

REACHING PAST FINGERTIPS WITH FORENSIC NEUROIMAGING—NON- “TESTIMONIAL” EVIDENCE EXCEEDING THE FIFTH AMENDMENT’S GRASP

I. INTRODUCTION

“A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die and a new generation grows up that is familiar with it.”¹

It was a summer night in 1977 when retired-Captain John Schweer was murdered.² He was working security at a car dealership in Council Bluffs, Iowa, and earlier that day, had called the police to report a man carrying what he thought was a rifle.³ He also reported that the man had a dog with him. There was no effort made to identify this man, and as a result, law enforcement had no leads when they found shotgun shells and two sets of footprints near Schweer’s body—one set clearly a dog’s.⁴

Days later, frustrated officials contacted sixteen-year-old Kevin Hughes, a known member of a local “car theft ring” with charges pending.⁵ A district attorney then took Kevin to the crime scene and explained that there was a five-thousand-dollar reward and a guaranteed release from charges for him if he could name the culprit.⁶ Kevin did just that, calling out one delinquent after another. After two suspects provided solid alibis, he named seventeen-year-old Terry Harrington.⁷

1. MAX PLANCK, SCIENTIFIC AUTOBIOGRAPHY AND OTHER PAPERS 33-34 (F. Gaynor trans., New York 1949).

2. *Harrington v. State*, 659 N.W.2d 509, 514 (Iowa 2003).

3. *Id.*

4. *Id.* at 518.

5. *Id.* at 517.

6. *Id.*

7. *Harrington*, 659 N.W.2d at 514-15, 517. Prior to naming Harrington, Hughes alleged three other “killers”; each produced a solid alibi, forcing Hughes to name

One year later, Terry Harrington was put on trial.⁸ The State's case rested on the shoulders of Kevin Hughes, who gave in-depth testimony about how Harrington had killed Captain Schweer.⁹ Kevin's friends corroborated the testimony.¹⁰ Harrington's defense, also corroborated by the testimony of friends, was that he was at a concert during the murder.¹¹ And with "minimal" physical evidence, consisting only of gun-powder residue found on Harrington's jacket, it became a case that would turn on who was more believable.¹² Schweer's report of the man with the rifle and dog was not disclosed.¹³ Harrington was found guilty of first-degree murder and sentenced to life without parole.¹⁴ His direct appeal, post-conviction claim, and habeas corpus actions failed.¹⁵

Terry Harrington spent the next twenty-five years of his life in prison.¹⁶ In 2003, new evidence was discovered using what the Iowa Supreme Court called "novel computer-based brain testing."¹⁷ He was forty-three years old.¹⁸ The brain testing discussed by the court was used to measure Harrington's neurological responses to factual scenarios, ultimately showing that he was not involved with Schweer's murder.¹⁹ When the State's witnesses were confronted with this evidence, they recanted their testimony.²⁰ Harrington's conviction was then

other possibilities. *Harrington v. State*, 659 N.W.2d 509, 514 (Iowa 2003).

8. *Id.*

9. *Id.* at 514-15. Prosecutors told Hughes what "they wanted to hear." *Id.* at 515.

10. *Harrington*, 659 N.W.2d at 515-17.

11. *Id.*

12. *Id.* at 515 ("The physical evidence linking Harrington to the crime was minimal.").

13. *Id.* at 517-18. There were also seven other police reports not disclosed at the time of trial. *Harrington*, 659 N.W.2d at 518.

14. *Id.* at 515.

15. *Id.*; see also *State v. Harrington*, 284 N.W.2d 244 (Iowa 1979); *Harrington v. State*, 458 N.W.2d 874 (Iowa Ct. App. 1990) (claiming that Hughes had given false testimony); *Harrington v. Nix*, 983 F.2d 872 (8th Cir. 1993).

16. *Brain Fingerprinting Testing Helps to Exonerate Man Falsely Convicted of Murder*, BRAIN FINGERPRINTING LABORATORIES, <http://www.brainwavescience.com/HarringtonSummary.php> (last visited May 7, 2012) [hereinafter "*Brain Fingerprinting*"].

17. *Harrington*, 659 N.W.2d at 516.

18. *Id.* at 514.

19. *Id.* at 516 n.6.

20. *Id.* at 516-17.

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reversed, and he was released.²¹

While Terry Harrington’s story and others like it illustrate the costs of an adversarial criminal justice system with limited admissible evidence, new procedures, similar to the one leading to Harrington’s release, may render these costs more and more avoidable.²² For the last thirty years, several neuroscientists have been working on a method of “brain testing,” with the idea that it could be used to collect facts that are otherwise inaccessible in cases like Harrington’s. Using this, neuroscientists can examine someone’s brain and determine if that person has first-hand experience with a set of facts.²³ Two procedures currently lead this field, and, given their potential probative value, many are calling for the judiciary to accept them.²⁴

But despite the possible benefits, examining the brain has warranted hesitation. Legal scholars, for example, have issued many challenges to the constitutionality of its use in court. One such challenge argues that using “brain evidence” *against* a criminal defendant, rather than for his release, would be unconstitutional.²⁵ That is, the argument asserts that the

21. *Brain Fingerprinting*, *supra* note 16.

22. See *Kansas v. Marsh*, 548 U.S. 163, 126, 197 (2006) (Scalia, J., concurring) (commenting on the close scrutiny given to criminal cases and claiming only a “0.27% error rate for American verdicts”). See generally Brandon L. Garrett & Peter J. Neufeld, *Invalid Forensic Science Testimony and Wrongful Convictions*, 95 VA. L. REV. 1 (2009) (discussing the effect of forensic science on wrongful convictions).

23. *Brain Fingerprinting*, *supra* note 16.

24. *E.g.*, NO LIE MRI, <http://noliemri.com/index.htm> (last visited May 7, 2012); *Brain Fingerprinting*, *supra* note 16.

25. See, *e.g.*, Jody Barillare, *As Its Next Witness, The State Calls . . . The Defendant: Brain Fingerprinting as “Testimonial” Under the Fifth Amendment*, 79 TEMP. L. REV. 971, 996-97, 1004 (2006) (arguing that forensic neuroimaging results are subject to the Fifth Amendment privilege); Sarah E. Stoller & Paul Root Wolpe, *Emerging Neurotechnologies for Lie Detection and the Fifth Amendment*, 33 AM. J.L. & MED. 359, 371 (2007) (describing the use of neuroimaging as a “chilling concept”); Teneille Brown & Emily Murphy, *Through A Scanner Darkly: Functional Neuroimaging as Evidence of a Criminal Defendant’s Past Mental States*, 62 STAN. L. REV. 1119, 1179 (2010) (asserting the limited probative value of neuroimaging as evidence); E. Spencer Compton, *Not Guilty by Reason of Neuroimaging: The Need for Cautionary Jury Instructions for Neuroscience Evidence in Criminal Trials*, 12 VAND. J. ENT. & TECH. L. 333 (2010) (pointing out a jury’s propensity to give neuroscience results too much weight in assessing different forms of evidence).

evidence can only be used for release because it is testimonial²⁶ evidence, making it subject to the privilege against self-incrimination.²⁷ These contentions, however, are based on a flawed understanding of the privilege and tainted by a fear of “sinister uses.”²⁸ They fail to account for the privilege’s historical principles, the doctrinal development in the area, and the value of accurate criminal investigation, which inherently limit abuse. To illustrate, consider the Harrington case, where “sinister” acts led to wrongful imprisonment; but now, imagine if that protocol required that every murder suspect be submitted to brain testing. Harrington’s story then becomes a wrongful arrest preceding release, rather than a wrongful twenty-five-year sentence.

This Comment proposes that forensic neuroimaging, or “novel computer-based brain testing,” produces evidence that is non-testimonial—not subject to the Fifth Amendment privilege. For support, the Comment explores the principles behind the privilege and the chief historical concerns at the time of its adoption.²⁹ It proceeds in three parts. Part I explains the science behind the testing and introduces the two leading forensic-neuroimaging procedures. Part II delves into the Self-Incrimination Clause and describes its limits on evidence collection.³⁰ It starts with the fundamental values underlying the Clause and follows with the Supreme Court’s construction of “witness” in both a Fifth and Sixth Amendment context, ending

26. “Testimonial” evidence refers to evidence gathered from a defendant’s factual “assertion[s]” and, if classified as such, can only be used against a criminal defendant when given voluntarily or without compulsion. Michael J. Zydney Mannheimer, *Toward a Unified Theory of Testimonial Evidence Under the Fifth and Sixth Amendments*, 80 TEMP. L. REV. 1135, 1138 (2007).

27. *Schmerber v. California*, 384 U.S. 757, 764 (1966) (asserting that “testimonial” evidence is within the scope of the privilege against self-incrimination).

28. Barillare, *supra* note 25, at 1004.

29. *Schmerber*, 384 U.S. at 764 (establishing the distinction between “physical” evidence and “testimonial” evidence).

30. Courts have addressed the relationship between the Self-Incrimination Clause and several types of evidence collection. *See, e.g.*, *Holt v. United States*, 218 U.S. 245 (1910) (forcing defendant to try on a shirt for fitting); *Schmerber*, 384 U.S. at 757 (blood-alcohol content); *Gilbert v. California*, 388 U.S. 263 (1967) (handwriting sample); *United States v. Dionisio*, 410 U.S. 1 (1973) (voice sample); *Fisher v. United States*, 425 U.S. 391 (1976) (subpoenaed documents); *Pennsylvania v. Muniz*, 496 U.S. 582 (1990) (slurred speech and responding to questions); *Palmer v. State*, 604 P.2d 1106 (Alaska 1979) (breathalyzer results); *Edwards v. Butler*, 882 F.2d 160 (5th Cir. 1989) (pictures); *Wisconsin v. Santana-Lopez*, 613 N.W. 2d 918 (Wis. Ct. App. 2000) (DNA testing); *State v. Athan*, 158 P.3d 27 (Wash. 2007) (saliva).

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with the Court’s current doctrinal framework.³¹ Part III proposes that forensic-neuroimaging results are non-testimonial because the procedure does not require a deliberate, controlled response.³² Further, it addresses counterarguments and misclassifications of the science.³³

Ultimately, this Comment accentuates the need for fact-finding advancements, addresses growing constitutional concerns for their use, and promotes technological incorporation, while leaving ample opportunity for procedural safeguards to limit intrusion and abuse.

II. NEUROSCIENCE: CONNECTING THE BRAIN AND THE MIND

Neuroscience, the branch of biology that focuses on the nervous system, is the study of individual neurons and their processes.³⁴ Over time it has incorporated non-neurological disciplines (such as psychology, sociology, and computer science) to assist in a broader focus on neural networks.³⁵ As the discipline developed, scientists began studying links between bodily function and the brain’s neural-network activity and developed new methods to observe the brain. Using what is called “functional neuroimaging,” they were able to watch real-time interactions between brain activity and motor skills and eventually able to identify specific body movements by identifying neural patterns.³⁶ Going further, they studied more complex networks, like those responsible for memory and cognition.³⁷

31. See *United States v. Hubbel*, 530 U.S. 27 (2000) (emphasizing the “mental and physical steps necessary” in the production of testimonial evidence). See also *Doe v. United States*, 487 U.S. 201 (1988) (focusing the analysis on the process of collection rather than the product).

