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Law and the Revolution in Neuroscience: An Early Look at the Field

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FOREWORD TO THE NEUROSCIENCE, LAW & GOVERNMENT SYMPOSIUM

*Jane Campbell Moriarty**

It is with much pleasure that I write the foreword for this Symposium in the *Akron Law Review*. The authors were each presenters at the Neuroscience, Law & Government Conference, held at The University of Akron School of Law in September, 2008. The articles in this edition of *Akron Law Review* are as diverse as the presentations themselves, and provide a fascinating glimpse into various ways in which neuroscience is making inroads in both law and government.

The explosion of neuroscience and neuroimaging discoveries this decade is nothing short of remarkable, leading one prominent scientist to term the last several years “the decade of the mind.”¹ Neuroscience has become a dominant aspect of scientific inquiry—there are now over 35,000 members of the Society for Neuroscience, a group which integrates scholarly work from scientific, mathematic, psychological, medical, and computer-based disciplines.² The emergence of functional magnetic resonance imaging, commonly termed “fMRI,” has substantially affected basic cognitive neuroscience research.³ Indeed, according to an article published in *Nature* in 2008, it appears as though there are roughly 19,000 peer-reviewed articles that may have used fMRI in some capacity.⁴

* Professor, The University of Akron School of Law, and Chair, Neuroscience, Law & Government Conference at The University of Akron School of Law, September 2008.

1. Steven Rose, *Introduction: The New Brain Sciences*, in *THE NEW BRAIN SCIENCES: PERILS AND PROSPECTS* 3 (Dai Reese & Steven Rose eds., 2004).

2. JONATHAN D. MORENO, *MIND WARS: BRAIN RESEARCH AND NATIONAL DEFENSE* 17 (2006).

3. Nikos K. Logothetis, *What We Can Do and What We Cannot Do with fMRI*, 453 *NATURE* 869, 869 (2008).

4. *Id.*

There are numerous instances where neuroscience intersects with law or government and the Conference at the University of Akron School of Law concerned many of them, including the use of neuroscience to detect deception as a defense to a crime, and as a method by which to explain the reason for a juvenile's unlawful behavior. In addition, Conference speakers considered the role of neuroscience in legislation related to gender issues, whether it should be used as part of death penalty decision-making, and the Fourth and Fifth Amendment implications of neuroscience evidence.

The legal and legislative systems have begun to rely on neuroscience in various types of decision-making. Without question, the relationship between the disciplines will become more enmeshed as more data is generated by neuroscientists. Are we ready for this potential sea change that will be both rich and strange?⁵

The Symposium begins with the comments of Professor Henry T. Greely, the keynote speaker, who provides an annotated version of his presentation. His talk focused on five ways neuroscience might affect the law: the areas of prediction, mind reading, responsibility, treatment, and enhancement.⁶ Professor Greely sketches a glimpse of where the science might bring us, while recognizing the uncertainty of predicting the future.

Professor Greely first discusses the use of neuroscience as a predictive element in the law—what if we could use neuroscience to predict who will be likely to develop conditions such as Alzheimer's disease or schizophrenia or who will become dangerous psychopaths? Should the law allow employers and others to use this kind of predictive information? Should it use these predictions itself at trial or to stop people before they commit dangerous acts? If so, how?

Neuroscience also intersects with law, Professor Greely argues, by the use of neuroimaging methods, such as fMRI to view the brain in action; in a sense, to "read minds." From experiments to determine what objects people are seeing (or visualizing) to studies to determine if minds can move prosthetic limbs, neuroscience is growing at a rapid pace. Other, more legally-oriented uses of neuroscience are likely as well—to detect pain, bias, and deception. Much of the Conference focused on the neuro-detection of deception and many of the articles in this Symposium discuss this issue.

5. Cf. WILLIAM SHAKESPEARE, *THE TEMPEST*, Act I, Scene II.

6. Henry T. Greely, *Law and the Revolution in Neuroscience: An Early Look Across the Field*, 42 AKRON L. REV. 687(2009).

