with age, health status and a multitude of other variables including the use of prescription or illicit drugs, depression, or the presence of a personality disorder (Wolpe, Foster, & Langleben, 2005, p. 43). There is no data on possible differences when this technology is applied outside of the laboratory setting. "...Lying can be a complex, situation-dependent activity, with a variety of degrees and levels of prevarication, and the ability to detect simple deceptions in laboratory settings may not translate into a usable technology in less controlled situations." (Wolpe, Foster, & Langleben, 2005, p. 42). Although fMRI is accepted as a reliable methodology for many applications in the medical field, consideration for use as a lie detection/truth verification technology is relatively new. Some scientists remain skeptical about results that have been reported, and question the data presented.

According to Merikangas (2008, p. 501) "The ability to image the anatomy and chemistry of the brain in spectacular detail has made neurology and psychiatry exciting endeavors. However, our understanding of the neural processes underlying complex behaviors as deception is still primitive." There are also variables which have not been screened for their impact on test reliability. There is no data on possible differences when this technology is applied outside of the laboratory setting. "...Lying can be a complex, situation-dependent activity, with a variety of degrees and levels of prevarication, and the ability to detect simple deceptions in laboratory settings may not translate into a usable technology in less controlled situations." (Wolpe, Foster, & Langleben, 2005, p. 42).

Much of the fMRI research has been completed No Lie MRI & Cephos, Inc.--two for profit companies that have the most to gain by the results being successful. The cost for fMRI involves not only the cost of the MRI machine, but the cost of the technology, capturing and storing the results, and the cost of an expert to set up, administer, and interpret the results of the test. The current costs per test are approximately \$ 10,000.00 each, and MRI machines cost about \$ 3 million each. The cost, coupled with the fact that there are sick people waiting to get an fMRI and only a limited number of machines and technicians available, presents a significant sub issue. Lastly, fMRI is in its infancy, and is not widely known about or accepted by society at large. Although it is gaining acceptance at a rapid rate, many remain cynical or skeptical about the promise it holds. Will it emerge as a 100% accurate method for detecting lies, or is its promise overshadowed by the CSI effect?

Countermeasures and Ethical Issues

It is not currently known if there are effective countermeasures to fMRI lie detection, although one highly respected study concluded, "It is also clearly evident that controlling one's cerebral activity to avoid detection is unfeasible" (Lee, Liu, Tan, et al, 2002, p. 163). FMRI technology brings with it a host of unresolved ethical issues. For example, if an fMRI test revealed a test candidate had a tumor or brain damage, or the early onset of Parkinson's Disease, how would this be handled? Could an agency be sued under ADA for deciding not to hire someone based on the discovery of one of these conditions? Universal protocols should be developed to deal with disclosure of medical information that might arise out of an fMRI test. These are topics for a separate article, but will need to be answered as fMRI technology continues to emerge.

Conclusion

The current model to screen police applicants has been in place for more than 25 years. It has not evolved despite advances in technology and predictor analyses that have been done. It is clear that fMRI technology for deception detection is emerging. Issues of validity, reliability, accuracy, cost, countermeasures, and the public's readiness to accept this technology surround fMRI technology. Significant research and money have been committed to studying the potential this technology holds, but there are still some unanswered questions, and unexplained outcomes that beg for additional study as well as comprehensive forecasting of how this technology will impact the future of law enforcement and other professions and endeavors.

Costs, portability, and validity of this technology continue to improve as knowledge and technology continue to evolve and grow. There are also ethical considerations that must be worked through, as well as an examination of how this technology could affect the other components of the screening process like psychological testing, written testing, etc. FMRI costs must also come down to an acceptable per test price. The attrition/failure rate of applicants might also increase due to stronger test validity, but agencies must think long term and stay the course. The clear benefit to using this technology far outweighs any of the sub-issues associated with it, and it's only a matter of time before it becomes the industry standard. Like MDTs in police vehicles, the only question to answer is whether your agency will be on the front end of this technology, or behind it playing catch up.

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