32. See *Schmerber v. California*, 384 U.S. 757, 764 (1966) (explaining that physical collections of evidence are not subject to the privilege against self-incrimination).

33. E.g., Erich Taylor, *A New Wave of Police Interrogation? “Brain Fingerprinting,” The Constitutional Privilege Against Self-Incrimination, and Hearsay Jurisprudence*, 2006 U. ILL. J.L. TECH. & POL’Y 287, 296-97 (2006) (arguing that evidence gathered through neuroimaging is hearsay and subject to the Fifth Amendment privilege).

34. Marcus E. Raichle, *Behind the Scenes of Functional Brain Imaging: A Historical and Physiological Perspective*, 95 PROC. NAT’L ACAD. SCI. 765 (1998) available at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC33796/>.

35. *Id.*

36. *Id.*

37. Anna Devor et al., *Stimulus-Induced Changes in Blood Flow and 2-*

Their research showed firm links between thought processing, perception, and neural patterns.³⁸ And as they have continued even further, researchers in other fields have considered the use of neuroscience—from medical doctors, following the neurological development of Alzheimer's, to phone companies, with thought-dialing software for the disabled, to *Star Wars* game designers, allowing “fans to use The Force” using neurological controls.³⁹

The legal community is now considering using neuroimaging as well.⁴⁰ Some say the technology could revolutionize the system, and others vehemently contend that the rights of privacy and autonomy prohibit its use.⁴¹ Nevertheless, two procedures, undoubtedly leading the way in reliability and availability, are being prepared for investigatory use.⁴² The first is the “novel brain testing” used in *Harrington v. State*, commonly called “Brain Fingerprinting,”⁴³ and the second is functional magnetic resonance imaging.⁴⁴

Deoxyglucose Uptake Dissociate in Ipsilateral Somatosensory Cortex, 28 J. NEUROSCIENCE 14347 (2008) available at <http://www.jneurosci.org/content/28/53/14347.full>.

38. R. Todd Constable, *Challenges in fMRI and Its Limitations*, in FUNCTIONAL MRI: BASIC PRINCIPLES AND CLINICAL APPLICATIONS 75-77 (2006).

39. DANIEL S. GOLDBERG, THE HISTORY OF SCIENTIFIC AND CLINICAL IMAGES IN MID-TO-LATE 19TH CENTURY AMERICAN LEGAL CULTURE: IMPLICATIONS FOR CONTEMPORARY LAW AND NEUROSCIENCE 210 (2010); Thakkar Pooja, *Thinking to Call Someone? Use Your Thoughts to Dial the Number* (April 14, 2011), TECHNOLOGY DIGITAL, <http://www.technology-digital.com/gadgets/thinking-call-someone-use-your-thoughts-dial-number>; Mike Snider, *Toy Trains 'Star Wars' Fans to Use The Force*, USA TODAY, Jan. 7, 2009, http://www.usatoday.com/life/lifestyle/2009-01-06-force-trainer-toy_N.htm.

40. See Erin B. Pulice, *The Right to Silence at Risk: Neuroscience-Based Lie Detection in the United Kingdom, India, and the United States*, 42 GEO. WASH. INT'L L. REV. 865 (2010) (discussing the use of neuroimaging in different legal settings).

41. See Dov Fox, *The Right to Silence as Protecting Mental Control*, 42 AKRON. L. REV. 763 (2009).

42. See Robin Marantz Henig, *Looking for the Lie*, N.Y. TIMES, Feb. 5, 2006, § 6, at 47 (drawing analogy between polygraphs and neuroscience); Joan O'C. Hamilton, *Journey to the Center of the Mind: 'Functional' MRI Is Yielding a Clearer Picture of What Thoughts Look Like*, BUS. WK., Apr. 19, 2004, at 78 (explaining the development of the fMRI).

43. *Scientific Procedure, Research, and Applications*, BRAIN FINGERPRINTING LABORATORIES, <http://www.brainwavescience.com/TechnologyOverview.php> (last visited May 7, 2012) [hereinafter “*Scientific Procedure*”].

44. See Roberta Conlan, *A Life-Saving Window on the Mind and Body: The Development of Magnetic Resonance Imaging*, in NAT'L ACAD. OF SCI., BEYOND DISCOVERY: THE PATH FROM RESEARCH TO HUMAN BENEFIT (2001), available at <http://www.beyonddiscovery.org/content/view.page.asp?I=135>.

A. “BRAIN FINGERPRINTING”

“Brain Fingerprinting” relies on research showing that all perceptions are stored by specific neural systems.⁴⁵ These storage systems become active upon recognition of something previously perceived.⁴⁶ When active, the neurons produce a “memory and encoding related multifaceted electroencephalographic response,” or a “MERMER,” indicating recognition.⁴⁷ During the testing, MERMERs are monitored through electroencephalographic (EEG) sensors placed on the outside of a subject’s head as visual or audio stimuli are provided.⁴⁸ Each MERMER indicates the subject’s perceptive experience with a stimulus.⁴⁹ To illustrate, if a participant were shown a picture of his home, the storage systems in his brain would become active, producing a MERMER, which, once identified by the EEG sensors, would reveal previous experience with that visual stimulus.

From an investigative standpoint, “Brain Fingerprinting” could theoretically identify whether a person had previously perceived a person, object, or sound.⁵⁰ For instance, if a suspect were shown a picture of a young homicide victim lying on the steps of an apartment complex, the procedure would indicate if the suspect had previously perceived the victim in that state. Much like a fingerprint, it would connect or disprove a connection between a suspect and a crime scene.

B. FUNCTIONAL MAGNETIC RESONANCE IMAGING (fMRI)

Brain Fingerprinting and fMRI are very similar—both rely on stored neural systems that actively respond to familiar scenes, and both require audio or visual stimuli and brain monitoring. The difference between them is purely methodical. FMRI provides data by measuring blood flow and oxidation levels, not MERMERs, and rather than EEG sensors, fMRI uses a powerful magnet to identify level changes.⁵¹ During the procedure, this

45. See *Scientific Procedure*, *supra* note 43.

46. *Id.*

47. Barillare, *supra* note 25, at 975-76. (explaining MERMER signals and recording of “P300 wave[s]”).

48. *Id.*

49. *Id.*

50. See *Scientific Procedure*, *supra* note 43.

51. Laurence R. Tancredi & Jonathan D. Brodie, *The Brain and Behavior: Limitations in the Legal Use of Functional Magnetic Resonance Imaging*, 33 AM. J.L. & MED. 271, 276-77 (2007).

magnet creates a real-time image of the brain, blood flow, and oxygen levels.⁵² Stimuli are then provided while changes in blood flow and oxygen levels, which occur in different areas of the brain, are recorded.⁵³ If a subject is familiar with a stimulus, levels rise in areas associated with recognition.⁵⁴

fMRI has also been used to test a subject's neural responses when answering questions.⁵⁵ After a question is asked, investigators attempt to detect whether a participant is lying by looking for increased blood levels in areas associated with unfamiliarity.⁵⁶ This inquiry-based variation has publicly overshadowed other uses and led some to refer to fMRI as "the new polygraph."⁵⁷

Importantly, fMRI and Brain Fingerprinting are not the only neuroimaging procedures.⁵⁸ They are simply the furthest along and exemplify the procedural commonalities relevant for a constitutional analysis. The next Section moves away from science to discuss the Fifth Amendment principles that apply to the judicial use of neuroimaging.

52. Laurence R. Tancredi & Jonathan D. Brodie, *The Brain and Behavior: Limitations in the Legal Use of Functional Magnetic Resonance Imaging*, 33 *Am. J.L. & Med.* 271, 276-77 (2007).

53. *Id.*

54. *Id.*

55. Steven D. Forman et al., *Improved Assessment of Significant Activation in Functional Magnetic Resonance Imaging (fMRI): Use of a Cluster-Size Threshold*, 33 *MAGNETIC RESONANCE MED.* 636, 636 (1995) (explaining the alternate uses of fMRI).

56. Luis Hernandez et al., *Temporal Sensitivity of Event-Related fMRI*, 17 *NEUROIMAGE* 1018, 1025 (2002) (discussing the ability of fMRI to recognize brain activity required for deception).

57. Brian Reese, *Using fMRI as a Lie Detector—Are We Lying to Ourselves?*, 19 *ALB. L.J. SCI. & TECH.* 205, 208 (2009) (claiming that neuroscience is "Lie Detection Today").

58. *Id.* at 210 (explaining "Positron Emission Tomography (PET) Scan"); Meltem Izzetoglu et al., *FUNCTIONAL NEAR-INFRARED NEUROIMAGING*, *IEEE TRANSACTIONS ON NEURAL SYSTEMS REHABILITATION ENGINEERING* 153, 156-58 (2005) (discussing "functional near-infrared light technology (fMRI)," which reflects infrared light off the frontal cortex); Dean A. Pollina et al., *Facial Skin Surface Temperature Changes During a "Concealed Information" Test*, 34 *ANNALS BIOMED. ENG'G* 1182, 1183 (2006) (explaining "thermographic technology," which detects heat emanating from the skin of the face).

III. THE FIFTH AMENDMENT PRIVILEGE: DEVELOPMENT, DOCTRINAL FRAMEWORK, & RECENT APPLICATION

Despite their various successes, the results of neurological procedures are useless to the legal system if found inadmissible. Thus, the admissibility of testing results is a primary concern for those pushing for its use. And while the reliability of any scientific testing is always an obstacle,⁵⁹ several legal scholars have stipulated the issue for sake of argument, since at least some courts have found the results reliable.⁶⁰ Likewise, the following assumes reliability is satisfied so that other constraints can be explored—namely, the application of the Fifth Amendment privilege against self-incrimination (the privilege). Specifically at issue is whether forensic neuroimaging requires an individual “to be a witness,” or elicits “testimonial” evidence. For this determination, the following provides the privilege’s origin, development, and recent applications.

