

## ESSAY

# GREATLY EXAGGERATING DUALISM'S DEATH: NEUROSCIENCE AND U.S. LAW

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### INTRODUCTION

In *Texas Department of Housing and Community Affairs v. Inclusive Communities*,<sup>1</sup> a case that considered durative confounding of the Fair Housing Act,<sup>2</sup> the United States Supreme Court held that even in the absence of discernible discriminatory intent, disparate impact produced by policy or practice may warrant remedy.<sup>3</sup> Writing for a 5-4 majority, Justice Anthony Kennedy referenced “unconscious prejudices” and “disguised animus,” pointing to a demarcation between mentation and action, concluding that the former is often inscrutable—to the subject and to external evaluators alike.<sup>4</sup>

Less than a year following *Inclusive Communities*, researchers showed that it is possible to “read” thoughts based on neural activity alone.<sup>5</sup> Looking at brain scans, the researchers were able to determine—with over 90% accuracy—whether participants were seeing a presently viewed face for the first time, a matter of much import for criminal identifications.<sup>6</sup> Slight experimental progress would entail impingement on concerns intimate with *Inclusive*

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<sup>1</sup> Tex. Dep’t of Hous. & Cmty. Affairs v. Inclusive Cmty. Project, Inc., 135 S. Ct. 2507 (2015).

<sup>2</sup> Fair Housing Act, 42 U.S.C. 3601 (1968).

<sup>3</sup> 135 S. Ct. at 2516–26.

<sup>4</sup> *Id.* at 2522.

<sup>5</sup> Jesse Rissman et al., *Decoding fMRI Signatures of Real-world Autobiographical Memory Retrieval*, 28 J. COGNITIVE NEUROSCIENCE 604, 604 (2016).

<sup>6</sup> *Id.* at 605.

*Communities*: if there is a question of discriminatory intent, don't look to disparate impact, a test that is both over-inclusive (non-discriminatory policies and practices, by statistical variance alone, will occasionally have disparate impact) and under-inclusive (many discriminatory actors may act ineffectually). Look instead to neural activity, where proof of intent, and not just evidence, is located. Mind and body, the theory goes, are one.

U.S. courts have long cordoned off mind from body. In criminal law, most convictions require both *actus reus* (literally, "guilty act") and *mens rea* ("guilty mind"). Similar distinctions have been made in rulings concerning compulsion and in the realm of tortious harms. The idea undergirding such distinctions arguably is one of mind-body dualism: that the mental and the physical, while equally real, are not able to be assimilated.<sup>7</sup> In other words, our thoughts are rather different than the world we see and touch, and it is unclear whether our thoughts are—or even can be—part of that physical world. Indeed, dualism in U.S. law is as old as the U.S. legal system itself.<sup>8</sup>

Recent advances in neuroscience have influenced thinking on dualism and are precipitating changes in legal scholarship and jurisprudence.<sup>9</sup> It has been argued that the distinction between mind and body is fallacious<sup>10</sup> and that dualist notions in the law are obsolete.<sup>11</sup> In addition, these advances in neuroscience have led to concerns that we are at grave risk of privacy invasions and other rights violations.<sup>12</sup>

In Part I, this Essay examines dualism and its philosophical meaning. Part II extends the discussion to dualism as glimpsed in U.S. jurisprudence. Part III discusses advances in neuroscience and what they mean for U.S. law. In particular, the ramifications for dualism in the law and for matters of privacy are discussed. Part IV explicates philosophical reasons for continuing the dualist legal doctrine. In Part V, it is argued that both the dualist landscape and neuroscientific advances have been poorly understood.

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<sup>7</sup> See generally Dov Fox & Alex Stein, *Dualism and Doctrine*, 90 IND. L.J. 975 (2015) (providing an overview of mind-body dualism in U.S. law).

