Hastings Law Journal

Volume 63 | Issue 6 Article 8

8-2012

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Notes

The Government Can Read Your Mind: Can the Constitution Stop It?

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Functional Magnetic Resonance Imaging ("fMRI") technology produces a four-dimensional map of brain activity, such as perception, memory, emotion, and movement. fMRI scans track the flow of blood to the various regions of the brain in real time and reveal the subject's response to particular stimulus. For example, an fMRI scan might reveal blood flow to a subject's memory center in response to a picture of the house in which she was raised. On the one hand, this technology seems to produce a model of a physical attribute and offer insight into the workings of the human brain. On the other, fMRI scans seem to read our minds and disclose our thoughts. The full range of applications of fMRI technology is just emerging, but proponents have already sought its admission in court as a type of lie detector or credibility builder. If fMRI scans are incorporated into the government's investigatory process, constitutional safeguards should be in place to protect the fundamental right of privacy and an individual's freedom to decide whether to assist the state. This Note proposes that the results of fMRI scans are testimonial evidence: first, because the scans reveal the subject's knowledge or beliefs, and second, because this classification ensures that fMRI scan results are afforded the protection of the Fifth Amendment. If fMRI scans are privileged under the Fifth Amendment, the government cannot compel an individual to submit to the scan and reveal the contents of her mind.

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Introduction

In George Orwell's novel *Nineteen Eighty-Four*, the Thought Police monitor the thoughts of citizens, trolling for any hint of forbidden viewpoints.[1] In 2012, functional Magnetic Resonance Imaging ("fMRI") of the brain may accomplish similar ends. Developed to aid cognitive neuroscientists in understanding which parts of the human brain are responsible for functions such as memory, speech, and perception, fMRI brain scans are able to track, in real time, the flow of blood to the various parts of the brain.[2] The fMRI scan's ability to reveal neural substrates of perception, emotion, and movement, as opposed to mere structure, differentiates fMRI from other brain imaging techniques like the CT scan.[3] The imaging reveals the distinct areas to which the subject's blood flows "when making a movement, thinking of a loved one, or telling a lie."[4]

Although fMRI was developed for diagnostic purposes, its future use has the potential to be more far-reaching. Some private firms already offer fMRI brain scans to clients who seek risk definition, fraud detection, or more accurate consumer research.[5] In addition, the Defense Advanced Research Projects Agency, a primary innovation engine of the Department of Defense, is also investigating the uses of fMRI brain scans.[6]

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1. *See generally* George Orwell, Nineteen Eighty-Four (2011).

2. *See generally* Scott A. Huettel et al., Functional Magnetic Resonance Imaging (2d ed. 2008).

3. Richard Robinson, *fMRI Beyond the Clinic: Will It Ever Be Ready for Prime Time?*, 2 PLoS Biology 715, 715 (2004).

4. *Id.*

5. *See, e.g.*, No Lie MRI, Inc., http://noliemri.com/customers/Overview.htm (last visited July 1, 2012); Mindsign Neuromarketing, http://mindsignonline.com/ (last visited July 1, 2012).

6. DARPA's budgets for fiscal years 2007–2010 list projects involving fMRI. Def. Advanced Research Projects Agency, Department of Defense Fiscal Year (FY) 2010 Budget Estimates: Research, Development, Test and Evaluation, Defense-Wide: Vol. I—Defense Advanced Research Projects Agency 213–15 (2009); Def. Advanced Research Projects Agency.

In a post-9/11 world, where the boundaries of personal liberty are in constant tension with the goals of national security, it is easy to envision the governmental use of fMRI brain scans as a quick and efficient way of identifying terror suspects.[7] This Note addresses whether the use of fMRI brain scanning in the investigatory process triggers safeguards sufficient to protect an individual's constitutional rights.[8] Specifically, given the nuanced information revealed by the scans, would this type of evidence constitute testimony and warrant *Miranda* warnings and the protection of the Fifth Amendment? Conversely, would the results of an fMRI scan be mere physical evidence that is untethered from constitutional protections and able to be compelled of any government detainee?

I. LIE BACK, RELAX, AND LET US EXTRACT YOUR TESTIMONY

fMRI maps human brain function by measuring the brain's blood flow and oxygenation in conjunction with mental operations.[9] Like traditional magnetic resonance imaging, a magnet causes molecules of the subject's body, mainly hydrogen, to align with a magnetic field.[10] Each mental process, from movement to speech to perception, corresponds to an increased flow of blood to particular areas in the brain.[11] This blood carries more oxygen, which stimulates the magnetic properties of the region and increases the signal that the magnetic resonance imaging machine can detect.[12] The fMRI is distinguishable from traditional magnetic resonance imaging technology, such as CT scans, because it

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DEPARTMENT OF DEFENSE FISCAL YEAR (FY) 2009 BUDGET ESTIMATES: RESEARCH, DEVELOPMENT, TEST AND EVALUATION, DEFENSE-WIDE: VOL. I—DEFENSE ADVANCED RESEARCH PROJECTS AGENCY 14–15 (2008). DARPA also funded a study that resulted in the 2005 publication *Telling Truth from Lie in Individual Subjects with Fast Event-Related fMRI*. Daniel D. Langleben et al., *Telling Truth from Lie in Individual Subjects with Fast Event-Related fMRI*, 26 HUM. BRAIN MAPPING 262, 271 (2005).

7. In 2006, the American Civil Liberties Union filed Freedom of Information Act requests with the Pentagon, National Security Agency, Central Intelligence Agency, Federal Bureau of Investigation, and Department of Homeland Security to determine whether and how the agencies planned to use technologies such as fMRI brain scans. *ACLU Seeks Information About Government Use of Brain Scanners in Interrogations*, AM. CIVIL LIBERTIES UNION (June 28, 2006), http://www.aclu.org/technology-and-liberty/aclu-seeks-information-about-government-use-brain-scanners-interrogations.