A. THE PRIVILEGE: A LINE OF AUTONOMY

The privilege is considered “one of the great landmarks in man’s struggle to make himself civilized,”⁶¹ and states that “[n]o person . . . shall be compelled in any criminal case to be a witness against himself.”⁶² On its face, this mark of civilization is a protection for both the guilty and innocent, restricting the types

59. *Daubert v. Merrell Dow Pharm.*, 509 U.S. 579 (1993) (recognizing that scientific procedures can be highly beneficial in investigations and trials but are inadmissible until first shown to be sufficiently reliable). Reliability is determined by lower courts and turns on several factors including the volume of testing, rate of error, and amount of peer review. *Id.*

60. Currently, the reliability of forensic neuroimaging is disputed. *E.g.*, Brown & Murphy, *supra* note 25, at 1119. The developers of the technology claim a ninety percent accuracy rate minimum. *Id.* Others have criticized these assertions for their relatively low volume of testing and have claimed that the developers are incentivized by private companies like No Lie MRI, Inc. to exaggerate findings. *Id.* See also Jane Campbell Moriarty, *Flickering Admissibility: Neuroimaging Evidence in the U.S. Courts*, 26 BEHAV. SCI. & L. 29 (2008); *Harrington v. State*, 659 N.W.2d 509, 516 (Iowa 2003); *Slaughter v. State*, 108 P.3d 1052 (Okla. Crim. App. 2005); *Slaughter v. State*, 105 P.3d 832 (Okla. Crim. App. 2005); *Lebron v. Sanders*, No. 02 Civ. 6327 (RPP), 2007 WL 1225548 (S.D.N.Y. April 20, 2007). See also Scott T. Grafton, *Has Neuroscience Already Appeared in the Courtroom?*, in A JUDGE’S GUIDE TO NEUROSCIENCE 54 (Sage Center for the Study of the Mind, 2010) (discussing instances where neuroscience has been deemed admissible).

61. *Chavez v. Martinez*, 538 U.S. 760, 801 (2003) (Ginsburg, J., concurring) (citing ERWIN N. GRISWOLD, *THE FIFTH AMENDMENT TODAY* 51 (Harv. Univ. Press 1955)).

62. U.S. CONST. amend. V.

of evidence that can be used against an accused. The landmark status, however, is not due to its function as a criminal sanctuary, but its role as an absolute limit on government power. By recognizing it, the people acknowledge the government's inherent fallibility by drawing a line of autonomy to protect them from "arbitrary authority."⁶³

The privilege, like other protections in the Bill of Rights, demonstrates the opposing interests of the individual and the public.⁶⁴ But unlike other constitutional provisions that circumstantially limit state action, the privilege is a line of autonomy, a *per se* restriction that prohibits certain methods of evidence collection.⁶⁵ No matter the public interest, the state cannot cross the line, but must collect evidence by its "own independent labors . . ."⁶⁶ Nonetheless, the privilege's application can be and has been narrowed through constitutional construction, which has left "an unsolved riddle of vast proportions, a Gordian knot in the middle of our Bill of Rights."⁶⁷ The following Section works to solve this riddle using the approach the Supreme Court has used in its most recent applications of the privilege—a historical approach.⁶⁸

1. "THE CRUEL TRILEMMA": TRUTH, LIES, OR SILENT CONTEMPT

The drafters of the Constitution firmly believed that the government's power must be limited, for, if unrestrained, the "historical abuses" of past governments would again infringe

63. *Chavez v. Martinez*, 538 U.S. 760, 801 (2003).

64. AKHIL REED AMAR, *THE CONSTITUTION AND CRIMINAL PROCEDURE: FIRST PRINCIPLES* 45-47 (Yale Univ. Press 1997).

65. *Id.* To contrast, the Fourth Amendment's limit on unwarranted government intrusion on privacy can be balanced away by warrant and suspicion. Akhil Reed Amar, *Fourth Amendment First Principles*, 107 HARV. L. REV. 757 (1994). For instance, if police search a car and find a bomb, the owner's right to privacy in his vehicle can be intruded if the public interest in searching was high enough prior to that search. If, for example, the bomb was visible from outside of the car, the state's intrusion would be valid. The line of autonomy is different. If the car owner was compelled to be a "witness" against himself, e.g., forced to tell the police what he was going to use the bomb for, the evidence taken from such "witnessing" is *per se* barred because of the intrusion on autonomy.

66. *Miranda v. Arizona*, 384 U.S. 436, 460 (1966).

67. AMAR, *supra* note 64, at 46.

68. *Pennsylvania v. Muniz*, 496 U.S. 582, 595 (1990). See also Jennifer Kulynych, *The Regulation of MR Neuroimaging Research: Disentangling the Gordian Knot*, 33 AM. J.L. & MED. 295 (2007).

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upon individual autonomy.⁶⁹ Hence, the privilege is meant to harness government power; in particular, it is meant to prevent “the Cruel Trilemma,” which is present any time a witness is asked a question and given no choice but to answer truthfully and self-incriminate, lie and commit perjury, or refuse to respond and be held in contempt.⁷⁰

In the 17th century, the Stuart monarchs used “the Cruel Trilemma” in England’s infamous “Star Chamber”⁷¹ to identify dissenters in a time of religious uproar.⁷² A “person of interest” would be secretly summoned to testify before a supervisory body and forced to take the “Star Chamber Oath.”⁷³ The oath required the person to truthfully answer questions presented on any subject whatsoever.⁷⁴ All answers were considered legal admissions,⁷⁵ and any untruthfulness, or a refusal to answer, resulted in harsh punishment.⁷⁶ It was an “inquisitorial” system that was criticized throughout England, as John Lilburn stated: “[N]o man’s conscience ought to be racked by oaths imposed, to answer to questions concerning himself in matters criminal, or pretended to be so.”⁷⁷

In time, Parliament abolished the chamber, but its abuses were not forgotten. Over a century later, the Framers provided protection for individual autonomy, prohibiting any use of the trilemma in criminal cases.⁷⁸ Consequently, an examination of the trilemma is valuable when determining the privilege’s scope; the privilege is the answer for the trilemma. And the trilemma is what an individual “compelled in any criminal case to be a witness against himself” is facing. The Supreme Court has acknowledged this stating its “unwillingness to subject those suspected of crime to the cruel trilemma . . . [its] preference for an accusatorial, rather than an inquisitorial, system of criminal

69. *Pennsylvania v. Muniz*, 496 U.S. 582, 595 (1990).

70. *Id.*

71. John Lilburn, *The Trial of John Lilburn and John Wharton, for Printing and Publishing Seditious Books*, in COBBETT’S COMPLETE COLLECTION OF STATE TRIALS 1315, 1316 (Bagshaw, Brydges-Street, Covent-Garden 1809).

72. *Id.*

73. *Miranda v. Arizona*, 384 U.S. at 442.

74. *Id.*

75. *Id.*

76. *Id.*

77. Lilburn, *supra* note 71, at 1315.

78. *Miranda*, 384 U.S. at 442.

justice; [and its] fear that self-incriminating statements will be elicited by inhumane treatment and abuses.”⁷⁹

The trilemma, though, is not some archaic torture device; it can potentially exist in any courtroom.⁸⁰ If a witness is asked a question and given no choice but to answer truthfully and self-incriminate, lie and commit perjury, or refuse to respond and be held in contempt, the trilemma is being faced.⁸¹ This is less probable now, however, since most people know of their right to avoid the trilemma—the right to “plead the Fifth” and the right to remain silent.⁸² The following subsection discusses the privilege’s application to circumstances where no trilemma exists.

2. THE CRUEL DILEMMA: NO LONGER “UNCONSTITUTIONALLY” OFFENSIVE

New investigative methods have given rise to questions concerning how far the prohibition on the trilemma extends. Specifically, criminal defendants have claimed the privilege should apply to all methods used to collect incriminating evidence, even when those methods do not allow them to choose between truthful and untruthful responses.⁸³ Fingerprinting, for example, does not allow for true or untrue responses, but does elicit incriminating evidence. However, because there is no opportunity to lie, there is no trilemma.⁸⁴

The Supreme Court has firmly established that the privilege does not apply to such dilemmas—investigative methods that do not allow a choice between truth and deceit.⁸⁵ In doing so, the Court has acknowledged a disparity between the privilege’s ideal protection of autonomy and its actual protection, noting that the privilege “has never been given the full scope which the values it helps to protect suggest.”⁸⁶ Thus, even if evidence compelled

79. *Doe v. United States*, 487 U.S. 201, 212 (1988).

80. Ronald J. Allen, *The Simpson Affair, Reform of the Criminal Justice Process, and Magic Bullets*, 67 U. COLO. L. REV. 989, 1016 (1996) (discussing the modern trilemma).

81. *Doe*, 487 U.S. at 212.

82. *E.g.*, Dan Barry, *Looking Behind the Mug-Shot Grin*, N.Y. TIMES, Jan. 15, 2011, <http://www.nytimes.com/2011/01/16/us/16loughner.html> (“I plead the Fifth,” Mr. Loughner said, though the deputy had no intention of questioning him.”).

83. *See Schmerber v. California*, 384 U.S. 757, 762-63 (1966) (blood tests).

84. *Brogan v. United States*, 522 U.S. 398, 404-05 (1998).

85. *See supra* note 30.

86. *Schmerber*, 384 U.S. at 762-63.

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through dilemmas infringes on the privilege’s “values” in autonomy, the protection falls short.⁸⁷ The Court has gone further, stating that “[t]he term ‘privilege against self-incrimination’ is not an entirely accurate description of a person’s constitutional protection”⁸⁸ The interest in “restraint on governmental power [is] not *unconstitutionally* offended” by some forms of self-incrimination—namely, those requiring the dilemma.⁸⁹

This disparity between values and application has left several scholars to question what an “unconstitutional” offense is and whether one can be converted to a “constitutional” offense by “re-characterizing” the constitutional scope of the privilege.⁹⁰ Nevertheless, subsequent decisions have upheld the scope limitations and arguably narrowed it even further.⁹¹ The following examines the privilege’s perimeters and what dissenters have called a “gradual depreciation of the right.”⁹²

3. TRILEMMA: “TESTIMONIAL, INCRIMINATING, AND COMPELLED”

After almost two centuries of delineating the boundaries of the Self-Incrimination Clause, the Supreme Court has employed terminology that more precisely reflects the privilege’s actual scope of application: “To qualify for the Fifth Amendment privilege, [evidence] must be *testimonial*, *incriminating*, and *compelled*.”⁹³ Noticeably, each requirement is drawn from the text.⁹⁴ In addition, each requirement represents a component of

87. *Schmerber v. California*, 384 U.S. 757, 762-63 (1966).

88. *United States v. Hubbel*, 530 U.S. 27, 31 (2000).

89. *Doe v. United States*, 487 U.S. 201, 213 (1988) (emphasis added).

90. Thomas Y. Davies, *Farther and Farther from the Original Fifth Amendment: The Recharacterization of the Right Against Self-Incrimination as a “Trial Right” in Chavez v. Martinez*, 70 TENN. L. REV. 987, 987 (2003).

91. *Id.*

92. *Schmerber v. California*, 384 U.S. 757, 766 (1966) (Black, J., dissenting). See also *Hubbel*, 530 U.S. at 55 (Thomas, J., concurring) (explaining his opinion of the Court’s departure from the text of the privilege and his willingness to return); *Doe v. United States*, THE OYEZ PROJECT AT ITT CHICAGO-KENT COLLEGE OF LAW, http://oyez.org/cases/1980-1989/1987/1987_86_1753 (last visited May 9, 2012) (Justice Scalia suggested in oral argument that perhaps the Court should look to the text. This suggestion was met with Chief Justice Rehnquist jesting, “that would be a stretch.” Laughter followed.).

93. *Hubbel v. Sixth Judicial Dist. Court of Nev., Humboldt Cnty.*, 542 U.S. 177, 189 (2004) (emphasis added).