<sup>8</sup> *Id.*

<sup>9</sup> Martha J. Farah, *Neuroethics: The Practical and the Philosophical*, 9 TRENDS IN COGNITIVE SCI. 34, 38–39 (2005).

<sup>10</sup> See *id.*

<sup>11</sup> Fox & Stein, *supra* note 7, at 975.

<sup>12</sup> See, e.g., Nita A. Farahany, *Incriminating Thoughts*, 64 STAN. L. REV. 351, 353 (2012).

Brain scans do not yield proof but rather new forms of evidence. As a result, the gains from neuroscience are less significant than what has been widely surmised. Equally important, the potential for misuse of neuroscientific technology is less threatening than what has been widely becried. The Essay concludes with implications for U.S. law in the near future.

## I

## PHILOSOPHICAL DUALISM

The idea that there are physical bodies is an obvious one, perhaps too obvious to be called an intuition. We see bodies, touch them, hear them as they move and speak. For much of human history, this intuition has been used as a baseline from which to venture towards something non-physical. Religions, varieties of philosophical worldviews, use of hallucinogens—all have been party to the formulation of dualist notions. What is the non-physical stuff? Perhaps it is something like mind—consciousness and thought—with which we are acquainted but struggle to place into physical space. In contrast with materialists (mental states are physical states) and idealists (physical states are mental states), dualists posit that the mental and the physical are equally real and not assimilable.

In philosopher Frank Jackson's famous *gedankenexperiment*,<sup>13</sup> a person named Mary has spent her entire life in a black and white room containing only a black and white TV. In spite of these visual limitations, Mary has managed to learn all there is to know about what goes on at the neurobiological level when someone sees a colored object. She knows how color stimulates the retina and how it is processed by the central nervous system. Thus, we are led to the key question: when Mary does finally leave the black and white room and sees color for the first time, will she learn anything new? "It seems just obvious that she will learn something about the world and our visual experience of it[.]" Professor Jackson writes,<sup>14</sup> with the implication that there are truths beyond physicalism.

This idea is ancient. Dualism dates from before Plato's *Phaedo*, which provided a robust, early account.<sup>15</sup> In

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<sup>13</sup> Frank Jackson, *Epiphenomenal Qualia*, 32 PHIL. Q. 127, 130 (1982) [hereinafter *Epiphenomenal Qualia*]. See also Frank Jackson, *What Mary Didn't Know*, 83 J. PHIL. 291 (1986) (providing additional analysis of the *gedankenexperiment*).

<sup>14</sup> *Epiphenomenal Qualia*, *supra* note 13, at 130.

<sup>15</sup> PLATO, *PHAEDO* (David Gallop trans., Oxford Univ. Press 2009) (c. 360

*Meditations*, a lodestone text in dualism, Descartes argued that there are two kinds of substances: matter and mind.<sup>16</sup> This conception of dualism, which is called “substance dualism” or “Cartesian dualism,” is distinct from “property dualism.” For property dualists, consciousness has a qualitative aspect that is above-and-beyond the states of the brain.<sup>17</sup>

## II

### DUALISM IN THE U.S. LEGAL SYSTEM

Dualism in the law is often conflated, rightly or wrongly, with discussions of folk psychology.<sup>18</sup> Professor Alces has argued that law often works from unscientific inferences made about others’ minds; in particular, that others have unified seats of agency and free will.<sup>19</sup> Such free will is often intimately connected to moral responsibility, especially within criminal law. While dualism does not necessarily entail moral responsibility, nor does it entail agency or free will, it is important to note the extent to which these concepts are often linked in discussions of their legal import.<sup>20</sup>

A thread of dualism can be traced through U.S. law. In short, the law respects a mind-body distinction and honors privacy of mind. Dualist parsing is especially clear in the law of compulsion. While the Fifth Amendment to the U.S. Constitution protects individuals charged with criminal offenses from having to testify against themselves, the protection is not absolute. In *Holt v. United States*, the Supreme Court held that the Fifth Amendment does not permit “exclusion of [the defendant’s] body as evidence when it may be material.”<sup>21</sup> In *Schmerber v. California*, the Court explicitly distinguished “real or physical evidence,”<sup>22</sup> stating that it was not protected by the Fifth Amendment, thus “track[ing] the

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<sup>16</sup> RENÉ DESCARTES, *MEDITATIONS ON FIRST PHILOSOPHY* (John Cottingham trans., Cambridge Univ. Press 1996) (1641).