8. This Note considers the implications of admitting fMRI brain scans into court. It should be noted that fMRI brain scans have not yet been deemed reliable under Federal Rule of Evidence 702, and they must satisfy the *Frye* and/or *Daubert* tests for admissibility of scientific evidence. *See* Frye v. United States, 293 F. 1013, 1014 (D.C. Cir. 1923); Daubert v. Merrell Dow Pharm., Inc., 509 U.S. 579, 589–92 (1993).

9. *See generally* HEUTTEL ET AL., *supra* note 2.

10. Edson Amaro Jr. & Gareth J. Barker, *Study Design in fMRI: Basic Principles*, 60 BRAIN & COGNITION 220, 221 (2006).

11. Randy L. Buckner & Jessica M. Logan, *Functional Neuroimaging Methods: PET and fMRI*, *in* HANDBOOK OF FUNCTIONAL NEUROIMAGING OF COGNITION 27, 28 (Roberto Cabeza & Alan Kingstone eds., 2001).

12. *Id.*; N.F. Ramsey et al., *Functional MRI Experiments: Acquisition, Analysis and Interpretation of Data*, 12 EUROPEAN NEUROPSYCHOPHARMACOLOGY 517, 519 (2002).

produces a four-dimensional map of brain activity.[13] For example, in response to particular stimuli, such as photographs, the recitation of facts, or questioning, the fMRI tracks the real-time flow of blood to the various regions of the brain responsible for each mental activity.[14] This tracking results in an fMRI scan that reveals which mental process a subject has in response to each stimulus. The real-time scan of a brain perceiving new information looks different than a scan of a brain remembering or perceiving information with which it is familiar.[15] In other words, if a particular subject is shown a photograph of a person who is unknown to the subject, the brain scan will look different than it would if the subject knows the person.

The fMRI has the potential to become an advanced and reliable polygraph test.[16] Although the reliability of fMRI scans may not yet meet the standard under Federal Rule of Evidence 702,[17] investigating the potential constitutional implications of their use is still imperative.[18] The constitutional rights implicated by fMRI scans, especially the protection

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13. Buckner & Logan, *supra* note 11, at 32 (noting that images of the whole brain can be acquired in two seconds); Ramsey et al., *supra* note 12, at 518 ("The series of scans is stored as a time-series of 3D volumes . . . .").

14. Buckner & Logan, *supra* note 11, at 32–33 (discussing options for study designs and corresponding efficacies).

15. Most often, the fMRI scans are run in batches and are used for comparative purposes. Matthew Baptiste 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, 148 (2008). Sometimes scans of different subjects are compared to study differences in brain activity between different groups of subjects. *Id.* "[M]eaningful results," however, "have been detected on the single-subject level. . . . [and fMRI can] be a useful tool for the forensic analysis of criminal suspects." *Id.*

16. *See generally* Sean Kevin Thompson, *A Brave New World of Interrogation Jurisprudence?*, 33 AM. J.L. & MED. 341 (2007) (analyzing the constitutional issues implicated by fMRI technology and arguing for a cautious approach in admitting fMRI evidence due to its privacy implications).

17. The use of fMRI scans in litigation is limited because of the novelty of the technology. As the Court noted in *Daubert* and as is reflected in the amended Federal Rule of Evidence 702, to be admissible the fMRI must prove a reliable application to the facts of the case. FED. R. EVID. 702; Daubert v. Merrell Dow Pharm., Inc., 509 U.S. 579, 593–94 (1993). For example, in *United States v. Saelee*, the District Court of Alaska excluded testimony by a handwriting expert because, although the expert could identify undisguised handwriting, the evidence failed to show that the handwriting at issue was in fact undisguised and unaltered, and the proponent offered no evidence as to how any disguise or variation might have affected the expert's error rate. 162 F. Supp. 2d 1097, 1104 (D. Alaska 2001). In *Entertainment Software Ass'n v. Blagojevich*, the state was allowed to admit results of an fMRI scan in an attempt to demonstrate how exposure to media violence—namely, the violent video games at issue in that case—affects brain activity. 404 F. Supp. 2d 1051, 1064 (N.D. Ill. 2005). Conversely, in *United States v. Semrau*, a magistrate judge excluded an fMRI scan offered to bolster the credibility of a testifying witness and to demonstrate that he did not commit fraud because it did not satisfy the requirements of Federal Rule of Evidence 702. No. 07-1004 M1/P, 2010 WL 6845092, at *16 (W.D. Tenn. June 1, 2010). The *Semrau* judge rejected the fMRI scan specifically because it found that the error rate of real-world applications could not be calculated based on fMRI use in laboratories. *Id.* at *10–11.

18. Thompson, *supra* note 16, at 342–44.

against self-incrimination, are weighty enough to tip the balance in favor of a preemptive analysis of the admissibility of fMRI scans.[19] The Supreme Court has noted time and again that the purpose of the Fifth Amendment is to protect the privacy inherent in the workings of an individual's mind.[20] History has taught that without this essential privilege a government can abuse its powers and seek to use force, threats, and pressure to obtain information that would not have been voluntarily given.[21] The evidence gleaned from excessive interrogatory pressure undermines the reliability of the judicial process.[22] Thus, procedural and constitutional safeguards are essential to ensure the efficacy of our court system. It is imperative that we continue to evaluate the applicability and sufficiency of these safeguards as technology advances.