94. “Testimonial” draws from “to be a witness,” “incriminating” from “in any

the cruel trilemma.⁹⁵ A witness facing the trilemma has the opportunity to lie or tell the truth because he is providing “testimony,” pays a price for telling the truth because the evidence is incriminating, and is punished if silent, meaning the person is compelled to respond.⁹⁶

While all three are required for the privilege to apply, whether evidence is “testimonial” depends solely on the way in which evidence is collected. Thus, to determine if the privilege applies when evidence is collected by examining forensic neuroimaging results, the following expounds on the meaning of “testimonial.”

B. THE PRIVILEGE: “TO BE A WITNESS”

The Fifth Amendment prevents investigatory methods that require a person “to be a witness” against himself. The Court has interpreted this to prevent methods that elicit “testimonial” evidence.⁹⁷ Though it has acknowledged that this narrows the textual scope, the Court has never clarified the difference between methods that require a defendant “to be a witness” and methods that require “testimonial” evidence. In particular, the Court has referred to an unspecified area called the “outer boundaries” of “testimony.”⁹⁸ The next subsection attempts to define these “boundaries” by considering how the word “witness”

criminal case . . . against,” and “compelled” from “compelled.” U.S. CONST. amend. V.

95. *Brogan v. United States*, 522 U.S. 398, 404 (1998).

96. *Id.*; see also *Kastigar v. United States*, 406 U.S. 441, 445 (1972) (addressing the requisite incentive for truth). The Court ruled that the privilege does not apply if immunity is given to a witness because the individual is no longer “exposed to ‘the cruel trilemma’” *Id.* See also *Chavez v. Martinez*, 538 U.S. 760, 801 (2003) (holding that action actually has to be brought against the witness); *Davies*, *supra* note 90. Evidence is considered incriminating if it provides evidence or “lead[s] to other evidence” that may expose the witness to a criminal charge. *Kastigar*, 406 U.S. at 445. To compel is to force or to give no choice. *United States v. Washington*, 431 U.S. 181, 187-88 (1977). A person is compelled unless he has “voluntarily, knowingly, and intelligently” participated in the production of evidence. *Berghuis v. Thompkins*, 130 S. Ct. 2250, 2263 (2010). Courts look to the totality of the circumstances and decide whether “the free will of the witness was overborne.” *Washington*, 431 U.S. at 187-88. Any physical force or psychological coercion shown will likely be sufficient to find compulsion. *Id.* However, if an individual has freely chosen to “assist the state” and he is fully aware of the “nature of the right being abandoned,” he is not compelled. *Thompkins*, 130 S. Ct. at 2263.

97. *Hibel*, 452 U.S. at 189.

98. *Pennsylvania v. Muniz*, 496 U.S. 582, 595 (1990). See also *Crawford v. Washington*, 541 U.S. 36, 72 (2004) (Rehnquist, C.J., concurring) (explaining that the Supreme Court has never explicitly defined testimonial).

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in other constitutional provisions has been interpreted.

1. “WITNESSES” UNDER THE FIFTH AND SIXTH AMENDMENT

On its face, “witnessing” could refer to a broad range of activity. As Justice Thomas has noted, “witness” historically “meant a person who gives or furnishes evidence,” not simply one that provides testimony.⁹⁹ Nonetheless, the Court’s jurisprudence clearly establishes that the term “witness” is not given its full meaning in all constitutional contexts.

In the Sixth Amendment, the word “witness” is used twice.¹⁰⁰ First, “witness” in the Compulsory Process Clause refers to a defendant’s right to gather evidence: “the accused shall enjoy the right . . . to have a compulsory process for obtaining witnesses in his favor.”¹⁰¹ It has been broadly interpreted to include any evidence the accused can furnish.¹⁰² The other use of “witness” in the Sixth Amendment is found in the Confrontation Clause, which provides that the accused has the right “to be confronted with the witnesses against him.”¹⁰³ While this right provides protection for the accused, it is, unlike in the Compulsory Clause, a negative protection because it limits the evidence that can be used against the defendant. “Witness” in this context does not guarantee “witnesses in his favor,” it prohibits certain evidence from being used “against him.”¹⁰⁴

Notably, the Court has interpreted the latter to mean “testimonial” and explained that evidence is “testimonial” under the Confrontation Clause where “[a] solemn declaration or affirmation made for the purpose of establishing or proving some fact” is given “with an eye towards trial”¹⁰⁵ It “establish[es]

99. *United States v. Hubbel*, 530 U.S. 27, 48 (2000) (Thomas, J., concurring).

100. U.S. CONST. amend. VI:

In all criminal prosecutions, the accused shall enjoy the right to a speedy and public trial, by an impartial jury of the State and district wherein the crime shall have been committed, which district shall have been previously ascertained by law, and to be informed of the nature and cause of the accusation; to be confronted with the witnesses against him; to have compulsory process for obtaining witnesses in his favor, and to have the Assistance of Counsel for his defense.

101. *Id.*

102. *Hubbel*, 530 U.S. at 48-49 (Thomas, J., concurring) (citing *United States v. Nixon*, 418 U.S. 683, 711 (1974)).

103. U.S. CONST. amend. VI.

104. *Id.*

105. *Crawford v. Washington*, 541 U.S. 36, 72 (2004).

or prove[s] past events potentially relevant to later criminal prosecution.”¹⁰⁶

Unfortunately, the Court has never declared that “testimonial” in the context of the privilege is the same as “testimonial” under the Confrontation Clause.¹⁰⁷ Thus, in ruling on the application of privilege, lower courts have been left to balance between the commitment to structural integrity and the sometimes conflicting jurisprudence. The next subsection explores the Court’s jurisprudence interpreting “testimonial” in the context of the privilege.

2. TESTIMONIAL AND PHYSICAL WITNESSING

In early cases, the Court held that the privilege against self-incrimination protected all “private” information, knowledge, and use of the body.¹⁰⁸ The privilege essentially applied any time an individual was compelled to produce incriminating evidence. Over time, this broad interpretation made it increasingly difficult to conduct investigations and obtain convictions as suspects refused to stand in line-ups, provide fingerprints, or participate in any way.¹⁰⁹ This subsection considers the Court’s decision to solve this problem by limiting the privilege.

In the early 1900’s, investigative roadblocks led the state to seek a distinction that would allow some self-incrimination to be compelled. In 1910, the Supreme Court articulated such a distinction through the phrase, “to be a witness.”¹¹⁰ The Court ruled that certain contributions, by their nature, have lower individual interests and infringe less on individual autonomy.¹¹¹ They fall short of the inquisitorial workings of “the Cruel Trilemma” and do not require an individual “to be a witness.”¹¹² Justice Holmes, writing for a unanimous Court, held that compelling a suspect to wear a piece of clothing in front of a jury does not require him “to be a witness.”¹¹³ Privilege applies to “extort[ed] communication . . . , not [] exclusion[s] of his body as

106. *Davis v. Washington*, 126 S. Ct. 2266, 2274 (2006).

107. *Mannheimer*, *supra* note 26.

108. *Boyd v. United States*, 116 U.S. 616, 633 (1886).

109. *Schmerber v. California*, 384 U.S. 757, 764 (1966).

110. *Holt v. United States*, 218 U.S. 245 (1910).

111. *Id.* at 252.

112. *Id.*

113. *Id.*

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evidence”¹¹⁴ Thereafter, requiring a defendant “to submit to fingerprinting, photographing, or measurements, to write or speak for identification, to appear in court, to stand, to assume a stance, to walk, or to make a particular gesture” was held not to require one “to be a witness” and was not within the privilege.¹¹⁵

In 1966, the Court limited the privilege’s scope once again through what Justice Black called “stealthy encroachments.”¹¹⁶ In *Schmerber v. California*, a split Court held that “to be a witness” was to provide evidence that was of a “testimonial or communicative nature” as opposed to a “physical or real” nature.¹¹⁷ The Court found that evidence, such as the blood test results presented to the Court, is “physical rather than testimonial” and categorically beyond the scope of the privilege, but unfortunately, it did not to define exactly what “testimonial” evidence was.¹¹⁸ It did, however, acknowledge that the line between “testimonial” and “physical” characteristics may be ambiguous at times:

There will be many cases in which such a distinction is not readily drawn. Some tests seemingly directed to obtain “physical evidence,” for example, lie detector tests . . . may actually be directed to eliciting responses which are essentially testimonial. To compel a person to submit to testing in which an effort will be made to determine his guilt or innocence on the basis of physiological responses, whether willed or not, is to evoke the spirit and history of the Fifth Amendment.”¹¹⁹

In his dissenting opinion, Justice Black claimed that this dictum above was evidence of the majority’s “own doubts, if not fears, of its own shadowy distinction”¹²⁰ He went on to point out that “testimonial” and “physical” are “not models of clarity and precision as the Court’s rather labored explication shows. Nor can the Court . . . find precedent . . . using these particular

114. *Holt v. United States*, 218 U.S. 245, 252-53 (1910).

115. *Schmerber v. California*, 384 U.S. 757, 764 (1966).

116. *Id.* at 776 (Black, J., dissenting).

117. *Id.* at 763-64.

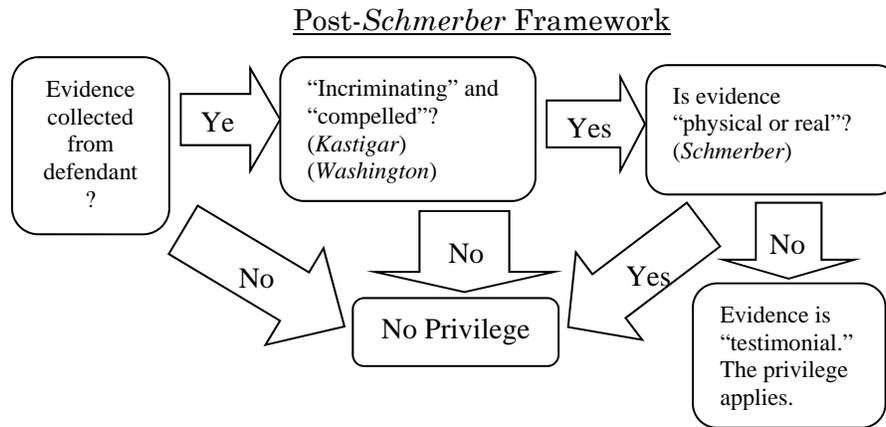
118. *Id.*

119. *Id.* at 757. Some legal scholars have relied on this dictum when determining forensic neuroimaging results are “testimonial.” See, e.g., Matthew B. Holloway, *One Image, One Thousand Incriminating Words: Images of Brain Activity and the Privilege Against Self-Incrimination*, 27 TEMP. J. SCI. TECH. & ENVTL. L. 141 (2008).

