Frye's Backstory: A Tale of Murder, a Retracted Confession, and Scientific Hubris

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The landmark case *Frye v. United States* is associated with the general-acceptance standard for admissibility of scientific evidence. The standard, still the law in some jurisdictions, has largely been replaced by one based on Federal Rule of Evidence 702. Although it is known from the 1923 *Frye* opinion's terse wording that the science in question was a systolic blood pressure deception test, the facts behind the case and the story of the device's inventor are rarely discussed. In this article we review the story of the defendant, James Alphonso Frye, and the psychologist, William Moulton Marston, who claimed he could prove that Frye had confessed falsely. The case continues to reverberate whenever scientific evidence makes a claim of finding the truth.

J Am Acad Psychiatry Law 42:226–33, 2014

"Dr. R. W. Brown, Well Known Colored Doctor, Shot Through Temple," announced the Washington, D.C., *Evening Star* on November 28, 1920.[1] Washingtonians were shocked by the Saturday night slaying of the president of the National Benefit Life Insurance Company by an unknown assailant. Dr. Brown, a widower with two daughters, had received four calls that day, and his house guest, Dr. Julian Dabney Jackson from Virginia, admitted a man late in the evening. Dr. Jackson described him as "being of light brown skin, about twenty-four or twenty-five years old, weighing about 135 pounds, and wore a dark brown suit" (Ref. 1, p 1). Dr. Brown and the man conversed and then Dr. Jackson heard four gunshots. Although there was no theory of motive, a .45-caliber revolver was left on the floor near the victim, and fingerprints were found on the bricks outside the house. A few months earlier, Dr. Brown had received a threatening letter, instructing him to leave money inside Union Station. After Dr. Brown called the police, a detective left the money, but no one claimed it.

The victim's family offered a $1,000 reward for the capture of the shooter,[2] but nearly a year elapsed before there was a break in the case. The August 23, 1921, *Evening Star* carried the headline, "James A. Frye Tells Police Shooting Was Done in Self-Defense After Doctor Struck Him."[3] Mr. Frye was caught forging a soldier's name to a government compensation check and then admitted to the robbery of a watch and a diamond ring from a salesman from Indianapolis whose taxi had broken down.[2] The Page 5 news story suggested that incriminating information led detectives to question Mr. Frye about Dr. Brown's murder.[3] The suspect apparently volunteered that he had shot the doctor after a disagreement:

> The prisoner told Inspector Grant and the detectives that he went to the physician's office for a prescription. He had only one dollar, he said, and the physician said two dollars was his price. Dr. Brown, he said, declined to accept his pistol as collateral for the extra dollar. Trouble followed, and the physician, he declared, knocked him down, having followed him from the office to the hallway. It was while he was down, he stated, that he fired four or five shots, one shot being when Dr. Julian Jackson . . . appeared on the scene [Ref. 5, p 5].

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Disclosures of financial or other potential conflicts of interest: None.

After his arrest, Mr. Frye had legal counsel appointed: Messrs. Richard Mattingly and Foster Wood. When they visited him, he told them he had nothing to do with the murder. The reason he confessed, he said, was that he had planned to share the reward money with the detective. Mr. Frye, a veteran of The Great War, was indicted for premeditated murder, tried in 1922, convicted of second-degree murder, and sentenced to life in prison. After spending nearly 18 years behind bars, he was paroled in 1939 and married the same year. He lived until 1953, never taking responsibility for Dr. Brown's death. During his incarceration, unrepentant, he produced multiple appeals for clemency.[4] Investigating Mr. Frye's life, James E. Starrs, a professor of law at George Washington University, learned that Frye was buried at Arlington National Cemetery, which is odd because he did not meet Army interment requirements.[4,5]

Confession or Scam?