Whether neuroscience has a role in the determination of legal responsibility is a subject about which there is much scholarship and current discussion. Noting the extreme polarization between those who believe neuroscience will replace the law and those who believe it provides nothing new, Greely suggests a likely middle path, where it will make a difference in some cases, but will be unlikely to lead to major changes in our view of criminal responsibility.

The fourth intersection between neuroscience and law may be in the area of treatment, Professor Greely writes. We may be able to improve human health by finding better ways of managing disease. But might we also find ways to treat such disorders as anti-social behavior? And if so, what dangers does such knowledge present? Should we forcibly treat criminals with neuro-techniques that pose grave dangers to those “treated”? Citing the current treatment of sex offenders with drugs that bring about “chemical castration,” Professor Greely wonders about the potential side effects and voices concerns about such brain-based treatment.

Finally, Professor Greely’s keynote presentation delves into the use of neuroscience drugs to enhance performance. Some drugs are currently being developed to enhance memory, while other machine-brain interfaces (such as cochlear implants for hearing loss) are already in use. But rather than simply treating disabled people, what if we decide to use these drugs simply to enhance normal abilities? What is the proper role of law for regulating such enhancements?

In sum, Professor Greely’s article looks into the future and, while claiming not to know what the future will actually bring, argues that the law will soon have to deal with neuroscience issues.

Several of the articles in this symposium consider different aspects of the intersection of neuroscience and testing for deception. Professor Joelle Moreno’s article provides an important philosophic link for those thinking about the role of the academy in evaluating novel scientific evidence such as neuroscience. Noting that “profound validity questions divide cognitive neuroscientists,” Professor Moreno cautions against ready admission of cognitive neuroscience evidence, recognizing that the images presented may be far more persuasive to judges and juries than they legitimately should be. Quoting studies on the effect of neuroscience evidence in forming opinions, she reminds readers that

cognitive neuroscience evidence can “strongly sway opinion, beyond what the evidence can support.”⁷

My article on the neuroscience of deception primarily looks at the fMRI studies of neuroimaging and discusses the reasons why such studies do not yet meet standards of evidentiary trustworthiness. Drawing on the lessons from courts’ decisions to admit much forensic science without proof of its validity or reliability, the article argues against ready admission of such evidence in the courtroom. Rather, it counsels in favor of an informal moratorium, while scientists and their critics consider and debate the neuroscience of deception, and other scholars consider the moral, jurisprudential, and ethical implications of such evidence.⁸

Dr. Dov Fox’s in-depth article explains how the forced use of neuroscience to detect deception violates the Fifth Amendment privilege against self-incrimination.⁹ Drawing the historical distinction in Fifth Amendment jurisprudence between testimonial and physical evidence, Dr. Fox recognizes that brain imaging is “difficult to classify because it promises distinctly testimonial-like information about the contents of a persons’ mind . . . in demonstrably physical-like form”¹⁰ Nonetheless, he concludes that our thoughts are much more “part of us” than our blood. So while our blood can be taken from us without violating the Fifth Amendment, the same is not true of our thoughts.

While Dr. Fox focuses on the Fifth Amendment implications of forced use of neuroscience, Professor Christian Halliburton delves deeply into the Fourth Amendment’s implications with respect to neuroscience use.¹¹ Arguing in favor of an expanded notion of property as an essential aspect of human identity, Professor Halliburton challenges existing Fourth Amendment jurisprudence as being too narrowly cabined in its ability to protect the government from forcibly protecting the thoughts emanating from one’s mind. Suggesting we “immolate” the current Fourth Amendment jurisprudence that centers on a privacy notion, he argues in favor of a personhood theory of property

7. Joëlle Anne Moreno, *The Future of Neuroimaged Lie Detection and the Law*, 42 AKRON L. REV. 717, 738 (2009) (quoting David P. McCabe & Alan D. Castel, *Seeing is Believing, The Effect of Brain Images on Judgments of Scientific Reasoning*, 107 COGNITION 343, 349 (2008)).

8. Jane Campbell Moriarty, *Visions of Deception: Neuroimages and the Search for Truth*, 42 AKRON L. REV. 739 (2009).

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

10. *Id.* at 794.