<sup>17</sup> DAVID CHALMERS, *THE CONSCIOUS MIND: IN SEARCH OF A FUNDAMENTAL THEORY* (1996).

<sup>18</sup> For an overview of folk psychology, see Ian Ravenscroft, *Folk Psychology as a Theory*, STAN. ENCYCLOPEDIA PHIL. (2016), <https://plato.stanford.edu/entries/folkpsych-theory> [https://perma.cc/84P3-UR2B].

<sup>19</sup> PETER A. ALCES, *THE MORAL CONFLICT OF LAW AND NEUROSCIENCE* 7, 9 (2018).

<sup>20</sup> See, e.g., *id.* at 33–35, 98, 113–14 (discussing the impact of neuroscience on understanding of dualism and free will).

<sup>21</sup> *Holt v. United States*, 218 U.S. 245, 253 (1910).

<sup>22</sup> *Schmerber v. California*, 384 U.S. 757, 764 (1966).

dualism of mind and body by protecting exclusively mental and not physical processes.”<sup>23</sup>

For most offenses, conviction requires both *actus reus* and *mens rea*. In *Sandstrom v. Montana*,<sup>24</sup> the Supreme Court affirmed the separateness and unknowability of mind: foreseeable and ordinary consequences of a defendant’s actions cannot, in themselves, be conclusory of the defendant’s state of mind. Behavior, the Court ruled, is simply evidence to be weighed by the jury in determining state of mind.

The Court also has distinguished between mind and body in the realm of tortious harms. Dualism has emerged in litigation surrounding addictive and harmful products, such as cigarettes. If one is aware of the health risks of a substance, but one shows signs of addiction to the substance, should the manufacturer and not the individual be held responsible for any resultant harm?<sup>25</sup> David Wallace argued that the answer should be in the negative, as a person is something beyond mere neurobiology: “Brains do not smoke cigarettes; acting people do . . . Law is about personhood, not biophysical function.”<sup>26</sup>

In *Metro-North v. Buckley*,<sup>27</sup> a railroad worker sued for emotional distress, alleging that asbestos exposure and the increased risk of developing a serious illness it caused led to significant fear and worry. The Supreme Court found that the plaintiff was not entitled to compensation for such mental harm. The Court reasoned that emotional injuries, while just as real as physical ones, are “far less susceptible to objective medical proof[.]”<sup>28</sup> In other words, the mind is inscrutable in ways that the body is not.

Some commentators have misunderstood the general approach to compensation for pain. As one scholar argued, “[T]he repeating mistake (in law, in culture, and to some extent still in medicine) is to conclude that that which is not *visible* is not *real*.”<sup>29</sup> Of course, this is not a mistake that courts make. Courts do not generally conclude that what is not visible is not

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<sup>23</sup> Fox & Stein, *supra* note 7, at 995.

<sup>24</sup> *Sandstrom v. Montana*, 442 U.S. 510 (1979).

<sup>25</sup> See *Engle v. Liggett Group, Inc.*, 945 So. 2d 1246, 1269 (Fla. 2006).

<sup>26</sup> David L. Wallace, *Addiction Postulates and Legal Causation, or Who’s in Charge, Person or Brain?*, 41 J. AMER. ACAD. PSYCHIATRY & L. 92, 93 (2013).

<sup>27</sup> *Metro-North v. Buckley*, 521 U.S. 424 (1997).