Why was Mr. Frye so eager to confess to Dr. Brown's murder? Unlike the robbery case, there was no physical evidence linking him to it. Starrs[4] investigated the case and found conflicting stories about the confession. Mr. Frye claimed at trial that his confession was false and that he had an alibi. The alibi failed, leaving the question of the reliability of the confession. Defense attorney Richard Mattingly tried to suppress the statement, claiming it was involuntary because Mr. Frye did not know his rights. The executive clemency application Mr. Frye filed in 1936 gives a sense of his ability to fantasize, according to Starrs.[4] In this document he first said that Detective Sgt. Jones agreed to drop the robbery charges if Mr. Frye would admit to Dr. Brown's murder. To add plausibility, he claimed that the officer would collect the reward money and, assuming that Mr. Frye's alibi was good, the murder charge would fail.

The two young lawyers were in a quandary: the government had Mr. Frye's confession, replete with accurate detail; the defendant could not support his alibi claim; and his position on the murder charge was that he was innocent. The truth of the claim that the defendant and the detective conspired was never proved.

Enter the Psychologist

An auspicious set of circumstances led to *Frye v. United States*: two attorneys were desperate for a way to extricate Mr. Frye from a possible death penalty, and a psychologist was testing a physiologic lie detector. The psychologist, Dr. William Moulton Marston, having discovered (he did not like the term invented) the systolic blood pressure deception test in 1915, was eager to promote the test. A recent faculty member at American University in Washington, D.C., he had earned a law degree and a doctorate in psychology from Harvard. According to Marston,[6] Mr. Frye's lawyers came to him and he agreed to test the defendant *gratis*. Marston recalled: "I gave him a deception test in the District jail. No one could have been more surprised than myself to find that Frye's final story of innocence was entirely truthful! His confession to the Brown murder was a lie from start to finish" (Ref. 6, p 71). The press, monitoring the situation, signaled anticipation of scientific lie detection. For example: "Attorneys Mattingly and Wood, for the defense, have brought [in] Dr. William M. Marston, who claims that his apparatus will reveal through the blood pressure whether or not the subject to which it is applied is telling the truth" (Ref. 7, p 1).

Marston recalled that the defendant was the sole witness supporting his story. Marston was in the wings, the *deus ex machina*. In Marston's version:

> At this point in the trial Mattingly and Wood offered to the Court the results of the Marston Deception Test. They proposed to qualify me as an expert in the detection of deception, for the purpose of proving that Frye had told the truth and that he was innocent of Dr. Brown's murder. The jury heard this offer and immediately took a new interest in the case. You could see by the expressions on their faces that they were greatly impressed by the information that the Lie Detector had found the defendant innocent. There was no other evidence to corroborate Frye's tale. But still, if the Lie Detector proved him truthful . . . ? [Ref. 6, pp 71–2].

Marston experienced Justice McCoy's diffidence at admitting novel evidence: "I have gotten too old and too much inured to certain general principles in regard to the trial of cases to depart from them rashly" (Ref. 6, p 72). The judge, according to Marston, excluded the deception test results because they had tested Mr. Frye several weeks before he gave his testimony. When defense counsel offered to repeat the test live in court, the judge said, "It's too late."

In the version reported by Alder,[8] Mattingly and Wood offered Marston as an expert witness, giving

Figure 1. Dr. William Marston (seated at right) checks James Frye's pulse and blood pressure in this 1926 simulation of the Systolic Blood Pressure Deception Test that he had administered to Mr. Frye before his murder trial in 1922. Image licensed from Corbis.

the judge a copy of his dissertation and other scientific papers. After a five-minute perusal, Justice McCoy ruled the next day that Marston could not testify, even though he had admitted psychiatrists previously. "The difference, he explained, was that lie detection was not yet 'a matter of common knowledge' " (Ref. 8, p 51). When lie detectors were as common as telephones, the judge suggested, machines would determine the facts, an outcome he hoped would not materialize during his lifetime. Until then, juries must determine if a witness is truthful; it is their job.