120. *Schmerber v. California*, 384 U.S. 757, 775 (1966) (Black, J., dissenting).

words to limit the scope of the Fifth Amendment's protection."¹²¹ He concluded with a question: "How can it reasonably be doubted that the blood test evidence was not in all respects the actual equivalent of 'testimony' taken from petitioner when the result of the test was offered as testimony . . . ?"¹²²

The Court addressed similar questions over the next few decades.¹²³ For guidance, the flow chart below illustrates the framework in place after *Schmerber*, while the following subsection traces the refinement of the *Schmerber* decision.¹²⁴



C. THE PRIVILEGE: TIGHTENING THE SCOPE

Many Supreme Court opinions regarding the scope of the privilege were written just after *Schmerber*, with each attempting to clarify the privilege's scope in light of *Schmerber*'s ambiguity. The first cases distinguished *Schmerber* while the latter cases created a new doctrine.¹²⁵ This subsection frames these developments so that the privilege's application to forensic neuroimaging can be addressed from each doctrinal perspective.

121. *Schmerber v. California*, 384 U.S. 757, 774 (1966) (Black, J., dissenting).

122. *Id.* at 778.

123. *See, e.g.*, *Gilbert v. California*, 388 U.S. 263, 267 (1967) (handwriting sample); *United States v. Dionisio*, 410 U.S. 1, 15 (1973) (voice sample); *Fisher v. United States*, 425 U.S. 391, 461 (1976) (subpoenaed documents); *Pennsylvania v. Muniz*, 496 U.S. 582 (1990) (slurred speech and responding to questions).

124. A flow chart illustrating the current analytical framework for applying the privilege can be found, *infra* Section II.C.3.

125. *United States v. Wade*, 388 U.S. 218, 221-23 (1967).

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1. EVIDENCE THAT REQUIRES ACTION

The *Schmerber* holding was easily distinguished from cases where the defendant had to do something because the defendant in *Schmerber* did not voluntarily act to produce the evidence.¹²⁶ He provided the blood, but made no deliberate or controlled action to produce it.¹²⁷ Therefore, investigative methods that relied on observing a defendant’s actions were not discussed in *Schmerber*. This changed, however, one year later when the Court decided *United States v. Wade*. There, the Court held that a defendant’s statements made during a lineup were *not* “testimonial” because the content of the statements was dictated by officers.¹²⁸ Only the defendant’s appearance in the lineup and the sound of his voice were used as evidence, and neither are “testimonial.”¹²⁹

With *Wade*, the Court provided a framework that applied to many scenarios. To illustrate, imagine a bank robbery. At the bank, a disguised robber gives the teller a note saying, “I am a bank robber, give me cash!” Unfortunately, the teller could not read, so the robber said aloud, “I am a bank robber, give me cash!” She complied, and the robber left, but forgot his note. Officers later arrested a suspect named Mr. B. Officers then forced him to write and say aloud, “I am a bank robber, give me cash,” while the teller listened. Experts concluded that the note was in Mr. B’s handwriting, and the teller concluded that the voice was identical to the robber’s. Mr. B claimed the privilege prohibited the evidence because it was compelled through self-incriminating actions. But according to *Wade*, the evidence was not testimonial because it was used solely for its physical characteristics. This hypothetical is similar to the facts presented in *Gilbert v. California*, where the Supreme Court held that evidence used solely for its physical characteristics is not testimonial.¹³⁰

2. EVIDENCE THAT REQUIRES ACTION AND “GIVES RISE” TO AN INFERENCE

After the Court in *Wade* found that someone’s actions could

126. *United States v. Wade*, 388 U.S. 218, 221-23 (1967).

127. *Muniz*, 496 U.S. at 595. See *infra* Section III (explaining deliberate acts).

128. *Wade*, 388 U.S. at 245.

129. *Id.*

130. *Gilbert v. California*, 388 U.S. 263, 266 (1967); see also *United States v. Dionisio*, 410 U.S. 1, 15 (1973).

be used against him, it had to identify when actions could not be so used. Two cases provided the opportunity; one spoke on a defendant's inaction, and the other considered inferences drawn from physical characteristics.¹³¹

For inaction, consider Mr. B's predicament, but during the investigation, police showed him a series of photos and asked him to describe each one. One picture was of the bank teller, and the rest were random. Mr. B described every picture except the one of the teller, which he refused to comment on. An inference was then drawn from his silence and used as evidence that he knew the teller. Though there was no action from Mr. B, the evidence would be "testimonial" according to *Estelle v. Smith*.¹³² There, the Court held that a defendant's inaction is deliberately chosen, so an inference drawn from it is "testimonial."¹³³

The Court addressed inferences again in *Pennsylvania v. Muniz*. There, a man suspected of drinking and driving was asked by police, "Do you know the date of your sixth birthday?"¹³⁴ He responded, "I don't know." His response was then used to show that he was "intoxicated."¹³⁵ The trial court held that the evidence was not testimonial because the "inference concerns 'the physiological functioning of [the defendant's] brain . . . which is asserted to be every bit as 'real or physical' as the physiological makeup of his blood and the timbre of his voice."¹³⁶ On appeal, the State argued that the defendant's lack of memory revealed the effect of alcohol on his brain functioning and that the inference was based solely on physical characteristics, but a divided Court found that the "characterization addresses the wrong question . . ." ¹³⁷ The relevant issue, according to the Court, was whether the defendant's deliberate action "gave rise to the inference."¹³⁸ If a choice of action "gave rise" to the inference, it was "testimonial."¹³⁹ The Court held that the response was

131. See, e.g., *Pennsylvania v. Muniz*, 496 U.S. 582, 595 (1990); *Estelle v. Smith*, 451 U.S. 454, 464-65 (1981).

132. *Estelle*, 451 U.S. at 464-65.

133. *Id.*

134. *Muniz*, 496 U.S. at 595 (compulsion presumed because no *Miranda* warnings were given).

135. *Id.*

136. *Id.* at 593.

137. *Id.*

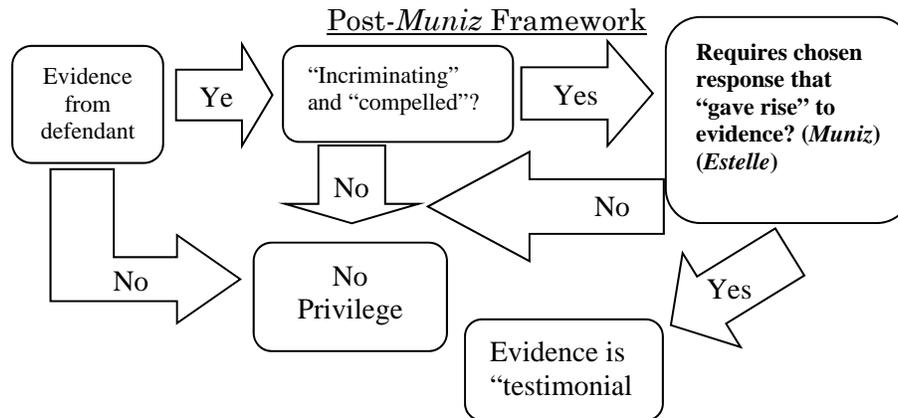
138. *Id.*

139. *Pennsylvania v. Muniz*, 496 U.S. 582, 593 (1990).

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“testimonial,” and in doing so, emphasized the correlation with the Cruel Trilemma.¹⁴⁰ Providing testimony, like facing the trilemma, requires a suspect “to choose a response.”¹⁴¹ If a choice of response is not given, there is no trilemma, no opportunity to deceive, and no “testimonial” evidence produced because there is no choice between self-incrimination and perjury.¹⁴²

The flow chart below illustrates the framework in place after *Muniz*, while the following subsection discusses the precedent addressing evidence collected from a defendant’s prior actions.¹⁴³



3. EVIDENCE COLLECTED FROM PRIOR ACTIONS

The last form of evidence the Supreme Court has spoken on regarding the privilege’s application is evidence collected from prior actions.¹⁴⁴ Generally, the “act of production doctrine,” as it is commonly called, is applied to document requests¹⁴⁵ or recordings voluntarily created by someone prior to an investigation. This subsection briefly explains the doctrine for its guidance in the application of the privilege to neuroimaging,

140. *Pennsylvania v. Muniz*, 496 U.S. 582, 593 (1990).

141. *Id.* at 593 (emphasis added).

142. *Id.*

143. The new additions to the chart are in bold. A flow chart illustrating the current analytical framework for applying the privilege can be found, *infra* Section II.C.3.

144. Thomas Kiefer Wedeles, *Fishing for Clarity in a Post-Hubbel World: The Need for a Bright-Line Rule in the Self-Incrimination Clause’s Act of Production Doctrine*, 56 VAND. L. REV. 613 (2003).

145. Samuel A. Alito, Jr., *Documents and the Privilege Against Self-Incrimination*, 48 U. PITT. L. REV. 27, 39 (1986).

which notably relies on perceptions made prior to investigation.

In earlier precedent, the Supreme Court found that privacy was closely linked to the privilege.¹⁴⁶ However, the Court recently severed that link in *Fisher v. United States*. There, the Court found that tax records did not “rise to the level of testimony within the protection of the Fifth Amendment.”¹⁴⁷ Furthermore, the Court discussed the differences between producing evidence created prior to an investigation and that created in response to an investigation.¹⁴⁸ The Court concluded that evidence created in response to an investigation may be “testimonial,” while evidence created prior to an investigation is not, unless the act of production “has communicative aspects of its own”¹⁴⁹ If the act itself reveals the “existence, possession, or authentication” of evidence, it is “testimonial” because of the “communicative aspects.”¹⁵⁰ However, if an investigator independently knew of the evidence’s existence, possession, and authentication, the communicative aspects are lost.¹⁵¹

For example, consider Mr. B’s bank robbery. Imagine that before the investigation, Mr. B writes about the robbery in his diary. During the investigation, the police send a subpoena requesting all written accounts of Mr. B’s activity on the day of the robbery. In response, Mr. B produces the diary, but claims the privilege prohibits its use. According to *Fisher*, Mr. B would be correct because the “act of production” reveals existence, possession, and authenticity, making it “testimonial”—unless investigators had prior independent knowledge of the diary’s existence, possession, and authentication.

On the other hand, if the diary was locked in a safe-deposit box, and Mr. B was forced to sign a waiver releasing access to his boxes, the diary could be used. There would be no “testimonial” act of production. This was the case in *Doe v. United States*. In the decision, the Court, relying on *Fisher*, found that the application of privilege turns on the “act of production” regardless of the substance being sought.¹⁵² The Court therein implicitly

146. *Boyd v. United States*, 116 U.S. 616, 633 (1886).

147. *Fisher v. United States*, 425 U.S. 391, 411 (1976).

148. *Id.*

149. *Id.*

150. *Id.* at 410.

151. *Id.*; see also *United States v. Hubbel*, 530 U.S. 27, 31-32 (2000).