11. Christian M. Halliburton, *How Privacy Killed Katz: A Tale of Cognitive Freedom and the Property of Personhood as Fourth Amendment Norm*, 42 AKRON L. REV. 803 (2009).

to apply to the Fourth Amendment, drawing heavily from Margaret Radin's theories.¹² Professor Halliburton calls for a ban on the government's non-consensual use of neuroscience on individuals, arguing that "the cognitive landscape of our ideas and intentions are so closely bound up with the self that they are essential to our ongoing existence and manifestation of a fully developed personal identity."¹³

Professor Michael Perlin, an international authority on the insanity defense, discusses the future implications of neuroimaging technology in insanity defense cases.¹⁴ Building upon his belief expressed in books and articles that "sanism" and mythic beliefs infect the jurisprudence of the insanity defense, Professor Perlin questions whether neuroimaging will change those concerns.¹⁵ Since the technology is both vivid and quantifiable, it has the potential to counter many of the myths of the insanity defense. Nonetheless, Professor Perlin is ambivalent as to whether neuroimaging will truly affect the insanity defense or whether the prejudices and stereotyping related to the defense will simply accommodate this new evidence. His article provides an interesting and thoughtful analysis premised on a long history of scholarship in the area of behavioral science.

Professor Aronson's article focuses on the connection between neuroscience and juvenile justice. He discusses whether the new neuroscience provides sufficiently reliable evidence to establish meaningful differences between adolescent and adult brains and whether science should mitigate the culpability of juvenile defendants and prevent them from being tried in the adult criminal justice system.¹⁶ He concludes that there is still too much scientific disagreement about the relationship between brain structure and decision-making capacity to even contemplate using neuroscience in this way. He notes that the few studies that have shown some link have had significant methodological flaws. In the end, Aronson is not convinced that neuroscience will be able to explain adequately why some teenagers commit crimes and others do not because so many other factors are involved in anti-social behavior, especially socioeconomic issues. He concludes by suggesting

12. *Id.* at 840-47, discussing Margaret Jane Radin, *Property and Personhood*, 34 STAN. L. REV. 957 (1982).

13. Halliburton, *supra* note 11, at 869-70.

14. Michael Perlin, "His Brain Has Been Mismanaged with Great Skill": How Will Jurors Respond to Neuroimaging Testimony in Insanity Defense Cases?, 42 AKRON L. REV. 885 (2009).

15. For more on these subjects, see *id.* at 887 n.8.

16. Jay D. Aronson, *Neuroscience and Juvenile Justice*, 42 AKRON L. REV. 917 (2009).

that our desire to find a scientific solution to questions of justice may be fundamentally misguided.

Professor Julie Seaman's remarks provide an interesting comparison between the "black box" of the jury room and the "black box" of the mind in her essay, questioning what will be revealed if neuroscience evidence on truthfulness is admitted at trial.¹⁷ Discussing the recognition that jury nullification has often had the salutary effect of acting as a safety valve for exceptional cases, she muses about how neuroscience evidence relating to truthfulness might affect the exercise of that role.

Professor Tovino's annotated remarks focus on the newly developing role of neuroscience in legislation about women's medical conditions.¹⁸ Discussing some of the small neuroscience studies addressing post-partum mood disorders, premenstrual dysphoric disorders, and eating disorders, Professor Tovino explains how advocates have begun to use the studies to attempt to affect legislation. As her research reveals, advocates are using neuroscience to help establish a physiological basis for these disorders so that these conditions will be given parity with other physical disorders. Previously, these disorders were considered solely mental disorders, which categorization limits the amount of medical coverage available for prevention and treatment. While these attempts to use neuroscience are laudable, Professor Tovino, like many of the scholars in this Symposium, cautions against inferring too much from the small, few studies that exist to date.

This symposium, in its variety of articles, touches upon many of the key issues as neuroscience moves into both law and government.

17. Julie Seaman, *Black Boxes: fMRI Lie Detection and the Role of the Jury*, 42 AKRON L. REV. 931 (2009).

18. Stacey A. Tovino, *Remarks: Neuroscience, Gender, and Law*, 42 AKRON L. REV. 941 (2009).