Newspaper headlines focused on the "quick and ignominious death"[9] of the deception apparatus: "Court Rules Out Lie-Finding Device,"[10] "Invention Met Its Death on First Trial,"[11] and "Quick Death to 'Sphygmomanometer,' "[12] for example. Immediately after the trial, however, the District of Columbia Court of Appeals agreed to rule on the admissibility of the sphygmomanometer.[13] It appears that the fate of the lie detector sold more newspapers than stories of the underlying crime. Marston and his machine had become celebrities. In Figure 1, we see a posed 1926 photograph of Mr. Frye attached to a sphygmomanometer.

Ever optimistic, Marston was also buoyed by a door left open to admitting the test under the right conditions. Besides, the psychologist said, "As far as Jim Frye was concerned, the test undoubtedly saved his life. No jury could help being influenced by the knowledge that Frye's story had been proved truthful by the Lie Detector" (Ref. 6, p 72). That the jury reduced the charge from first- to second-degree murder spoke for itself.[4] Marston's discovery was down but not out. Indeed, in 1924, he recalled, Indiana turned Justice McCoy's dictum into case law by allowing administration of lie detector tests to fact witnesses in court. Marston's vindication was mitigated by disapproval that the test was being conducted in public: "The jail, or the prison hospital is a far better place to give Lie Detector tests, from the psychologist's point of view, than is the open court-room" (Ref. 6, p 74).

The *Frye* We Know

The District of Columbia Court of Appeals ruled on James Frye's appeal in 1923.[14] In what some consider a maddeningly terse two-page opinion, Associate Justice Van Orsdel showed his understanding of the theory behind the science. He abstracted that lying causes a rise in blood pressure, which corresponds to the mental struggle between fear and control of fear. Whereas truth flows without conflict, deception requires effort, manifest in a rise in systolic pressure distinguished from the normal fear of the test situation. Acknowledging the defense attorneys' argument that expert testimony is required when the subject matter is beyond ordinary experience, the court took a different approach to experts' use of such technology:

> Somewhere in this twilight zone [between experimental and demonstrable stages of discovery] the evidential force of the principle must be recognized, and while courts will go a long way in admitting expert testimony deduced from a well-recognized scientific principle or discovery, the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs [Ref. 14, p 1014].

Thus, the exclusion of Marston's lie detector was affirmed. The court reasoned that, since the apparatus had not yet achieved standing, the testimony from which it was derived must be excluded. At the time of the *Frye* decision, more advanced polygraphs had not been offered in court. For example, John Larson, from the University of California, was not as sanguine as Marston about the machine's forensic efficacy. Larson, who preferred the term emotion recorder,[6] was a pioneer in law-enforcement applications of polygraphy. The author of the introduction to Marston's 1938 book,[6] he acknowledged Marston's primacy, though he took credit for the police application. Around the time of Mr. Frye's trial, Lar-

son wrote to Marston about the outliers in his database. It appeared that systolic blood pressure had validation issues: "I will send copies of the records of all types of cases and of individuals who have lied without any appreciable change of blood pressure, as well as those who have shown extreme changes."[15] Validity concerns, especially in relation to psychopaths, have been reviewed recently by Raine.[16]

The *Frye* test of general acceptance has been widely discussed.[17,18] The decision was a nearly impenetrable obstacle faced by polygraphists, though refined iterations of devices based on autonomic responses have long enjoyed other markets outside the courtroom (for example, in police interrogations and in investigating claims of spousal infidelity).[8,19] Alder[8] pointed out that, as hopeful as Marston had been, the outcome of the *Frye* decision was the death of forensic polygraphy. However, although the *Frye* decision is widely believed to have dealt a fatal blow to polygraphy in the courtroom, in fact, U.S. jurisdictions differ in their treatment of polygraph evidence. Twenty-nine states exclude polygraphy results as evidence under any circumstance; 15 admit the evidence if both parties stipulate to it before testing; and New Mexico permits the routine admission of polygraphs in the courtroom.[20,21]