152. *Doe v. United States*, 487 U.S. 201, 206 (1988). See also *Fisher*, 425 U.S. at

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severed any “zone of privacy” protection under the privilege by stating that “personal privacy,” like Mr. B’s diary, does not “prevent the otherwise proper . . . use of evidence” under the privilege.¹⁵³

The Court’s movement away from privacy toward a protection of chosen responses by a suspect to investigations is where the application of the privilege currently stands.¹⁵⁴ The following Section proposes that when taking into account the historical principles underlying privilege, the structural integrity of constitutional construction, and the recent doctrinal developments, forensic neuroimaging results are not “testimonial,” and the privilege does not apply. The flow chart below illustrates the current framework for the application of the privilege.¹⁵⁵

399 (“Within the limits imposed by the language of the Fifth Amendment, which we necessarily observe, the privilege truly serves privacy interests; but the Court has never on any ground, personal privacy included, applied the Fifth Amendment to prevent the otherwise proper acquisition or use of evidence which, in the Court’s view, did not involve compelled testimonial self-incrimination of some sort.”).

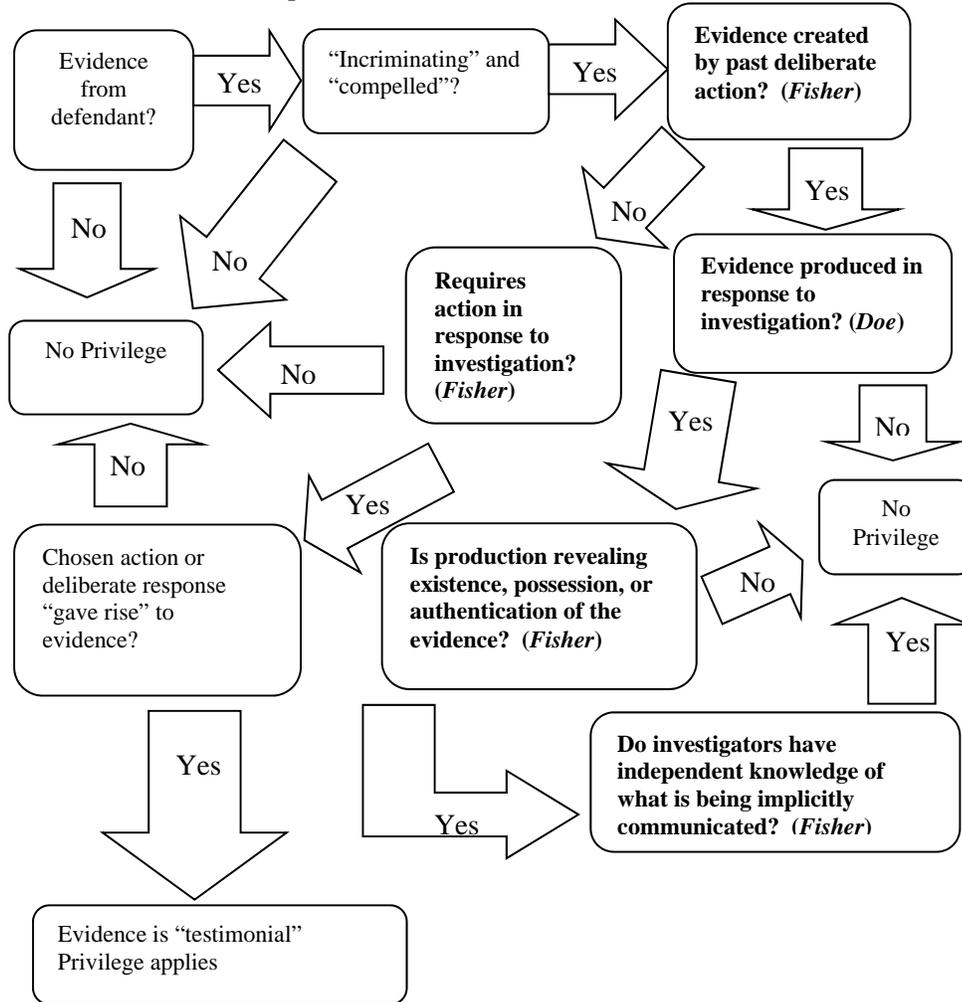
Id. Privacy has been relied on in several articles arguing for the privilege’s application to neuroscience. See generally Leo Kittay, *Admissibility of fMRI Lie Detection: The Cultural Bias Against “Mind Reading” Devices*, 72 BROOK. L. REV. 1351, 1352 (2007); Fox, *supra* note 41.

153. *Doe*, 487 U.S. at 210. See also Daniel E. Will, “Dear Diary—Can You be Used Against Me?”: *The Fifth Amendment and Diaries*, 35 B.C. L. REV. 965 (1994).

154. *Doe*, 487 U.S. at 210. Notably, this again suggests symmetry between “testimony” under the Confrontation Clause and the privilege because “testimony” under the Confrontation Clause turns on whether a witness had “an eye towards trial.” *Crawford v. Washington*, 541 U.S. 36, 72 (2004).

155. There are new additions to the chart in bold. A flow chart illustrating the current analytical framework for applying the privilege can be found, *infra* Appendix A.

Complete Testimonial Framework



V. NON-TESTIMONIAL NEUROIMAGING: READING THE MIND'S DIARY

When looking to the historical motivations of the privilege's incorporation, its doctrinal development since, and the structural interpretations of "testimony," it is clear that the privilege against self-incrimination does not apply to non-inquiry based forensic neuroimaging results. Simply put, forensic neuroimaging does not require the "Cruel Trilemma" because no chosen response or deliberate production is needed. Therefore, the procedure does not elicit testimonial evidence and is beyond the scope of the privilege. The following analysis proceeds in two parts. First, it sets forth the historical, doctrinal, and structural

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arguments for not applying the privilege to neuroimaging results. Second, it discusses the misclassifications of neuroscience and responds to legal scholars contending that the privilege applies to neuroimaging results.

A. FORENSIC NEUROIMAGING RESULTS ARE NON-TESTIMONIAL

Apart from the scientific jargon and complex technology, neuroimaging can be understood simply as stimulus-and-response testing. An image is perceived, aurally or visually, and a response follows. Notably, this response is involuntary. Therefore, in applying the jurisprudence on the application of privilege, forensic neuroimaging presents merely a “cruel *dilemma*,” as it does not require a choice between providing true or false evidence and is not affected by whether a defendant has “an eye towards trial.”¹⁵⁶ The following will discuss each claim and its guidance in determining the privilege’s application.

1. PARTICIPANTS SUBJECTED TO A DILEMMA, NOT “THE CRUEL TRILEMMA”

“The Cruel Trilemma,” which motivated the incorporation of the privilege into the Bill of Rights, continues to guide the application of the privilege. It requires that three choices be present: truth; deception; or silence. Anything less is beyond the scope of the privilege. As the Court has stated, the trilemma requires someone to “choose a response,” not just to respond or participate.¹⁵⁷ A procedure that allows someone to choose to participate or not participate is merely a *dilemma*. A defendant facing a dilemma cannot choose between producing the truth and producing a lie.

With forensic neuroimaging, a defendant may be able to choose to cooperate or not, but cannot choose to produce false results, unlike those who face a trilemma. Much like a blood test or fingerprinting, a defendant subjected to neuroimaging has no influence over the results. The opportunity to lie, inherent in communicative acts, is simply not present. Therefore, because “societal interests in restraint on governmental power are not

156. *Crawford v. Washington*, 541 U.S. 36, 72 (2004).

157. *Pennsylvania v. Muniz*, 496 U.S. 582, 587 (1990) (emphasis added). The Court has also held that when immunity is given or the evidence will not be used at trial, the privilege did not apply because the incentive to lie was gone and thus no trilemma. *Kastigar v. United States*, 406 U.S. 441, 445 (1972).

unconstitutionally offended” by soliciting evidence through a dilemma, the privilege does not apply to forensic neuroimaging.¹⁵⁸

2. NO CHOSEN RESPONSE OR DELIBERATE PRODUCTION

The Supreme Court’s doctrine supports the conclusion made under a historical approach, because under its doctrine evidence is testimonial and subject to privilege when it is derived from a chosen action that “gave rise” to an inference or is taken from a deliberate production in response to an investigation.¹⁵⁹ In both there is some form of control over the results, and in both the Court found the evidence was testimonial. For instance, the defendant in *Muniz* could have chosen to lie when he claimed he could not remember his birthday, and Mr. B, in the hypothetical, could have deliberately produced a fake diary in response to the investigation because he, like the defendant in *Muniz*, controlled the production.

On the other hand, the defendant in *Schmerber* could not have changed the amount of alcohol found in his blood. Because he had no control, the evidence was not testimonial and was, thus, beyond the scope of privilege. Likewise, a defendant participating in a neuroimaging procedure cannot change the way his neural networks respond to stimuli.¹⁶⁰ He has no control over the production, so the results are also not testimonial.

Hypothetically, assume Mr. B was compelled to participate in a neuroimaging procedure, and the results showed that he was present at the bank during the robbery. Using the doctrinal flow chart in Appendix A to apply the privilege, the results were (1) taken from a defendant and (2) compelled and incriminating. The third step, “(3) created by past-deliberate action,” is more difficult to assess because of the brain’s storing capacity. Similar to a diary, the neuroimaging results revealing Mr. B’s presence at the bank were created because of a past-deliberate action, or by choice. Mr. B chose to be at the bank. However, whether he chose to store his perceptions, like someone chooses to write in a diary, or whether the storage was incidental to his choice, like

158. *Doe v. United States*, 487 U.S. 201, 213 (1988) (emphasis added).

159. *Muniz*, 496 U.S. at 587; *Fisher v. United States*, 425 U.S. 391, 411 (1976).

160. Additionally, even if someone could find a way to manipulate their neural activity to skew the results, it would be no different than someone manipulating the sound of their voice or style of their handwriting which the Court found was not testimonial in *United States v. Wade*, 388 U.S. 218, 221-23 (1967).

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alcohol storage in the blood is incidental to consumption, is unresolved, but nonetheless inconsequential. Even if deliberately stored in the past, the act of production was (4) not a chosen response to an investigation, so the privilege would not apply. Likewise, if it was not deliberately stored, like blood alcohol levels, the neural activity was (4) in response to an investigation,¹⁶¹ but not a (5) chosen action or deliberate response giving rise to the evidence. Therefore, the privilege would not apply under the Court’s doctrine.

3. EVIDENCE IS CONSTANT, NOT CHANGED BY KNOWLEDGE OF INVESTIGATION

Furthermore, under a structural analysis, the construction of adjoining constitutional provisions gives direction for applying the privilege to neuroimaging. A broad reading of the word “witness” is given when it is used on behalf of the accused to provide evidence, but when “witness” prohibits evidence from being used “against” an accused, the word is more limited. The term is used in the privilege for the latter purpose, so a more limited construction is structurally consistent.

Moreover, the word “testimonial,” construed from the Confrontation Clause “witness,” has been interpreted as evidence given with an “eye towards trial.”¹⁶² Likewise, “testimonial” evidence in the context of the privilege requires action in response to investigation.¹⁶³ These parallel interpretations both imply that “testimonial” evidence may change if the provider of that evidence knows there is an investigation or trial underway. For instance, statements made regarding someone’s crime might change if that person knows there is an investigation underway or if trial is in sight.