<sup>28</sup> *Id.* at 434 (quoting *Consolidated Rail Corp. v. Gottshall*, 512 U.S. 532, 552 (1994)).

<sup>29</sup> Amanda C. Pustilnik, *Legal Evidence of Subjective States: A Brain-Based Model of Chronic Pain Increases Accuracy and Fairness in Law*, 25 HARV. REV. PSYCHIATRY 279, 284 (2017).

real. Quite the opposite. The dualism doctrine posits that what is not visible may certainly be real, but because it is unknowable, the evidentiary burden that would permit compensation is unlikely to be met.

### III

#### ADVANCES IN NEUROSCIENCE THAT IMPINGE THE U.S. LEGAL SYSTEM

Neuroscience and neurolaw are increasingly salient, not least because of popular accounts.<sup>30</sup> A primary idea in these accounts is that once the neural correlates of higher-level human cognition are fully mapped, that is, once we know how a person's subjective experience is represented in that individual's physical brain, it will be possible to circumvent almost all of the evidentiary difficulties that beset the legal system. Functional magnetic resonance imaging (fMRI) decoding, such as multivoxel pattern analysis,<sup>31</sup> would make it possible to know the substance of defendants' and witnesses' thoughts. It would be possible to determine who intended or intends what, and that information could be used to, one, establish *mens rea* and, two, prevent future unlawful behavior.<sup>32</sup>

Given the prohibition against compulsion of self-incriminating testimony, *mens rea* is a formidable piece of the criminal puzzle. Did the defendant intend to do that which he or she did? In a 2009 murder trial, fMRI scans were introduced<sup>33</sup> as evidence that the defendant exhibited neural activity that was similar to neural activity characteristic of individuals diagnosed with psychopathy.<sup>34</sup> The defendant's attorneys implied that this meant that the defendant's behavior was less intentional than the prosecution had suggested.<sup>35</sup>

*Mens rea* often is a matter of degree. Was the criminal conduct carried out with knowledge or with recklessness? Did

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<sup>30</sup> See, e.g., Steven Spielberg's 2002 film, *MINORITY REPORT* (DreamWorks Pictures, Twentieth Century Fox 2002).

<sup>31</sup> Kenneth A. Norman et al., *Beyond Mind-Reading: Multi-Voxel Pattern Analysis of fMRI Data*, 10 *TRENDS COGNITIVE SCI.* 424 (2006).

<sup>32</sup> Again, see Stephen Spielberg's *MINORITY REPORT*, *supra* note 30.

<sup>33</sup> This evidence was introduced during the sentencing phase.

<sup>34</sup> Virginia Hughes, *Science in Court: Head Case*, 464 *NATURE* 340, 340 (2010).

<sup>35</sup> See, e.g., Carla L. Harenski et al., *Aberrant Neural Processing of Moral Violations in Criminal Psychopaths*, 119 *J. ABNORMAL PSYCHOL.* 863 (2010) (discussing aberrant neural activity that is potentially indicative of a propensity for criminal psychopathy).

the defendant know that there were drugs in the backpack, or did she simply think the backpack likely to contain drugs? A knowing state of mind carries harsher penalties than does a reckless one. Professor Vilares and colleagues employed a machine learning method to distinguish these brain states at the neurological level.<sup>36</sup> Forty subjects were scanned using fMRI while deciding whether to carry a suitcase with unspecified “valuable” content across a county border.<sup>37</sup> Two matters of probability were varied: whether the suitcase contained contraband and how many customs checkpoints the subject would have to traverse. The researchers were able to distinguish—with good but not great accuracy—participants who knowingly transported drugs from those who recklessly transported them.