Of course, the *Frye* decision represents only one piece of the puzzle that courts have used to resolve the legal tensions related to proffered scientific evidence. More than 50 years after the *Frye* decision, in 1975, Congress enacted the U.S. Federal Rules of Evidence (FRE), to guide federal judges in evidentiary matters. Rule 702 addressed the admissibility of experts with scientific, technical, or otherwise specialized knowledge.[22] However, the FRE failed to indicate whether *Frye*'s general-acceptance test survived the enactment of the federal evidence rules. After many years of debate in the legal community, the 1993 U.S. Supreme Court decision in *Daubert v. Merrell Dow Pharmaceuticals*[23] held that the FRE superseded *Frye*'s general-acceptance standard and outlined a nonexclusive list of factors to be considered by federal judges in scientific evidentiary matters. Despite the *Daubert* decision, numerous state jurisdictions retain the *Frye* standard to determine the admissibility of scientific evidence.

Although technology has evolved and the focus has shifted from the periphery to the brain, the introduction of lie detection into the courtroom continues to be stalled.[24] Only with great reluctance did the judge in the trial of John Hinckley, Jr., admit computed tomographic (CT) scans of the defendant's brain, but only to support a clinical diagnosis. Although the gatekeeping under the Rule 702-based *Daubert*[23] standard of admissibility may be an opportunity to vet each iteration of technology, the test is no more welcoming of lie detectors than was *Frye*. This problem has been highlighted by recent judicial analyses that resulted in the exclusion of functional magnetic resonance imaging (fMRI) lie detection evidence when either the *Frye* or *Daubert* standard was applied.[25,26]

The Backstory's Backstory

Marston's interest in the physiology of emotion and its application to truth-seeking was no accident. As a Harvard student, he was an apprentice to Dr. Hugo Münsterberg, head of the psychology laboratory. William James, who had made significant contributions to psychology, had imported Münsterberg from Germany in 1892.[27] Münsterberg brought with him an interest in the workings of the mind, in particular accessing emotional pathways via word-association tests touted by the Swiss psychiatrist C. G. Jung and others.[28] When Jung suggested that changes in blood flow convert into electricity during the testing, the press immediately embraced the idea of scientific wizardry in crime detection.[29] Although such techniques had scientific cachet, they were little more than confirmations of astute readers of body language; guilty persons tend to give themselves away.[30] In his critique of Jung's word-association work, Sigmund Freud cautioned that manifest body language might be in response to something entirely different from the subject at hand.[30]

Turning Harvard's department of psychology into a laboratory, Münsterberg, to James's dismay,[8] attempted to apply experimental findings to ordinary life. Through a series of experiments, often with students, Münsterberg showed what we still know to be true: that memory is faulty and prone to distortion.[31] Worse, people lie for self-serving reasons, making justice difficult. This problem also applied to eyewitness testimony, a notoriously dicey area and often a fruitful line of cross-examination. He published his findings in a series of articles in *McClure's Magazine*[32] and other mass-market outlets and then in a book.[33] Münsterberg hoped to see his word-association studies used to determine the veracity and accu-

racy of witnesses and had begun to market himself through the popular literature.

The idea that the infant science of psychology might make its way into court did not sit well with the nation's expert on evidence, John Henry Wigmore, Dean of Northwestern University's School of Law. Using the *Illinois Law Review* as a platform, Wigmore[34] lambasted Münsterberg in an article. It appears that he was most insulted that Münsterberg, not trained in the law, was asserting what should and should not be evidence. The long article, replete with historical, literary, and biblical references, pretended to put Münsterberg on mock trial for professional negligence. Wigmore's fantasized jury found the defendant guilty.

Münsterberg continued to popularize psychology and to enjoy celebrity at Harvard, even surviving attacks based on his warm relations with Germany during World War I.[35] It appeared, however, that his goal of applied psychology would not soon be realized and he died during a lecture at Radcliffe in 1916.[36] His protégé Marston, however, kept his eye on the Holy Grail of admissibility of psychological testimony.

