BRAIN STRAIN: CAN YOU REMEMBER WHAT YOU JUST SAW?

Can Neurotechnology Help in Eyewitness Memory Recollection?

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COMMAND COLLEGE CLASS 51

The Command College Futures Professional Article is a 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 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.

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If someone asked you who William McCaffrey, Dewey Bozella, James Woodard and Rubin "Hurricane" Carter were, could you answer them? These are just a few of the names of those who have been imprisoned for crimes they did not commit. Each of these individuals was convicted of their crimes based on faulty eyewitness testimony. In fact, it is estimated hundreds of others are sitting in prisons that have also been wrongfully convicted based on eyewitness testimony. The morality of jailing the innocent aside, government also spends hundreds of millions of dollars each year on court costs and restitution for wrongful convictions. Certainly, in our current economic malaise, we cannot afford to continue to pay these amounts. In any climate, we must eliminate aspects of the criminal justice system that is prone to these costly errors.

Envision a time when an investigator could utilize neurotechnology to enhance an eyewitness memory to ensure the information they receive is true and accurate. Neurotechnology refers to technologies to improve brain functions, one of which would be the accuracy of one's memory. Neurotechnologies have been utilized to improve vague, incomplete, false or lost memories in eyewitnesses. Their use by law enforcement would be of tremendous value to the whole criminal justice system. Utilizing the application on witnesses not only improve their memories, but also could be utilized to ensure their statements is truthful. If you think this is a futuristic dream, know that the technology exists now.

Criminal Justice System

Eyewitness testimony remains a vital part of the criminal justice system, and is the most persuasive form of evidence (Tversky, Fisher, 2010). It has a powerful impact on juries, and in many cases, it would be nearly impossible to convict without it.

According to the California Criminal Jury Instructions the court has no sua sponte (from Latin: one's own will) duty to give an instruction to jurors on eyewitness testimony. An instruction relating eyewitness identification to reasonable doubt, including any relevant "pinpoint" factors, must be given by the trial court on request an eyewitness identification of the defendant is a key element of the prosecution's case but is not substantially corroborated by evidence giving it independent reliability.

Eyewitnesses to crimes are generally asked to give an account of what happened or to identify a possible suspect involved in a crime they witnessed. According to Dr. Steven Ceci, Ph.D. Cornell University, stress, fear or time, are all factors limiting one's ability to recollect what they originally had witnessed. Illustrating this phenomenon is an instance where Northwestern Law School criminal procedure students were faced with a scenario where a stranger stormed into their class, said some disparaging things to the professor, and then stormed out. The students were then asked to write a description of the intruder. More than 75 percent of the students were unable to provide a description of the person (Warden, 2001). Of course, law enforcement investigators are aware of the fallibility of eyewitness recall, and have used a variety of techniques to enhance the validity of witness recall. The most common of these is the Cognitive Interview.

The Cognitive Interview

The police have used cognitive interviews since 1992 to collect valid information from eyewitnesses (McLeod, 2010). Pioneered by the Los Angeles Police Department working with cognitive psychologists, the Cognitive Interview works to apply techniques to clarify understanding and provoke the retrieval of memories by a witness during a structured interview by the police. An untrained interviewer (including police officers)

will normally utilize what is termed a domain interview, which can be structured or unstructured. A structured interview is one in which the interviewer has prepared specific questions. Unstructured interviews generally consist of open-ended questions designed to encourage people to tell their own story. Cognitive interviews are a method of trying to get the eyewitness to remember what they saw or remembered through specific prompts asked by the interviewer (Hill, 2011).

According to Gordon Willis from the Research Triangle Institute "Cognitive interviews are a common means to apply the cognitive model in a manner that may ultimately improve the quality of questions." He believes police utilize this technique to assist witnesses in recalling details about observed crimes and this technique helps them remember events (Willis, 2004). Willis concludes that cognitive interviewing techniques are a tool, but not an exact science. Research has shown, though, that it does enhance the effectiveness of interview outcomes.

In 1984, UCLA researcher R. Edward Geiselman investigated the effectiveness of the cognitive interview (Geiselman et al. 1985). In his research, he asked participants to view a film of a violent crime; after 48 hours, they were interviewed by an officer using one of three methods: the cognitive interview; a standard domain interview utilized by the Los Angeles Police Department; and interview utilizing hypnosis. The cognitive interview showed the greatest results, with 41.2 percent recalling what had occurred. Participants interviewed in a hypnosis protocol had 38.0 percent accuracy of recall, while the standard domain interview was the least effective, with only 29.4 percent accuracy in recall. Geiselman concluded the cognitive interview to be a practical, partial solution to the important problem of eyewitness memory enhancement. At present, the cognitive

interview is the most effective interviewing technique; stunningly, the probability of its accuracy is less than 50-50. We must find a better way.

Neurotechnology

Neurotechnology is a computer-based means to allow enhancement, alteration, or scanning of the brain and related neurological tissues and systems. Neurotechnologies have been used since the 1960s, originally developed to aid persons suffering from Parkinson's disease, or with neural disorders such as epilepsy. As technology improved, the use of neurotechnology has been expanded to treat patients suffering from depression and other psychiatric disorders (Van Essen, 2007). Its potential to aid memory was discovered quite by accident.

In 2008, scientists at Ontario's Toronto Western Hospital performed brain surgery to suppress a dangerously obese man's appetite. Awake during the surgery, the patient began talking about events in his past, events he had long forgotten (Asher, 2008). Professor Andres Lozano, of the Neurosurgery Department, said the results were attributed to the use of Deep Brain Stimulation, also known as neurotechnology and it was like "turning up the volume" on the brains memory circuits (Lozano, 2008).