Neuroscientists are working to solve the inscrutability of mental harm that was described by the *Metro-North* Court. Progress has been made in identifying the structures of the brain that are responsible for pain perception,<sup>38</sup> and researchers have been able to predict pain intensity by means of fMRI.<sup>39</sup> Similar methods are useful when pain is physically located in the non-brain body but difficult to observe, as with chronic back pain.<sup>40</sup>

#### A. The Obsolescence of Dualism in the Law

Most neuroscientists and legal scholars are concerned with the causal relation between brain states and behavior. For instance, two individuals with ostensibly identical prefrontal cortices (PFCs) may act differently in the face of criminal temptation, implying that abnormal PFC functioning may be a contributing factor but not the sole cause of criminality. As one scholar argued, “[i]t is one thing to say that brain scanners can correlate certain behaviors with a certain neural basis, and another to interpret such a correlation as the cause of the behavior.”<sup>41</sup>

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<sup>36</sup> Iris Vilares et al., *Predicting the Knowledge—Recklessness Distinction in the Human Brain*, 114 PROC. NAT'L ACAD. SCI. 3222 (2017).

<sup>37</sup> *Id.* at 3223.

<sup>38</sup> Jonathan Brooks & Irene Tracey, *From Nociception to Pain Perception: Imaging the Spinal and Supraspinal Pathways*, 207 J. ANATOMY 19 (2005).

<sup>39</sup> Tor D. Wager et al., *An fMRI-Based Neurologic Signature of Physical Pain*, 368 NEW ENG. J. MED. 1388 (2013).

<sup>40</sup> Greg Miller, *Brain Scans of Pain Raise Questions for the Law*, 323 SCI. 195 (2009).

<sup>41</sup> Laura Cabrera, *Can Brain Scans Spot Criminal Intent?*, CENTER FOR ETHICS AND HUMANITIES IN THE LIFE SCIENCES AT MICHIGAN STATE UNIVERSITY (Apr. 6, 2017), <https://msubioethics.com/2017/04/06/can-brain-scans-spot-criminal-intent/>

This notion has become a point of fixation in neuroscience and neurolaw. The idea is that, although we are not there yet, given time and increasingly precise technology, we will be able to move from correlation to causation. This will be possible, the argument goes, because mind and body are comprised of the same stuff, and the neuroscientific task is the rather clerical one of linking neural activation to behavior. Given this, some argue that dualism is an antiquated notion and one that should be scrubbed from scholarly thought. As Professors Fox and Stein wrote, “the divorce of mind from body is a fiction that distorts the doctrines of harm, compulsion, and intentionality and that serves no redeeming value sufficient to justify its presence.”<sup>42</sup> When it comes to harm in particular, all harm is “ultimately and fundamentally physical.”<sup>43</sup>

#### B. Increasing Privacy Concerns

Justice Broussard of the Supreme Court of California wrote, “[i]f there is a quintessential zone of human privacy it is the mind.”<sup>44</sup> The U.S. Supreme Court has somewhat affirmed this zone of privacy. In a 1969 case, Justice Marshall argued that a U.S. state could not “constitutionally premise legislation on the desirability of controlling a person’s private thoughts.”<sup>45</sup> Embracing this notion, lay<sup>46</sup> and academic<sup>47</sup> theorists have posited that brain scans create the potential for serious privacy intrusions. Professor Shen has referred to this as a “mental privacy panic.”<sup>48</sup> Such technology has been called a “potential tool for evil,”<sup>49</sup> one that might be exploited by governments and corporations.<sup>50</sup> These fears have led to calls for procedural

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[<https://perma.cc/GF52-5JK5>].

<sup>42</sup> Fox & Stein, *supra* note 7, at 978.

<sup>43</sup> Alces, *supra* note 19.

<sup>44</sup> Long Beach City Emps. Ass’n v. City of Long Beach, 41 Cal. 3d 937, 944 (1986).

<sup>45</sup> Stanley v. Georgia, 394 U.S. 557, 566 (1969).

<sup>46</sup> Celia Gorman, *The Mind-Reading Machine*, IEEE SPECTRUM (July 9, 2012), <http://spectrum.ieee.org/biomedical/diagnostics/the-mindreading-machine> [<https://perma.cc/7MZV-6V7J>].