II. Brain Scans and the Constitution

> A defendant can be compelled to produce material evidence that is incriminating. Fingerprints, blood samples, voice exemplars, handwriting specimens, or other items of physical evidence may be extracted from a defendant against his will. But can he be compelled to use his mind to assist the prosecution in convicting him of a crime? I think not.
>
> —Justice John Paul Stevens[23]

Because an fMRI brain scan reveals the mental reaction of a subject in response to a particular stimulus—for example, recognition in response to a picture—the scan necessarily implicates an individual's right not to reveal that information, the fact of the recognition. The Supreme Court has consistently affirmed the Fifth Amendment's provision that no person shall be compelled to be a witness against himself.[24] The Fifth Amendment is designed to insulate individuals from the "cruel trilemma" of self-incrimination, perjury, or contempt in the face of interrogatory pressure by the state.[25] This fundamental privilege protects citizens from torture and compulsion during interrogation.[26] Devices that enable the government to access information that would ordinarily have to be offered voluntarily by an individual allow the government to circumvent this integral protection.

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19. *Id.* at 344.

20. *See, e.g.*, Pennsylvania v. Muniz, 496 U.S. 582, 596 (1990); Miranda v. Arizona, 384 U.S. 436, 460 (1966); Curcio v. United States, 354 U.S. 118, 128 (1957).

21. *See* Couch v. United States, 409 U.S. 322, 327 (1973) ("Historically, the privilege sprang from an abhorrence of governmental assault against the single individual accused of crime and the temptation on the part of the State to resort to the expedient of compelling incriminating evidence from one's own mouth.").

22. *See generally Miranda*, 384 U.S. 436.

23. Doe v. United States (*Doe II*), 487 U.S. 201, 219 (1988) (Stevens, J., dissenting); *see also* United States v. Hubbell, 530 U.S. 27, 34–38 (2000).

24. *See, e.g.*, U.S. Const. amend. V; *Doe II*, 487 U.S. at 210.

25. *Muniz*, 496 U.S. at 597.

26. *Couch*, 409 U.S. at 327.

It is imperative, therefore, that the law progress as quickly as technology advances.

The Supreme Court's landmark decision in *Miranda v. Arizon*a established a respect for "the inviolability of the human personality" that "demands that the government seeking to punish an individual produce the evidence against him by its own independent labors."[27] In *Schmerber v. California*,[28] the Supreme Court held that the Fifth Amendment protects the accused from testifying against himself or providing the state with "evidence of a testimonial or communicative nature," unless the government provides appropriate constitutional safeguards.[29] Evidence that is protected under the Fifth Amendment requires the prophylactic *Miranda* warning, which can only be waived voluntarily, knowingly, and intelligently, so that the "inherently compelling pressures" of interrogation do not "undermine the individual's will to resist . . . [or] compel him to speak where he would not otherwise do so freely."[30] However, the Fifth Amendment, and therefore *Miranda*, only protects evidence that is (1) testimonial, (2) compelled, and (3) incriminating.[31] fMRI scans blur the lines of traditional evidentiary distinctions and, in so doing, call into question the effectiveness of these safeguards.

A. A Cruel Trilemma

The fMRI brain scan produces testimonial evidence because it forces the participant "to disclose the contents of his own mind" and to reveal incriminating information.[32] The nature of the evidence revealed by fMRI brain scans differentiates it from mere physical evidence. Physical evidence is limited to "an identifying physical characteristic" of an individual, such as a handwriting exemplar, a blood sample, or fingerprint.[33] Physical evidence is distinct from testimonial evidence and

27. 384 U.S. at 460.

28. 384 U.S. 757 (1966) (holding that the compulsion of a blood test in a hospital from a seemingly intoxicated driver did not involve any testimonial compulsion or forced communication by the driver and therefore did not infringe upon his Fifth Amendment right).

29. *Id.* at 761.

30. *Miranda*, 384 U.S. at 467.

31. This dispositive, three-prong test was promulgated by the Supreme Court in *Doe v. United States (Doe II)*. 487 U.S. 201, 207 (1987). The Court has since applied it consistently when analyzing whether evidence is testimonial in nature and thus privileged under the Fifth Amendment. *See, e.g.*, Hiibel v. Sixth Jud. Dist. Ct., 542 U.S. 177, 189 (2004) ("[T]he Fifth Amendment privilege against self-incrimination applies to acts that imply assertions of fact."); United States v. Hubbell, 530 U.S. 27, 34–38 (2000) ("[T]o be testimonial, an accused's communication must itself, explicitly or implicitly, relate a factual assertion or disclose information.").

32. Curcio v. United States, 354 U.S. 118, 128 (1957). For a discussion of why fMRI brain scans constitute incriminating evidence, *see infra* Part II.C.

33. Gilbert v. California, 388 U.S. 263, 267 (1967); *Schmerber*, 384 U.S. at 764.

not afforded the protections of the Fifth Amendment because physical evidence does not communicate personal beliefs or knowledge of facts.[34]

In *Schmerber v. California*, the Supreme Court discussed the admissibility of a blood sample, taken in a hospital, which showed the patient-driver's blood alcohol level was above the state limit.[35] The defendant alleged that the admissibility of the analysis of the blood test violated his Fifth Amendment right against self-incrimination.[36] The Court noted that the driver's self-incrimination was irrelevant because the evidence consisted only of the chemical analysis of his blood and contained no testimony or communication.[37] The Court distinguished the physical nature of the blood sample from the communicative nature of testimonial evidence.[38] Relying on *Holt v. United States*, the Court found that the Fifth Amendment prohibition of compelled communication does not preclude using the "body as evidence when it may be material," and to hold otherwise would "forbid a jury to look at a prisoner and compare his features with a photograph in proof."[39] Thus, in *Schmerber*, because the blood sample was material to the issue in dispute, contained no testimonial component, and was merely a physical sample of the driver, it did not implicate the protections of the Fifth Amendment. The Court recognized that federal and state courts had declined to extend the Fifth Amendment 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."[40] Ultimately, the Court distinguished communication and testimony, the latter being privileged from "compulsion which makes a suspect or accused the source of 'real or physical evidence.'"[41]