Though there have been many claims to the invention of the lie detector, it is not disputed that Marston's 1915 discovery and experimental verification of systolic pressure correlations provided a basis for more complex iterations of the technology.[8,19] Having received his doctorate in 1921, Marston was tapped for Mr. Frye's defense in only a matter of months. The theory underlying the deception test was that "consciousness of an attitude of deception" causes blood pressure to rise (Ref. 19, p 121). Confirmatory elements of the device included a chronoscope to measure response times during word association and a kymograph to measure breathing.[19] Compared against a tradition of police brutality in interrogating suspects by using the third degree,[37] scientific lie detection was clean and painless. The suspects betrayed themselves physiologically, without a taint of coercion. Bunn[38] points out, though, that the polygraph can be just as coercive as a rubber hose. That is, by lying to the suspect in claiming a failed test, the police would tend to induce a confession. Law enforcement views this tactic as a boon to crime solving.

Having tested his deception device in military and civilian settings, Marston was confident it would be welcome in court, just as Münsterberg's testimony had been until Wigmore satirized it. Marston, who was educated in the law, lay in wait for the right opportunity; Mr. Frye's case was a near miss. According to Marston, Wigmore made a practical suggestion on improving the deception test in court: to amplify the blood pressure reading so the jurors could see the fluctuations as they were happening. Although it could be done, Marston declined: "I believed that the jury should not be permitted to form their own opinions of a witness's blood pressure record. Interpretation of the record should be made only by experts, psychologists with legal training and experience in lie detecting" (Ref. 6, p 74). With Wigmore's blessing and without Marston, in 1930 Northwestern University opened the first forensic laboratory.[8] Its purpose was to aid police, which, by implication, could help to exonerate persons who made false confessions. More likely, the laboratory would aid in ridding Chicago of criminals.

The Lasso of Truth

Marston's rejection in *Frye* did not deter him. Remaining within academic circles, he was eclipsed by other claimants to the "invention" of lie-detecting technology, notably John Larson and August Vollmer in Berkeley and Leonarde Keeler of Northwestern's crime detection laboratory.[8] By the time the laboratory opened, he had moved to Hollywood, where he was a consultant at Universal Studios. His efforts at mainstreaming lie detection took on a character of entertainment; for example, demonstrating that blondes were more emotionally reactive than brunettes.[8,39] Desirous of another shot at mainstream forensics, when the convicted Lindbergh baby killer Bruno Hauptmann requested a "truth test" in 1935, Marston volunteered.[19] However, the defendant's request was denied. Other celebrities and public officials sought to settle disputes through polygraphy, and the technique became a trope in popular fiction.

Marston's legacy was transmuting early applied psychology into a criminological meme. If his role in Mr. Frye's trial is seldom discussed, what was his lasting contribution? It was his creation of the comic-book character Wonder Woman, who first appeared in 1941. After leaving academics and helping to popularize the polygraph, Marston worked for a publishing company that eventually became DC Comics, the publisher of Batman and Superman. In the pre-

television era, he was aware that the comic book medium was wildly popular, with a circulation of 100 million.[40] In keeping with his understanding of the importance of emotions, he offered this rationale for comics:

> Nine humans out of ten react first with their feelings rather than with their minds; the more primitive the emotion stimulated, the stronger the reaction. Comics play a trite but lusty tune on the C natural keys of human nature. They rouse the most primitive, but also the most powerful, reverberations in the noisy cranial sound-box of consciousness, drowning out more subtle symphonies [Ref. 40, p 36].

Wonder Woman was a remarkable synthesis of superior values and elevation of a female to superhero status. According to Alder, the character was an expression of Marston's theory of human behavior: ". . . that dominance and submission were the primary human drives . . . that women were . . . the dominant sex . . . [and] most people secretly longed to submit to a superior power" (Ref. 8, p 182). Wonder Woman used benign domination to defeat despots and her clever powers to extricate herself from bondage. Marston equipped her with her own lie detector, the Golden Lasso of Truth, an infallible instrument.[19] Smart, sexily clad, and irresistible, the Wonder Woman character was tainted with sadomasochism and lesbianism, forcing Marston to shore up her image.[8] In Figure 2 we see her in action, making an editorial statement about female superheroes.