<sup>47</sup> Mara Boundy, *The Government Can Read Your Mind: Can the Constitution Stop It*, 63 HASTINGS L.J. 1627 (2011); Frank Tong & Michael S. Pratte, *Decoding Patterns of Human Brain Activity*, 63 ANN. REV. PSYCHOL. 483 (2012).

<sup>48</sup> Felix X. Shen, *Neuroscience, Mental Privacy, and the Law*, 36 HARV. J. L. PUB. POL’Y 653, 668 (2013).

<sup>49</sup> Gorman, *supra* note 46.

<sup>50</sup> BARBARA J. SAHAKIAN & JULIA GOTTWALD, SEX, LIES, AND BRAIN SCANS: HOW FMRI REVEALS WHAT REALLY GOES ON IN OUR MINDS (2017). *See also* Marcello Ienca & Pim Haselager, *Hacking the Brain: Brain-Computer Interfacing Technology and the Ethics of Neurosecurity*, 18 ETHICS & INFORMATION TECH. 117 (2016) (exploring ethical and legal implications relating to the emerging risk of malicious brain-

safeguards.<sup>51</sup> Some theorists have outlined specific recommendations for protecting the mental privacy of individuals.<sup>52</sup>

#### IV

##### PHILOSOPHICAL SUPPORT FOR DUALISM IN THE LAW

The emphasis on the hoped-for transition from correlation to causation is suspect in that it neglects to consider a live debate in philosophy of mind. Many of the above scholars understand the problem as one of determining how patterns of neural activation cause experience. The discussion is framed as taking place between themselves and substance dualists, whom they characterize as doubting whether patterns of neural activation cause experience. As Professor Poldrack wrote, “[O]ne of the fundamental problems in lay thinking about neuroscience [is] what I often call folk dualism. This is the idea (crucial in legal applications of neuroimaging) that there is somehow a difference between brain and mind that is relevant to understanding people’s actions.”<sup>53</sup>

However, there is another way besides Professor Poldrack’s and that of substance dualists. Professor Thomas Nagel has written of the expanse between brain states and phenomenological experience.<sup>54</sup> Indeed, at least since John Locke was writing in the 17th century, it has been argued that consciousness—and, by extension, mind reading—requires something that is limited to a subject’s internal perspective.<sup>55</sup> As Professor Nagel argued, purely physical processes lack qualia, the essentially subjective character of conscious experience.<sup>56</sup> Furthermore, if conscious experience is veridical,

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hacking); Tim Requarth, *This is Your Brain. This is Your Brain as a Weapon*, FOREIGN POL’Y (Sept. 14, 2015), <http://foreignpolicy.com/2015/09/14/this-is-your-brain-this-is-your-brain-as-a-weapon-darpa-dual-use-neuroscience/> [https://perma.cc/WF2T-3FZ3] (discussing potential military and national security uses of neural technologies).

<sup>51</sup> As Boundy wrote, “Because of the invasiveness of this technology, it is imperative that any use be subject to the most stringent procedural safeguards.” Boundy, *supra* note 47, at 1627, 1643.

<sup>52</sup> Giulio Mecacci & Pim Haselager, *Identifying Criteria for the Evaluation of the Implications of Brain Reading for Mental Privacy*, SCIENCE AND ENGINEERING ETHICS (2017).

<sup>53</sup> Russell Poldrack, *The Risks of Reading the Brain*, 541 NATURE 156, 156 (2017).

<sup>54</sup> Thomas Nagel, *What Is It Like to be a Bat?* 83 PHIL. REV. 435 (1974).

<sup>55</sup> JOHN LOCKE, AN ESSAY ON HUMAN UNDERSTANDING (Dover Press 1959) (1688).