Just a year after *Schmerber*, the Court again analyzed how physical evidence is distinct from testimony and why it is not afforded the protections of the Fifth Amendment.[42] In *United States v. Wade*, the defendant argued that having to stand in a lineup and speak words heard by witnesses to a robbery violated his Fifth Amendment right against

34. Pennsylvania v. Muniz, 496 U.S. 582, 597 (1990) (citing *Doe II*, 487 U.S. at 210–11).

35. 384 U.S. at 758–59.

36. *Id.* at 759. The defendant also raised other constitutional issues, but those are not relevant to the current inquiry.

37. *Id.* at 765.

38. *Id.* at 761.

39. *Id.* at 763 (quoting Holt v. United States, 218 U.S. 245, 252–53 (1910)). In *Holt*, the Court found that the defendant's Fifth Amendment rights were not violated when he was compelled to put on a blouse to see if it fit. *Holt*, 218 U.S. at 252–53.

40. *Schmerber*, 384 U.S. at 764.

41. *Id.*

42. *See generally* Gilbert v. California, 388 U.S. 263 (1967); United States v. Wade, 388 U.S. 218 (1967).

self-incrimination.[43] The Court noted that the lineup was an analysis of a physical feature of the defendant's body, identification of which was material to the case.[44] Relying on *Holt* and *Schmerber*, the Court found that compelling the defendant to speak the words purportedly uttered by the robber—in essence to give a sample of his voice—did not constitute government compulsion of testimony.[45] Rather, Wade was merely "required to use his voice as an identifying physical characteristic."[46]

In *Gilbert v. California*, the prosecution admitted samples of the defendant's handwriting into evidence.[47] On appeal, the defendant alleged that admitting his handwriting sample violated his Fifth Amendment rights.[48] The Court found that, although handwriting and speaking were modes of communicating, it did not follow that every compulsion of an accused to demonstrate his voice or handwriting compelled communication.[49] The defendant in *Gilbert* did not claim that the handwriting sample's content was testimonial, and the Court held that "a mere handwriting exemplar, in contrast to the content of what is written, like the voice or body itself, is an identifying physical characteristic" outside the purview of the Fifth Amendment.[50]

From *Holt* through *Wade*, *Gilbert*, and *Schmerber*, the Court has drawn a distinction between evidence that communicates content and evidence that is a physical characteristic used to identify the accused. Despite this seemingly clear rule, however, determining what evidence is privileged under the Fifth Amendment is not always simple. The Court addressed the substantial gray area between physical and testimonial evidence more recently in *Pennsylvania v. Muniz*.[51] There, the Court held that the slurred speech of a defendant who had been pulled over for allegedly driving drunk was not privileged under the Fifth Amendment and was admissible without *Miranda* warnings.[52] As in *Wade*, where a defendant was compelled to reveal the properties of his voice by speaking in front of witnesses,[53] the Court in *Muniz* found that the slurred speech and lack of muscular coordination revealed by the defendant's responses to questions were not testimonial components of those responses.[54] The

43. 388 U.S. at 220–21.
44. *Id.* at 222–23.
45. *Id.* at 221–22.
46. *Id.* at 222–23.
47. 388 U.S. at 266.
48. *Id.*
49. *Id.*
50. *Id.* at 266–67.
51. *See generally* 496 U.S. 582 (1990).
52. *Id.* at 590.
53. *Wade*, 388 U.S. at 222–23.
54. *Muniz*, 496 U.S. at 590–91.

Court drew a bright line between the manner in which a defendant speaks, which is neither testimonial nor entitled to protection under the Fifth Amendment, and the content of his speech, which is protected.[55] Thus, in order to determine whether evidence is physical or testimonial, we must look to whether the evidence is being offered to identify the defendant or to prove that the defendant communicated something in particular.

The Supreme Court has held that the Fifth Amendment protects "an accused's communications, whatever form they might take,"[56] when they relate to "express or implied assertions of fact or belief."[57] In *Doe v. United States* (*Doe II*), the Court addressed a circuit split and defined testimonial evidence protected by the Fifth Amendment.[58] In that case, the defendant was issued a court order to sign a consent form that would authorize two foreign banks to disclose whether he had accounts with them.[59] The defendant contended that the directive violated his Fifth Amendment right against self-incrimination.[60] In *Doe II*, however, the Court found that the directive did not implicate the Fifth Amendment because it merely authorized the bank to provide information and did not compel the defendant to disclose "any knowledge he might have."[61] The Court distinguished between requiring a defendant to authorize a third party to disclose information and requiring the defendant himself to reveal that information. In order for a defendant to successfully claim that evidence is testimonial, the evidence must expressly or impliedly disclose the defendant's knowledge or beliefs.

Similarly in *Muniz*, the defendant was asked a series of questions during a field sobriety test.[62] The Court determined that physical manifestations of his responses—including slurred speech and lack of muscle coordination—were not testimonial,[63] yet it held that the content of his responses was testimonial.[64] For example, the accused was asked if

55. *Id.* at 592.