Types of Neurotechnologies

There are several neurotechnologies in use today; however, the three most common are Deep Brain Stimulation (DBS), Transcranial Magnetic Stimulation (TMS) and Brain Fingerprinting. DBS and TMS are the only two techniques being utilized on medical/psychiatric patients and to recover memory loss.

Deep Brain Stimulation (DBS) is a surgical treatment involving the implantation of a medical device called a brain pacemaker, which sends electrical impulses to specific

parts of the brain to improve memory. Even though the use of DBS has shown successes some scientists and physicians think it tends to be a complex procedure with unknown long-term effects (Greenberg, 2011). Transcranial Magnetic Stimulation (TMS) is another technique that is less invasive; it utilizes a magnetic field to induce electrical currents into the brain.

The third and probably the most celebrated is Brain Fingerprinting. Brain Fingerprinting utilizes words or pictures relevant to a crime flashed on a computer screen, along with other, irrelevant words or pictures. Electrical brain responses are measured non-invasively through a headband equipped with sensors. A computer then analyzes the brains responses. According to its inventor, Dr. Lawrence Farwell, this process can determine if crime-relevant information is stored in the brain.

Farwell, who invented Brain Fingerprinting in 1991, asserts it can change the criminal justice system by providing a new scientific method to help identify the guilty and exonerate the innocent (Farwell & Donchin, 1991). He claims his technique has been 100% accurate in more than 120 tests, including tests on FBI agents, the US Intelligence Agency and the United States Navy.

In 2000, Dr. Farwell utilized Brain Fingerprinting during the appeal of the murder conviction of Terry Harrington in Iowa on behalf of the defendant. Harrington had been convicted in 1978 of the murder of a retired policeman working as a security guard. His conviction was based primarily on the testimony of a single eyewitness. Through the use of Brain Fingerprinting on Harrington, Farwell determined Harrington had stored memories that did not match the crime scene, but did match his alibi. Confronted with this evidence, the sole witness to the murder recanted his original testimony (it was

determined the witness was actually involved in the murder) (Harrington v. State 2001, Farwell & Makeig, 2005). In October 2003, the State of Iowa subsequently ordered Harrington's release.

In a separate case, Dr. Farwell utilized Brain Fingerprinting on Jimmy Ray Slaughter, who was convicted of the 1991 murder of his former girlfriend and eleven-month old daughter in Oklahoma. Slaughter tried to get his conviction overturned by submitting to brain fingerprinting conducted by Dr. Farwell. Farwell concluded Slaughter had not committed the crime. The results were presented to the U.S. Supreme Court who rejected his appeal (Russell, 2005). Slaughter was subsequently executed on March 15, 2005.

Even with the success of its use in the Harrington case, there are many who believe the technique is unreliable. According to Barry Steinhardt, Director of a technology program for the American Civil Liberties Union, the use of Brain Fingerprint is "pure snake oil and it's the 21st century version of the lie detector test, which also doesn't work very well." (Elsner, 2003). Other critics, such as Peter Rosenfeld, a psychology professor at the Institute for Neuroscience, say brain fingerprinting would be ineffective in cases in which a person commits a crime while under the influence of alcohol or drugs. His belief is if you're "stoned" when you commit the crime, you're certainly not going to remember it the next day, let alone years later (Rosenfeld, P. 2005).

According to Dr. Jeffrey Noebels, a professor of neurology at Baylor College of Medicine, though, memory studying whether or not storage and retrieval could be electronically enhanced "is fascinating." But he noted, "Just as in drug testing, extreme care must be exercised to avoid unleashing undesirable and lasting effects arising from

the very plasticity and rewiring of the brain that is likely to arise." (Robakis, 2012) as far as its use in law enforcement is concerned, the jury is still out.

Neurotechnology and the criminal justice system

As law enforcement agencies look at utilizing neurotechnology the question remains if the courts would allow it to be utilized. The US Supreme Court uses the Daubert criteria to assess the validity of scientific evidence presented in trial. This requires the science to have been tested, peer reviewed and published. It also has to be accurate and well accepted by the scientific community (Witchalls, 2004). Even though the Daubert criteria do not apply to District Courts, the Iowa District Court ruled that brain fingerprinting passed the Daubert criteria and was therefore admissible as evidence. In November 2000, an Iowa District Court held a hearing on Terry Harrington's post-conviction relief. In March 2001, District Judge Timothy O'Grady ruled that Brain Fingerprinting met the legal standard for admissibility in court as scientific evidence. At this time there has been no other rulings made in either courts.

Conclusion

It is imperative for organizations to be progressive and forward thinkers, especially when it comes to new sciences and technology. Law enforcement agencies need to maintain transparency to keep their communities safe. Part of this work includes means to ensure they are arresting and convicting those who actually committed a crime.

Neurotechnology has a positive track record with regard to memory loss therapy, and provides a potential source by which we can enhances and validate the memory of eyewitnesses. Any technology that may improve or recall memory loss of eyewitnesses should be explored by law enforcement and the criminal justice system. If

neurotechnology is proven to be effective in memory enhancement, and thus yields reliable evidence, courts must then determine when and under what circumstances it should be used.

Given the fact that eyewitness testimony plays such an important role in the arrest, prosecution and adjudication of those accused of crime, neurotechnology may hold the promise of yielding evidence with a higher level of reliability. That promise alone dictates its exploration by law enforcement. If shown reliable, the next natural step would be its use.

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