Notably, forensic neuroimaging results and a defendant’s production of those results are not changed by a defendant’s knowledge of investigation. The results are not subject to a defendant’s incentive, or lack thereof, to lie, much like a fingerprint would not change just because it is given in response to an investigation. Therefore, finding that neuroimaging results

161. Whether a defendant’s brain activity constitutes (4) “action” on the part of the defendant is also a debatable, but irrelevant, application of the privilege because the lack of chosen response.

162. *Crawford v. Washington*, 541 U.S. 36, 72 (2004).

163. *Fisher*, 425 U.S. at 411.

are not within the scope of the word “witness” under the privilege is consistent with the structural integrity of constitutional construction.

The following sections discuss issues that have given some scholars “Orwellian fears” of the government’s “sinister uses.”

B. NEUROSCIENCE FICTION

Two classifications of forensic neuroimaging have led to flawed reasoning in the application of the privilege. The first is the fear that if this technology is allowed into courts and investigations, the government will be able to “read your mind.”¹⁶⁴ This apprehension is likely due to exaggerated headlines used to get public attention anytime a scientist utters the words, *technology*, *advancement*, and *brain* in the same sentence. The second myth is that neuroimaging procedures are simply advanced “lie detectors.”¹⁶⁵ While there are uses that produce results similar to a polygraph’s, categorizing forensic neuroimaging as a newer version of the polygraph is imprecise. The following attempts to dispel these misclassifications and responds to wrongful applications of the privilege to neuroimaging.

1. NEUROIMAGING: WATCHING THE MIND, NOT READING IT

Mindreading is an ability often flaunted in literature, movies, and magic shows, and while there may be scientists claiming technologies currently available can “read your mind,” forensic neuroimaging cannot.¹⁶⁶ Scientists have had no

164. See, e.g., *Reading Minds, the Science, not the Fiction, Brain Briefings*, Society for Neuroscience, (Apr. 2010), http://web.sfn.org/siteobjects/published/0000BDF20016F63800FD712C30FA42DD/559D776AE37B37F448886373E9ABB4C2/file/April%202010_BB_Reading%20Minds.pdf; *60 Minutes: How Technology May Soon “Read” Your Mind*, (Jan. 4, 2009), available at <http://www.cbsnews.com/stories/1998/07/08/60minutes/main4694713.shtml?tag=cbsnewsSidebarArea.0>. See also Kittay, *supra* note 152, at 1352.

165. See generally Reese, *supra* note 57 (comparing polygraphs to neuroimaging). But see *Interview with Dr. Lawrence Farwell*, BRAIN FINGERPRINTING LABORATORIES, <http://www.brainwavescience.com/FreqAskedQuestions.php> (last visited May 10, 2012) [hereinafter “*Interview*”].

166. See *60 Minutes*, *supra* note 164 (claiming the fMRI can produce “thought identification” as neuroscientist Marcel Just termed it); Reese, *supra* note 57 at 205. E.g., WILLIAM ICKES & ELLIOT ARONSON, *EVERYDAY MIND READING: UNDERSTANDING WHAT OTHER PEOPLE THINK AND FEEL* (Book News, Inc., Portland, Or. 2004); *The Amazing Kreskin Bio*, THE AMAZING KRESKIN,

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consistent success with interpreting a person’s thoughts.¹⁶⁷ Moreover, not even the most advanced cognitive neuroscience can credibly display the cognition responsible for intent, morality, or religious conviction.¹⁶⁸ And importantly, neuroscience lacks an essential mindreading function—the production of isolated facts.¹⁶⁹ In other words, forensic neuroimaging can only verify knowledge of facts independently collected by investigators.¹⁷⁰ It cannot dig into the conscious for subjective knowledge.¹⁷¹ At most, the procedures simply allow scientists to “watch the brain think.”¹⁷²

Importantly, this observation of the brain cannot be used to read thoughts.¹⁷³ It can only identify a subject’s familiarity with a group of facts.¹⁷⁴ The extent of the procedure’s capacity is to measure and observe brain activity, which in turn indicates a subject’s recognition of stimuli.¹⁷⁵ This indication is limited to isolated facts that the subject either has or has not had first-hand

<http://www.amazingkreskin.com/biography/> (last visited May 10, 2012).

167. See generally Dennis O’Brien, *Mind Readers: Scanning Technology Promises to Map the Brain’s Pathways, but Some Fear Its Ability to Expose a Patient’s Secrets and Lies*, BALTIMORE SUN, Dec. 10, 2004, at 1E; *The Brain Tumor Center*, MASSACHUSETTS GENERAL HOSPITAL, <http://brain.mgh.harvard.edu/btc.htm> (last visited May 10, 2012) (stating that the brain continues to be “the least understood organ in the human body”).

168. See Donald Kennedy, *Neuroimaging: Revolutionary Research Tool or a Post-Modern Phrenology?*, 5 AM. J. BIOETHICS 19 (2005).

169. *Id.*

170. Martha J. Farah & Paul Root Wolpe, *Monitoring and Manipulating Brain Function: New Neuroscience Technologies and Their Ethical Implications*, HASTINGS CENTER REP., May-June 2004, at 35, 40, available at http://repository.upenn.edu/cgi/viewcontent.cgi?article=1006&context=neuroethics_publications.

171. See Jeffrey Rosen, *Roberts v. the Future*, N.Y. TIMES, Aug. 28, 2005, at 3, available at <http://www.nytimes.com/2005/08/28/magazine/28ROBERTS.html?pagewanted=1> (discussing Brain Fingerprinting and fMRI how it relates to the right to privacy).

172. Kittay, *supra* note 152, at 1351; see *60 Minutes*, *supra* note 164.

173. Reese, *supra* note 57, at 205.

174. See Craig E. L. Stark & Larry R. Squire, *Functional Magnetic Resonance Imaging (fMRI) Activity in the Hippocampal Region During Recognition Memory*, 20 J. NEUROSCIENCE 7776, 7776 (2000) (explaining fMRI procedure).

175. See Stark & Squire, *supra* note 174; “Interview” *supra* note 165 (explaining “Brain Fingerprinting”); John D. E. Gabrieli, *Functional Neuroimaging of Episodic Memory*, in HANDBOOK OF FUNCTIONAL NEUROIMAGING OF COGNITION 262 (Roberto Cabeza & Alan Kingstone eds., 2d ed. 2001) (providing a detailed explanation of neuroimaging and brain scanning).

experience with.¹⁷⁶ Rather than mindreading, it is more realistic to compare these procedures with other investigative methods used to match a set of collected facts to a subject's physical characteristics, like fingerprinting.¹⁷⁷

2. NEUROIMAGING CAN DETECT LIES, BUT IS NOT A POLYGRAPH

The second myth is that neuroimaging procedures are advanced lie detectors or polygraphs.¹⁷⁸ People have long been fascinated with the idea of detecting deception,¹⁷⁹ and many have claimed that advances in neuroscience are intended for just that purpose.¹⁸⁰ Statements claiming the "brain test could be [the] next polygraph"¹⁸¹ and private companies, with names like No Lie MRI,¹⁸² have no doubt contributed to this misconception. However, even if forensic neuroimaging was used primarily to detect deception, the two technologies are still substantially different as they spring from different fields of science and use distinguishable methodologies.¹⁸³

The polygraph was designed to detect deception through inquiry and is dependent on physiological measurements correlated with anxiety.¹⁸⁴ These include perspiration, heart rate, respiration, and blood pressure.¹⁸⁵ The idea is that when forced

176. See "Interview," *supra* note 165 (explaining "Brain Fingerprinting").

177. See "Interview," *supra* note 165 (explaining "Brain Fingerprinting").

178. See generally Reese, *supra* note 57 (comparing polygraphs to neuroimaging).

179. E.g., C. COLLODI, *THE ADVENTURES OF PINOCCHIO* (Candida Martinelli ed., Carol Della Chiesa trans., 1883) (the fictional character whose nose grew when he lied); Adi Narayan, *The fMRI Brain Scan: A Better Lie Detector?*, TIME (July 20, 2009), available at <http://www.time.com/time/health/article/0,8599,1911546-2,00.html>; see Stoller & Wolpe, *supra* note 25, at 359.

180. Robin Marantz Henig, *Looking for the Lie*, N.Y. TIMES, Feb. 5, 2006, § 6, at 47 (drawing analogy between polygraphs and neurotechnology).

181. Tom Paulson, *Brain Test Could Be Next Polygraph*, SEATTLE PI (Sept. 14, 2008), available at http://www.seattlepi.com/local/379082_brainwave15.html (claiming neuroscience is the next step for the polygraph).

182. See NO LIE MRI, <http://www.noliemri.com> (last visited May 10, 2012).

183. See Sean Kevin Thompson, *A Brave New World of Interrogation Jurisprudence?*, 33 AM. J.L. & MED. 341, 341-42 (2007) (discussing the development of the polygraph). See also Hamilton, *supra* note 42, at 78 (explaining the development of the fMRI); Faye Flam, *Your Brain May Soon Be Used Against You*, PHILA. INQUIRER, Oct. 29, 2002, at A01.

184. See *The History and Basic Facts of Polygraph*, AACHEN POLYGRAPH ASSOCIATES, <http://www.polygraphexaminer.com/polygraph-history.html> (last visited May 10, 2012).

185. See Kittay, *supra* note 152, at 1361-62.

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to answer probing questions, a subject will naturally be more anxious when he is lying, and testing will indicate this anxiety.¹⁸⁶ Significantly, research has shown that these measurements are not directly related to deception, but are simply the results of the anxiety *most* subjects experience when they are attempting to deceive.¹⁸⁷ This research has led many to try to “beat” polygraphs by manipulating stress levels so that test results are inconsistent.¹⁸⁸ One common way participants accomplish this is by placing a thumb tack inside of their shoes and pressing down on it randomly throughout the procedure.¹⁸⁹ This in theory tricks the body and skews anxiety readings, which in turn produces unreliable results. Due to these inconsistencies, the use of polygraphs in criminal proceedings has been widely unaccepted¹⁹⁰ and mocked as being little more than “the toss of a coin.”¹⁹¹

While scientists have used inquiry-based fMRI to detect deception,¹⁹² this use is fundamentally distinguishable in methodology and science. FMRI is founded in neurological observations of brain activity and blood flow, neither of which is subject to anxiety levels.¹⁹³ This is because they are not

186. “Interview,” *supra* note 165 (explaining the difference between “Brain Fingerprinting” and polygraphs).

187. *The Polygraph and Lie Detection*, NAT’L RES. COUNCIL 212 (Nat’l Academies Press 2003), available at http://www.nap.edu/openbook.php?record_id=10420&page=212.

188. Emily Yoffe, *Can I Beat a Lie Detector?*, SLATE MAGAZINE, Jan. 27, 2005, available at <http://www.slate.com/id/2112734/> (discussing various methods used to cause error in the results of a polygraph).