56. Schmerber v. California, 384 U.S. 757, 763–64 (1966).

57. United States v. Hubbell, 530 U.S. 27, 35 (2000) (citing *Muniz*, 496 U.S. at 594–98); *see* Hiibel v. Sixth Jud. Dist. Ct., 542 U.S. 177, 189 (2004) (quoting Doe v. United States (*Doe II*), 487 U.S. 201, 210 (1988)).

58. 487 U.S. at 219. Before the Supreme Court granted certiorari, the Fifth Circuit, along with the Second and Eleventh Circuits, held that the Fifth Amendment is not implicated by a court order compelling consent to the disclosure of foreign bank records. *See In re* Doe, No. 86-2663, 812 F.2d 1404 (5th Cir. Feb. 13, 1987), *aff'd*, 487 U.S. 201; United States v. Davis, 767 F.2d 1025, 1039–40 (2d Cir. 1985); United States v. Ghidoni, 732 F.2d 814, 819 (11th Cir. 1984). Conversely, a divided panel of the First Circuit held that such an order violates the Fifth Amendment. *See In re* Grand Jury Proceedings, 814 F.2d 791, 793–96 (1st Cir. 1987).

59. *Doe II*, 487 U.S. at 203.

60. *Id.* at 207.

61. *Id.* at 217 (quoting United States v. Wade, 388 U.S. 218, 222 (1967)).

62. Pennsylvania v. Muniz, 496 U.S. 582, 585 (1990).

63. *Id.* at 592.

64. *Id.* at 598.

he knew the date of his sixth birthday, and the Court found that the "the trier of fact could infer from Muniz's answer (that he did not know the proper date) that his mental state was confused."[65] The Court made an important distinction between the physical characteristics of Muniz's speech and its content in determining what was protected under the Fifth Amendment: "The correct question for present purposes is whether the incriminating inference of mental confusion is drawn from a testimonial act or from physical evidence."[66] The Court in *Muniz* stated that the blood test in *Schmerber* fell outside the scope of the Fifth Amendment "not simply because the evidence concerned the suspect's physical body, but rather because the evidence was obtained in a manner that did not entail any testimonial act on the part of the suspect."[67]

Conversely, the defendant in *Muniz* was posed a question to which he formed a response. Relying on the line of cases that culminated in *Doe II*, the Court found that

> [t]he *Schmerber* line of cases does not draw a distinction between unprotected evidence sought for its physical characteristics and protected evidence sought for its [other] content. Rather, the Court distinguished between the suspect's being compelled himself to serve as evidence and the suspect's being compelled to disclose or communicate information or facts that might serve as or lead to incriminating evidence.[68]

Thus in *Muniz*, privilege under the Fifth Amendment turned not on whether the defendant's impaired faculties could "be characterized as an aspect of his physiology, but rather whether Muniz's response to the sixth birthday question that gave rise to the inference of such an impairment was testimonial in nature."[69] Because this question compelled Muniz to disclose his knowledge—or lack thereof—a fact, it fell squarely within the definition promulgated by the Court in *Doe II* and was found to be privileged.[70] The Court ordered Muniz's response suppressed, vacated the Pennsylvania state court's decision, and remanded for a new trial consistent with the Court's holding.[71]

The purpose of the Fifth Amendment is to prohibit the state from extracting "self-condemnation."[72] In *Curcio v. United States*, the Court noted that the privilege was implicated when the government attempted

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65. *Id.* at 592 (emphasis omitted).

66. *Id.* at 593.

67. *Id.* (emphasis omitted).

68. *Id.* at 594 n.7 (emphasis omitted) (quoting Doe v. United States (*Doe II*), 487 U.S. 201, 211 n.10 (1988)).

69. *Id.* at 593–94.

70. *Id.* at 594–95.

71. *Id.* at 605–06.

72. Couch v. United States, 409 U.S. 322, 327 (1973).

to compel an accused "to disclose the contents of his own mind."[73] In *Doe II*, the Court found that the purpose of the Fifth Amendment is satisfied "when the privilege is asserted to spare the accused from having to reveal, directly or indirectly, his knowledge of facts relating him to the offense or from having to share his thoughts and beliefs with the Government."[74] Even tests that are designed to measure involuntary physiological responses to interrogation may actually elicit results that are testimonial, and those must be afforded Fifth Amendment protection.[75] This recognition by the Court opens up other non-verbal forms of communication to protection under the Fifth Amendment.

In two cases involving document subpoenas, *United States v. Doe* (*Doe I*) and *Fisher v. United States*, the Court recognized that the act of producing subpoenaed documents, not in and of itself the making of a statement, might nonetheless invoke the Fifth Amendment.[76] Citing both *Doe I* and *Fisher*, the Court concluded in *Doe II* that, "by producing documents in compliance with a subpoena, the witness would admit that the papers existed, were in his possession or control, and were authentic," and in doing so would make an implicit statement of fact.[77] Thus, the Court stated "that the Fifth Amendment privilege against self-incrimination applies [equally] to acts that imply assertions of fact."[78] More recently, in *United States v. Hubbell*, the Court held that, separate from the content of the document in question, the relevant compelled testimony was "the testimony inherent in the act of producing those documents."[79] Following the line of reasoning established in *Doe I* and *Doe II*, *Fisher*, and *Schmerber*, the Court in *Hubbell* also recognized that a defendant's reaction to a subpoena constitutes testimony because it implies that the defendant knows about the existence of the documents in question.[80]

Nevertheless, it is important not to overemphasize the act of disclosing testimonial evidence. *Hubbell* does not establish a test for determining whether evidence is testimonial based on the process of

73. 354 U.S. 118, 128 (1957).