<sup>56</sup> THOMAS NAGEL, MIND AND COSMOS: WHY THE MATERIALIST NEO-DARWINIAN CONCEPTION OF NATURE IS ALMOST CERTAINLY FALSE (2012).

then the physical world must include more than can be described by physical processes alone.<sup>57</sup> These processes—neural firings, neurochemistry, and the like—characterize a space- and time-bound world, not how that world appears from a particular perspective, and the latter is essential to conscious experience. These physical processes, while clearly related to consciousness, likely are not alone responsible for phenomenological experience.<sup>58</sup>

Regardless of this final point, if Professor Nagel is correct, then neuroscience likely never will yield proof of intentions or pain, as the subjective mind cannot be accessed by anyone other than the subject.<sup>59</sup> What neuroscience will yield is stronger evidence. Consider a tort in which a claim is made for pain and suffering. The plaintiff may limp, grimace, or even call out. Her neural activations also may suggest that she is suffering, as the patterns may be statistically similar to patterns observed in others who report pain.<sup>60</sup> But it is clear that neither the first batch of evidence (limp, grimace, cry) nor the second (neural activation) provides access to the phenomenological experience of being in pain. The jury cannot experience what the plaintiff experiences.

The discussion of neurotechnical testimony and evidence is not meaningfully different than the one attendant to the introduction, years ago, of polygraph tests.<sup>61</sup> Neuroscientific evidence should be vetted as other evidence is vetted, with consideration of relevancy, reliability, validity, false positives, and the standards promulgated in *Daubert*,<sup>62</sup> *Frye*,<sup>63</sup> and Federal Rules of Evidence 403 and 702, among others.

Moreover, the current state of neuroscience suggests—and

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<sup>57</sup> *Id.*

<sup>58</sup> *Id.*

<sup>59</sup> See Amihud Gilead, *Can Brain Imaging Breach Our Mental Privacy?* 6 REV. PHIL. & PSYCHOL. 275 (2015).

<sup>60</sup> This is, of course, the only way by which interpretations of brain activations are possible. The researcher must compile many other brain imaging tests during which subjects are asked to describe what they are experiencing. This intersubjectivity is quite different than individual human experience, a problem often considered in discussions of the limitations of reverse inference.

<sup>61</sup> Marc Jonathan Blitz, *Lie Detection, Mind Reading, and Brain Reading*, in SEARCHING MINDS BY SCANNING BRAINS 45–58 (Marc Jonathan Blitz ed., 2017). See also Stephen J. Morse, *Brain Overclaim Syndrome and Criminal Responsibility: A Diagnostic Note*, 3 OHIO ST. J. CRIM. L. 397 (2006) (discussing strong but poorly supported claims made by advocates for increased use of neuroscience in the law).

<sup>62</sup> See, e.g., Greg Miller, *Science and the Law: fMRI Lie Detection Fails a Legal Test*, 328 SCI. 1336 (2010).

<sup>63</sup> *Frye v. United States*, 293 F. 1013 (D.C. Cir. 1923).

increasingly so—that theorists like Professor Nagel are correct: neuroscience yields neural-behavioral correlations, but it does not yield phenomenology, the mind.<sup>64</sup> To date, researchers are stymied in explaining the interaction between mind and brain, between consciousness and neural activations,<sup>65</sup> and there has been a revival in dualist thinking, as seen in the work of various philosophers.<sup>66</sup> These theoretical limitations in current neuroscience are evident in researchers' inability to capture large swaths of individual experience. For example, long-term memories are stored via synaptic connections in brain structures in inactive states, and fMRI can access these memories only when they are actively recalled by subjects,<sup>67</sup> a fact suggestive of the poverty of this science in its attempts to reveal typical phenomenological experience.

## V

### IMPLICATIONS

If it is a matter of an increase in evidence and not an introduction of proof (that is, not the advances seen in films like *Minority Report*), then the privacy discussion is a rather straightforward one. How much information about their neural activations are individuals willing to give up for the sake of additional evidence, keeping in mind that this neural information is, like all stored information, subject to misuse? While this is an empirical question, we might assume that individuals will not be willing to give up much, if any, of such information.