189. Gary T. Marx, *A Tack in the Shoe and Taking Off the Shoe: Neutralization and Counter-neutralization Dynamics*, SURVEILLANCE AND SOCIETY (2009), <http://web.mit.edu/gtmarx/www/shoe.pdf>.

190. See Kittay, *supra* note 152, at 1361-62; John C. Bush, *Warping the Rules: How Some Courts Misapply Generic Evidentiary Rules to Exclude Polygraph Evidence*, 59 VAND. L. REV. 539, 542-52 (2006) (highlighting some courts’ efforts to find polygraph evidence inadmissible). See also *United States v. Scheffer*, 523 U.S. 303 (1998) (holding the exclusion of polygraph evidence does not violate the Sixth Amendment right to present a defense).

191. *United States v. Cordoba*, 991 F. Supp. 1199, 1203 (C.D. Cal. 1998).

192. Luis Hernandez et al., *Temporal Sensitivity of Event-Related fMRI*, 17 NEUROIMAGE 1018, 1025 (2002) (discussing the fMRI ability to recognize brain activity required for deception).

193. See generally Steven D. Forman et al., *Improved Assessment of Significant Activation in Functional Magnetic Resonance Imaging (fMRI): Use of a Cluster-Size Threshold*, 33 MAGNETIC RESONANCE MED. 636 (1995) (explaining the alternate uses of fMRI). See also Dan Eggen & Shankar Vedantam, *Polygraph Results Often in Question—CIA, FBI Defend Test’s Use in Probes*, WASH. POST, May 1, 2006, at A1 (pointing out the effect of the examiner in a polygraph).

measuring the secondary products of the anxiety associated with lying.¹⁹⁴ They are measuring primary brain activity, and even when used to detect deception, they are identifying it while it is occurring, rather than taking note of its after effects.¹⁹⁵

Typically, forensic neuroimaging is not inquiry-based.¹⁹⁶ In other words, there are no probing questions and no requests for formulated responses.¹⁹⁷ Everything needed for the procedure is provided without any chosen response by the subject. Much like a photograph or DNA trace, the procedures provide evidence of a person's experience at a specific location, and that evidence may contradict the testimony provided.¹⁹⁸ However, a procedure is not a new and improved polygraph just because it produces evidence that shows a person's testimony to be false.¹⁹⁹ Nor is it a polygraph because like a blood test, fingerprint, or writing sample, it was taken from a suspect's person.²⁰⁰ Forensic neuroimaging is the new polygraph only if polygraph is defined so broadly that it encompasses any method which assesses an individual's truthfulness based on physical examination.²⁰¹ Without this comprehensive definition, neuroimaging procedures cannot be coined the next step for the polygraph, but simply, the next step in collecting facts.

3. RESPONDING TO THE MISAPPLICATION OF THE PRIVILEGE

Apart from misclassifications of the science, legal scholars have misapplied the scope of the privilege in three primary ways. First, they have claimed that neuroimaging is the functional

194. See "Interview," *supra* note 165.

195. See Kittay, *supra* note 152, at 1361-62. See also Hamilton, *supra* note 42 (explaining the neurological roots of fMRI); *Who's the Liar? Brain MRI Stands Up to Polygraph Test*, RSNA Press Release, RADIOLOGICAL SOC'Y OF NORTH AMERICA (Jan. 31, 2006), http://www.rsna.org/media/pressreleases/pr_target.cfm?ID=273.

196. See Barillare, *supra* note 25, at 976.

197. See Kittay, *supra* note 152, at 1361-62. This detail may seem minute, but as explained in Section III, it is particularly important in the analysis of whether privilege applies.

198. See generally Amy Harmon, *Taking a Peek at the Experts' Genetic Secrets*, N.Y. TIMES, Oct. 19, 2008, available at http://www.nytimes.com/2008/10/20/us/20gene.html?_r=1&ref=dnaage (discussing the general uses of DNA testing).

199. *E.g.*, Paulson, *supra* note 181 (claiming neuroscience is the next step for the polygraph).

200. See Bush, *supra* note 190.

201. See Thompson, *supra* note 183 (following the development and purposes of the polygraph).

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equivalent of an inquisitorial system, like “the Cruel Trilemma” compelling a “yes” or “no” answer from the defendant. Second, relying on the dicta in *Schmerber*, they have argued that the spirit of the Fifth Amendment is invoked by forensic neuroimaging. Third, they have argued that privacy, under the privilege, protects information extracted from the mind. This subsection will address each of these before concluding.

Some scholars have asserted that submitting to a forensic neuroimaging procedure is essentially getting the same results as asking the suspect questions through an inquisitorial system like that of “the Cruel Trilemma.”²⁰² The Court in *Muniz* addressed a similar contention when it identified the question relevant for determining the scope of privilege. The State claimed that the determination turned on the results;²⁰³ the end justified the means. The argument is converted by the scholars to say that the end disqualifies the means. However, as stated by the Court, however, “[t]his characterization addresses the wrong question”²⁰⁴ The pertinent question has nothing to do with what the results are; rather, it is about the process: “[D]oes a chosen response give rise to the evidence?” In *Muniz*, the defendant’s chosen response gave rise to the inference that he was under the influence, so the answer was yes, and the evidence was prohibited. Here, a subject cannot choose a response, so the answer is no, and the privilege does not apply.

It has also been argued that the polygraph dictum from *Schmerber* refers to procedures like forensic neuroimaging.²⁰⁵ Specifically, “[t]o compel a person to submit to testing in which an effort will be made to determine his guilt or innocence on the basis of physiological responses, whether willed or not, is to evoke the spirit and history of the Fifth Amendment.”²⁰⁶ However, there are several reasons the application of privilege cannot turn on this dictum. First, polygraphs, the testing the Court was referring to, are distinguishable from neuroimaging. Polygraphs

202. Matthew B. Holloway, *One Image, One Thousand Incriminating Words: Images of Brain Activity and the Privilege Against Self-Incrimination*, 27 TEMP. J. SCI. TECH. & ENVTL. L. 141 (2008).

203. *Pennsylvania v. Muniz*, 496 U.S. 582, 587 (1990).

204. *Id.*

205. *Schmerber v. California*, 384 U.S. 757, 764 (1966).

206. *Id.* at 757. Some legal scholars have relied on this dictum when determining whether forensic neuroimaging results are “testimonial.” See, e.g., Holloway, *supra* note 202.

require inquiry-based testing. Neuroimaging does not. A subject does not have to formulate an answer or choose a response during neuroimaging, while a subject does have to during a polygraph. This is significant because the Court has never held that any procedure that does not require a chosen response is within the scope of the privilege.

Additionally, as noted above, the science is different. The dictum considers “physiological responses,” but neuroimaging does not rely on physiological responses. The responses used in neuroimaging are neural-network and blood-level responses. These responses are more like those that occur in the blood during a blood test. They are not changed by a subject’s anxiety. Whether he is anxious or not, his past perceptions do not change; therefore, the results will not change unlike those produced by a polygraph.

Moreover, the Supreme Court’s subsequent jurisprudence has not considered the *Schmerber* dictum in applying the privilege to any other investigative method because it was not the Court’s holding. It was simply an identification of vulnerabilities to a new rule the heavily divided Court had just carved out distinguishing between testimonial and physical evidence. It was highly criticized by the dissent in the case and never adopted despite numerous opportunities. Therefore, to apply the privilege to neuroimaging in contradiction of forty-five years of doctrinal development to satisfy the dictum in *Schmerber* is unjustified.

Lastly, a universal lack of understanding in the organ being examined during neuroimaging—the brain—has led several scholars to articulate privacy concerns that they claim can be remedied by applying privilege. This may be so, but the concern is misplaced. Privacy is no longer consequential to the application of privilege.²⁰⁷ Thus, whether neuroimaging examines the brain, diary, or blood, the target of the study is irrelevant for the application of privilege as long as the process of collection is proper.²⁰⁸ As long as the production of the evidence lacked a testimonial act, even the most personal information compelled from a defendant would still be beyond the scope of the privilege.²⁰⁹ Limits to government intrusions based on privacy

207. *Doe v. United States*, 487 U.S. 201, 206 (1988).

208. *See Fisher v. United States*, 425 U.S. 391, 399 (1976).

209. *Doe*, 487 U.S. at 206

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are no longer found in the privilege, but notably, other constitutional provisions can still be used.²¹⁰

V. CONCLUSION

Two policy concerns apply to the application of the privilege to neuroscience. First, when applying a constitutional right or privilege, all of the Court’s constitutional commitments, e.g., the history, underlying purpose, structural integrity, and doctrinal consistency, must be taken into account. A fear of “sinister uses” alone should not modify the Clause’s application. The privilege’s line of autonomy, which can never be balanced away by circumstance, should not be made subject to such a test, as it was not intended to provide more autonomy one day and less the next. Its value is in its consistency and how it absolutely protects the individual from historical abuses.

Second, neuroimaging will advance accuracy and efficiency in criminal justice. Every such advancement, from fingerprinting and blood tests to lie detectors and DNA testing, has met opposition, declaring the possible abuses.²¹¹ But among them, the Supreme Court has only applied a per se bar, like privilege, to methods proven unreliable or painfully intrusive.²¹² Forensic neuroimaging is painless, non-invasive, and is making progress in reliability.²¹³ Therefore, to advocate for a per se ban by applying the privilege to a procedure that will reliably advance accuracy in criminal justice without painful intrusion is inconsistent with the

210. For example, the Fourth Amendment protects individual privacy but can be balanced away through circumstances and legislation requiring a certain level of suspicion be present before a suspect can be compelled to participate in neuroimaging. This is a more efficient method of limiting intrusion because to apply the privilege would per se bar its compelled use no matter the circumstance. Further, neuroimaging may also be subject to challenge under the Due Process Clause according to *Rochin v. California*, 342 U.S. 165 (1952) (holding that stomach pumping “shocks the conscience” and therefore, violates the Due Process Clause).

211. *United States v. Scheffer*, 523 U.S. 303 (1998).

212. *Pennsylvania v. Muniz*, 496 U.S. 582, 596 (1990); *Ulmann v. United States*, 350 U.S. 422, 428 (1956).

213. See generally *United States v. Semrau*, No. 07-10074 MI/P, 2010 WL 6845092 (W.D. Tenn. June 1, 2010) (considering the admission of fMRI results in a criminal proceeding after a thorough examination of the procedure and its reliability); Anand Giridharadas, *India’s Use of Brain Scans in Courts Dismays Critics*, N.Y. TIMES, Sept. 14, 2008,

<http://www.nytimes.com/2008/09/15/world/asia/15iht-15brainscan.16148673.html> (explaining that a judge in India cited a brain scan as proof that the suspect’s brain held “experiential knowledge” about a murder before sentencing her to life in prison).

Supreme Court's jurisprudence, favoring advancement. Therefore, to maintain consistent constitutional application, uphold historical values and structural integrity, and welcome advancements that limit abuses, forensic neuroimaging should be classified as non-testimonial evidence beyond the scope of the privilege against self-incrimination.

Aaron J. Hurd

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APPENDIX A: COMPLETE TESTIMONIAL FRAMEWORK