74. Doe v. United States (*Doe II*), 487 U.S. 201, 213 (1988).

75. Schmerber v. California, 384 U.S. 757, 764 (1966). The Court, in dicta, discussed the admissibility of polygraph tests and noted that the involuntary physiological reaction was inextricably tied to the communicative nature of the evidence. Although polygraph tests have generally fallen into disrepute, *Schmerber* exemplifies the Court's willingness to protect evidence that comprises both a communicative and physical response. *Id.*

76. United States v. Doe (*Doe I*), 465 U.S. 605, 613 (1984); Fisher v. United States, 425 U.S. 391, 394, 396 (1976).

77. *Doe II*, 487 U.S at 209.

78. *Id.*

79. 530 U.S. 27, 40 (2000).

80. *Id.* at 34–35.

gathering the information. *Hubbell*, along with *Fisher* and *Doe I*, only stands for the proposition that testimonial evidence is not limited to verbal utterances. As the Court stated in *Schmerber*, the Fifth Amendment protects testimonial communications, "whatever form they might take."[81] Further, as noted in *Muniz*, "nonverbal conduct contains a testimonial component whenever the conduct reflects the actor's communication of his thoughts to another."[82] What emerges from these cases is a definition of testimonial evidence comprised of a response by the accused that expressly or implicitly discloses his knowledge of facts. Therefore, the definition of testimonial evidence is not limited to speech or even to active, voluntary disclosures. If the definition of testimonial were "active" or "voluntary" disclosure of knowledge or belief, it would conflate the first prong—testimonial—with the second prong—compulsion—of the Supreme Court's three-part test. This cannot be what the Supreme Court intended for two reasons. First, because testimonial evidence offered voluntarily, even if incriminating, does not always require *Miranda* warnings.[83] Second, because even when *Miranda* warnings are properly administered, the Fifth Amendment still prohibits the admission of coerced or compelled testimony.[84]

The essential analysis to determine whether the content of fMRI brain scans is testimony and thus privileged under the Fifth Amendment is whether the content discloses the subject's "express or implied assertions of facts or beliefs."[85] fMRI brain scans cannot be categorized as physical evidence because the images the scans create are not mere "identifying characteristics." Rather, fMRI brain scan results communicate the mental reaction of the subject to particular stimuli in real time.[86] Physical changes in the oxygenation of blood in the brain in response to these stimuli cannot be separated from the information they

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81. Schmerber v. California, 384 U.S. 757, 763–64 (1966). "A nod or head-shake is as much a 'testimonial' or 'communicative' act in this sense as are spoken words." *Id.* at 761 n.5.

82. Pennsylvania v. Muniz, 496 U.S. 582, 595 n.9 (1990).

83. Illinois v. Perkins, 496 U.S. 292, 297–298 (1990) (holding that an inmate's voluntary disclosure of incriminating evidence to an undercover police officer he believed to be a fellow inmate did not violate the requirements of *Miranda*); Miranda v. Arizona, 384 U.S. 436, 478 (1966) (stating that outside of a custodial interrogation, volunteered "statements of any kind are not barred by the Fifth Amendment and their admissibility is not affected by [the] holding today").

84. *Compare* Dickerson v. United States, 530 U.S. 428, 434 (2000) (noting that even after *Miranda*, the voluntariness of a confession is an issue of due process, determined by assessing the totality of the circumstances), *with* Oregon v. Elstad, 467 U.S. 649, 670 (1984) ("Despite the fact that patently *voluntary* statements taken in violation of *Miranda* must be excluded from the prosecution's case, the presumption of coercion does not bar their use for impeachment purposes on cross-examination.").

85. *Hubbell*, 530 U.S. at 35 (citing *Muniz*, 496 U.S. at 594–98).

86. fMRI scans, which reveal mental reactions in real time, do not expose a mere "stagnant physical characteristic but a dynamic process whose unfolding communicates information." Holloway, *supra* note 15, at 170.

convey.[87] Without the subject's response, the fMRI scan would have nothing to reveal. Prior to this technology, the information the fMRI discloses would have been invisible and unobtainable unless affirmatively disclosed by the subject. By revealing a measure of the interior workings of the subject's brain, however, fMRI brain scans force the subject to take "the mental and physical steps necessary to provide . . . incriminating evidence."[88] Technology has advanced beyond the roughly hewn categories of "testimonial" and "physical" used to distinguish evidence protected by the Fifth Amendment from evidence that may be properly compelled with mere probable cause.[89] That technology is blurring this line, however, does not negate the fact that the fMRI scan communicates the subject's knowledge of facts. As the Court stated in *Schmerber*, 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."[90]

It is imperative that technology not outpace the fundamental protections afforded the accused. Constitutional standards, such as those provided by the Fifth Amendment, play a critical role in ensuring that evidence admitted in court is reliable and that defendants receive a full and fair trial. Advances in technology should not undermine these cardinal policies of our criminal justice system. Rather than continue to sort evidence into two bins, courts should consider whether the evidence is a response by the accused that expressly or implicitly discloses his knowledge of facts. If the answer to this question is yes, then the evidence should be privileged under the Fifth Amendment and require *Miranda* warnings to ensure that this evidence is not unwittingly surrendered.

B. Techniques of Persuasion

Compulsion is the second prong of the Supreme Court's test for determining whether evidence is afforded Fifth Amendment protection.[91]

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87. *Id.* at 172–73.

88. *Id.* at 172 (alteration in original) (quoting *Hubbell*, 530 U.S. at 42).

89. "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 measuring changes in body function during interrogation, may actually be directed to eliciting responses which are essentially testimonial. . . . Such situations call to mind the principle that the protection of the privilege is as broad as the mischief against which it seeks to guard." Schmerber v. California, 384 U.S. 757, 764 (1966) (internal citation omitted).