Figure 2. Wonder Woman applying the Lasso of Truth to a helpless journalist (Ref. 40, p 44). Reprinted with permission from The American Scholar, Volume 13, No. 1, Winter 1943/44. Copyright 1943 by The Phi Beta Kappa Society.

Discussion

Lie detection is a fiction indelibly etched on our collective consciousness. The systolic blood pressure deception test, and polygraphs in general, measure neither truth nor lies. Rather, they are measurements of physiological states during standardized conditions. The gap between what they measure and the inferences drawn by expert witnesses, though it may have narrowed, remains unbridgeable. Although the results of polygraph examinations may not accompany testimony, they have been used in everyday police work since Vollmer introduced them in Berkeley in 1921.[41] The utility of using polygraphy in police work lies in the procedure's ability to induce truthful incriminating statements from suspects. Jurors judging the reliability of the confession would not be privy to this tactic or exposed to the prejudicial effect of learning that a machine had been used in determination of truth. Thus, in the courtroom, polygraphy is kept behind the scene.

Drawing from a 1965 report to the House of Representatives, Matté[42] pointed out that "[p]eople have been deceived by a myth that a metal box in the hands of an investigator can detect truth or falsehood. The polygraph machine is not a 'lie detector' nor does the operator who interprets the graph detect 'lies' " (Ref. 42, pp 3–4). The congressional report listed factors that would tend to invalidate a polygraph examination: extreme nervousness, mental abnormalities (neuroses, psychoses, low intelligence, dissociation, and pathological lying), lack of responsiveness, and body movements.

Although Marston may have overreached in his press to be the first psychologist to bring lie detection into the courtroom, he was able to parlay his exuberance into a permanent place in popular psychology. As recent articles in the *Journal* have suggested, newer technologies continue to pound on the courtroom door.[43,44] However, recent court decisions indicate that judicial gatekeepers are unlikely to allow entry to these new technologies in the near future. In *Wilson*

v. Corestaff Services,[26] fMRI expert testimony to support the veracity of a witness was excluded because it failed to meet the *Frye* general-acceptance admissibility standard. In *United States v. Semrau*, the Sixth Circuit Court of Appeals affirmed the district court's decision to exclude fMRI lie detection testimony because it failed to satisfy the *Daubert* admissibility standard, and the technology had not been fully tested in real-world settings.[25] In addition to the relevant jurisdictional admissibility standards, these technologies must contend with judicial reluctance to permit testimony that could effectively usurp the jury's function of determining witness credibility. Grubin[45] has urged that we not throw the baby out with the bathwater by equating all polygraphy with Wonder Woman's lasso, citing its application in the postconviction treatment of sex offenders. Noting that the Supreme Court's opinion in *McKune v. Lile*[46] called the practice "sensible," Grubin argued that polygraphy is not compelled self-incrimination: "The focus is not on passing or failing the polygraph test, but on facilitating disclosures that assist in gaining an understanding of the individual and enhancing treatment and supervision" (Ref. 45, p 449).

Marston's innocuous comment on human nature goes to the heart of the question of admissibility of graphic evidence: "pictures tell any story more effectively than words" (Ref. 40, p 37). If true, we need extra vigilance among gatekeepers to be sure that images of brain functioning are used in support, not instead, of testimony based on an expert witness's findings. Otherwise, jurors may be responding to images rather than to the truth of the underlying science.[47] With a criminal defendant's freedom or life in the balance, courts will allow functional neuroimaging in penalty phase or sentencing proceedings but generally not in determining guilt or innocence.[48]

Even if the technical elements of scientific truth-finding were refined to the level of DNA identity-matching standards, ethics-related and constitutional concerns remain. These are chiefly in the domain of privacy and self-incrimination.[49] Deutsch, writing in 1955 and referencing Orwell's *1984*, had these comments on the impact of technology and liberty: "One can't help but feel that the commercial application of the lie detector is an unwholesome extension of mechanical snoopery. It marks further 'gadgetization' of human relations" (Ref. 41, p 171). Little has changed. What was *Frye*'s backstory in 1922 will be tomorrow's cover story.

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