At the same time, the threat is less than feared. So far, there is scant evidence that access to neural activation allows for access to phenomenological experience. Researchers do not yet understand how an individual can be inside his or her own mind, much less how it might be feasible for an individual to be inside someone else's mind. The mind, subjective experience, phenomenological experience—these are not at hazard. What is at hazard are electrical and chemical

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<sup>64</sup> Blitz, *supra* note 61, at 45–58.

<sup>65</sup> Ralph Adolphs, *The Unsolved Problems of Neuroscience*, 19 TRENDS COG. SCI. 173 (2015).

<sup>66</sup> See, e.g., David Chalmers, *The Singularity: A Philosophical Analysis*, 17 J. CONSCIOUSNESS STUDIES 7 (2010) (providing a general survey of some philosophers who maintain dualist or partially-dualist accounts when discussing the possibility of artificial general intelligence).

<sup>67</sup> Jesse Rissman & Anthony D. Wagner, *Distributed Representations in Memory: Insights from Functional Brain Imaging*, 63 ANN. REV. PSYCHOL. 101 (2012); Frank Tong & Michael S. Pratte, *Decoding Patterns of Human Brain Activity*, 63 ANN. REV. PSYCHOL. 483, 494 (2012).

processes in the brain. How much information concerning these processes are individuals willing to give up? Framed this way, we might assume that the answer is quite a bit, and therein lies the crux of the legal and policy considerations.

Most agree that neural activations play some role in phenomenological experience. The disagreement is whether they alone are responsible for experience, whether they can be solely responsible, or whether they form a necessarily insufficient piece. This is a philosophical question. Until it is answered, there will be some privacy concerns about allowing access to neural activations. Even so, the current state of neuroscience suggests that neural activations, while clearly related to consciousness, likely are not alone responsible for phenomenological experience. As a result, neurotechnical testimony is less valuable than we might think (it proves nothing; it is mere evidence) and also potentially less invasive (the mind is not accessed). The concerns then are not so different than the privacy concerns in a typical Fourth Amendment search and seizure matter or the concerns in a Fifth Amendment testimonial matter.

#### CONCLUSION

In this Essay, it was argued that much current thinking on neuroscience's impact on the law and on the doctrine of dualism is misguided. But this is not to say that neuroscience lacks value. Within criminal law, retention of the legal dualist doctrine does not demand abandonment of rehabilitation; on the obverse, if one doubts the validity of all forms of dualism, this does not entail that agency, will, and moral responsibility cease to be of importance. The evidence neuroscience provides on physical structures that show individual differences and may contribute to criminal behavior, such as PFC, is important.<sup>68</sup> It suggests nuances to conviction that are in their nascence. For example, should a defendant, on account of age (either adolescence or dotage), trauma, or physical abnormality be considered "less" guilty if there is neural evidence suggestive of PFC abnormality?<sup>69</sup> Conviction then might involve

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<sup>68</sup> Oren Contreras-Rodríguez et al., *Functional Connectivity Bias in the Prefrontal Cortex of Psychopaths*, 78 *BIOLOGICAL PSYCHIATRY* 647 (2015); Meredith Cusick, *Mens Rea and Methamphetamine: High Time for a Modern Doctrine Acknowledging the Neuroscience of Addiction*, 85 *FORDHAM L. REV.* 2417 (2017); ANTONIO DAMASIO, *DESCARTES' ERROR: EMOTION, REASONING, AND THE HUMAN BRAIN* (1998).

<sup>69</sup> Franco Posa & Gabriele Losa, *Neurosciences in Criminology*, 2 *FRACTAL GEOMETRY & NONLINEAR ANALYSIS IN MED. & BIOL.* 1 (2016).

rehabilitation, treatment, non-prison sequestering, and other means of protecting society while preserving individual rights and justice. The promise of neuroscience for the law lies down this path.