90. *Id.*

91. The Court laid the framework for this test in *Doe v. United States (Doe II)*, 487 U.S. 201, 207 (1987). The Court has since applied it consistently when analyzing whether evidence is testimonial in nature and thus privileged under the Fifth Amendment. *See, e.g.*, Hiibel v. Sixth Jud. Dist. Ct., 542 U.S. 177, 189 (2004) ("[T]he Fifth Amendment privilege against self-incrimination applies to acts that

In *Miranda*, the Supreme Court noted that evidence obtained while an individual is in police custody is presumed to have been compelled in the absence of prophylactic constitutional safeguards because of the "antagonistic forces" and "techniques of persuasion" frequently used in custodial interrogations.[92] The admissibility of evidence obtained after a person indicates he does not want to be interrogated turns on whether his request was "scrupulously honored."[93] In fact, if an individual indicates that he does not want to answer the government's questions, he must not be interrogated.[94] Compulsion is also found where, considering the circumstances of the interrogation, the free will of the witness has been oppressed.[95]

Today, fMRI brain scans are not portable and would presumably be administered only after an accused was in custody. Even though measuring the subject's mental response to stimuli with an fMRI scan is analogous to asking questions, it is not the same as, for example, the questions posed in *Muniz* and the defendant's verbal responses. In order to analyze the applicability of the compulsion prong of the Court's three-prong test, we must determine if and when a brain scan constitutes custodial interrogation. In *Rhode Island v. Innis*, the Court addressed the meaning of "interrogation" under *Miranda v. Arizona*.[96] In *Miranda*, the Court concluded that, in the context of custodial interrogation, certain procedural safeguards are necessary to protect an accused's Fifth and Fourteenth Amendment rights.[97] In that case, the Court broadly defined interrogation as "questioning initiated by law enforcement officers after a person has been taken into custody or otherwise deprived of his freedom of action in any significant way."[98] However, in *Innis*, the Court noted that the *Miranda* Court had been concerned not just with express questioning, but with "the 'interrogation environment' . . . [that] would 'subjugate the individual to the will of his examiner' and thereby undermine the privilege against compulsory self-incrimination."[99]

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imply assertions of fact."); United States v. Hubbell, 530 U.S. 27, 34–38 (2000) ("[T]o be testimonial, an accused's communication must itself, explicitly or implicitly, relate a factual assertion or disclose information.").

92. Miranda v. Arizona, 384 U.S. 436, 461 (1966); *see also In re* Gault, 387 U.S. 1, 47 (1967) ("One of [the Fifth Amendment's] purposes is to prevent the state, whether by force or by psychological domination, from overcoming the mind and will of the person under investigation and depriving him of the freedom to decide whether to assist the state in securing his conviction.").

93. Michigan v. Mosley, 423 U.S. 96, 104 (1975) (quoting *Miranda*, 384 U.S. at 479).

94. *Miranda*, 384 U.S. at 445.

95. United States v. Washington, 431 U.S. 181, 188 (1977) (citing Rogers v. Richmond, 365 U.S. 534, 544 (1961)).

96. 446 U.S. 291, 297 (1980).

97. *See generally Miranda*, 384 U.S. 436.

98. *Id*. at 444.

99. 446 U.S. at 299 (quoting *Miranda*, 384 U.S. at 457–58).

The *Innis* Court defined interrogation while in custody as involving either express questioning or the "functional equivalent" where police or government conduct is "reasonably likely to elicit an incriminating response."[100] In *Innis*, the conversation between officers that resulted in the accused's statements did not fit either definition of interrogation, and the Court noted specifically that the officers' remarks were in no way designed to elicit a response.[101] Conversely, fMRI brain scans are intricate machines that are designed expressly to elicit a subject's response to stimuli. Furthermore, fMRI brain scans disclose the reaction of a subject to particular stimuli and are therefore the functional equivalent of an interrogation. The scans are "reasonably likely to elicit an incriminating response" and thus should be subjected, like all custodial interrogations, to the procedural safeguards set forth in *Miranda*.[102]

The Court in *Innis* was quick to note that not all statements of an accused while in custody are considered the product of interrogation and reaffirmed that statements given freely and voluntarily are admissible in evidence in the absence of *Miranda* warnings. Still, given the nuance of fMRI brain scan technology and the rarity of its current use, the government should take extra care to ensure the safeguards provided by *Miranda* are met.[103] Thus, special care should be taken to ensure that consent to fMRI brain scans meets the requirements of *Miranda* and the information disclosed by the results is in fact freely and voluntarily given. One of the central purposes of the Fifth Amendment is "to prevent the state, whether by force or by psychological domination, from overcoming the mind and will of the person under investigation and depriving him of the freedom to decide whether to assist the state in securing his conviction."[104] Although the privilege was historically a protection against the use of torture and threats, advancements in technology like fMRI brain scans implicate the same constitutional problems. In essence, the brain scan removes an accused's ability to refrain from disclosing his responses to questioning. Once he is in the machine, his response to such stimuli—that is, his testimony—is revealed. He no longer possesses the freedom to decide whether to assist the state; he cannot divert the flow of blood within his brain or mask the information it reveals. Thus brain scan

100. *Id*. at 302.

101. *Id*. at 303 n.9.

102. *Id*. at 301.

103. The scarcity of the technology of fMRI brain scans and the recognition of the human mind as an "inviolab[le]," *Miranda*, 384 U.S. at 460, "private inner sanctum," Couch v. United States, 409 U.S. 322, 327 (1973), is reminiscent of the Court's decision in *Kyllo v. United States*, 533 U.S. 27 (2001). In *Kyllo*, the Court found that thermal imaging of a home using advanced technology constituted a search under the Fourth Amendment because of the rarity of the technology in use and because of the inherent privacy interest in a person's home. 533 U.S. at 39–40.

104. *In re* Gault, 387 U.S. 1, 47 (1967).

administration procedures must meet the highest standards of consent in order to avoid infringing upon a person's Fifth Amendment rights. Specifically, the subject should be made fully aware of the capacity of the machine to reveal what he would choose to hide and, knowing that, given the opportunity to refuse the test.

For example, consider whether an accused can consent to an fMRI brain scan without an attorney present. Traditionally, an accused's constitutional right to counsel attaches only at the initiation of criminal proceedings against him.[105] However, "when the process shifts from investigatory to accusatory—when its focus is on the accused and its purpose is to elicit a confession . . . the accused must be permitted to consult with his lawyer."[106] Furthermore, an individual's failure to make an explicit request for a lawyer while in police custody does not waive his Sixth Amendment right to counsel.[107] The extension of the right to counsel in certain pretrial situations, such as interrogation in police custody, recognizes that the results of the confrontation may determine an accused's guilt and reduce the trial to a mere formality.[108] Given the Supreme Court's recognition that the right to counsel "embodies a realistic recognition of the obvious truth that the average defendant does not have the professional legal skill to protect himself,"[109] the fMRI scan may be one instance that necessitates the presence of counsel to ensure that the capacity of the test is not downplayed and consent is real. In weighing fundamental constitutional rights against the government's need to effectively investigate crimes, it is imperative that the constitutional and procedural safeguards that protect verbal testimony are available to protect testimony that is disclosed via advances in technology such as those revealed by fMRI brain scans.

C. A Link in the Chain

To activate the protections of the Fifth Amendment, the testimony the accused is compelled to disclose must be incriminating.[110] Incriminating evidence provides "a link in the chain" of evidentiary support needed to prosecute an individual for a crime.[111] Evidence is incriminating within the meaning of the Fifth Amendment if it significantly enhances the likelihood

105. Kirby v. Illinois, 406 U.S. 682, 688–89 (1972).

106. Escobedo v. Illinois, 378 U.S. 478, 492 (1964).

107. *Miranda*, 384 U.S. at 470.

108. United States v. Gouveia, 467 U.S. 180, 189 (1984) (citing United States v. Wade, 388 U.S. 218, 224 (1967)).

109. Johnson v. Zerbst, 304 U.S. 458, 462–63 (1938).

110. Doe v. United States (*Doe II*), 487 U.S. 201, 210 (1988).

111. Hoffman v. United States, 341 U.S. 479, 486 (1951).

of prosecution or if it facilitates conviction.[112] In *Miranda*, the Court noted that the Fifth Amendment privilege "protects the individual from being compelled to incriminate himself in any manner; it does not distinguish degrees of incrimination."[113] Incriminating evidence need not be condemning; in fact, the government may use seemingly innocuous responses from an innocent party against that person, and such responses would still be entitled to Fifth Amendment protection.[114]

Given the broad definition of "incriminating," it is likely that nearly every fMRI brain scan will satisfy the incriminating element of the Court's three-prong test for testimonial evidence. For example, fMRI brain scans have the ability to disclose that a subject has knowledge of a particular place or person by revealing increased blood flow to the brain's memory center in response to images of that person or place. If the scan's results indicate that the subject has knowledge of a particular fact, and that fact furnishes an evidentiary link to the issue at trial, it satisfies the incriminating prong. Thus it is not that fMRI scans can divulge our darkest secrets, it is that they can reveal what we know and recognize, which may be all that the government is looking for.

CONCLUSION

fMRI brain scanning is a complex and nuanced technology that tracks, in real time, the subject's responses to pictures or facts. This technology removes the subject's ability to exercise his constitutional right to end an interrogation once a question has been asked because no affirmative or voluntary action on the part of the subject is needed for the fMRI to record his response. Thus, the technology is invasive enough to disclose the subject's responses and knowledge against her volition. Before this technology existed, the type of information fMRI brain scans disclose would have been invisible and unobtainable unless voluntarily and affirmatively disclosed by the subject. Further, the subject would have been free to terminate the interrogation at any time, particularly in response to a question that the subject did not want to answer. In measuring the subject's mental response, an fMRI brain scan forces the subject to take the "mental and physical steps necessary" to provide the government with incriminating evidence, regardless of whether a subject wishes to respond to the question or to invoke his right against self-incrimination.[115] Because of the invasiveness of this technology, it is

112. Marchetti v. United States, 390 U.S. 39, 54 (1968).

113. Miranda v. Arizona, 384 U.S. 436, 476 (1966).

114. Ohio v. Reiner, 532 U.S. 17, 21 (2001) (quoting Grunewald v. United States, 353 U.S. 391, 421 (1957)) ("[O]ne of the Fifth Amendment's 'basic functions . . . is to protect innocent men . . . who otherwise might be ensnared by ambiguous circumstances.'" (emphasis omitted)).

115. United States v. Hubbell, 530 U.S. 27, 42 (2000).

imperative that any use be subject to the most stringent procedural safeguards.

fMRI brain scan results must be considered privileged evidence protected by an individual's Fifth Amendment right not to bear witness against himself. fMRI brain scans disclose the contents of the subject's mind and allow the government to extract self-incriminating knowledge without having to derive that information independently. The admissibility of fMRI brain scans, if found reliable, should turn on whether the scan is compelled by the government. Holding otherwise would enable the government to invade the inner sanctum of an individual's mind and strip citizens of a fundamental constitutional protection. The government can read our minds, and the Constitution should protect us.