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# Neuroscience and Health Law: An Integrative Approach

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## NEUROSCIENCE AND HEALTH LAW: AN INTEGRATIVE APPROACH?

*Stacey A. Tovino, J.D., Ph.D.\**

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Neuroscience is one of the fastest growing scientific fields in terms of the numbers of scientists and the knowledge being gained.<sup>1</sup> In recent years, both the scope of neuroscience and the methodologies employed by neuroscientists have broadly expanded, from biochemical and genetic analysis of individual nerve cells and their molecular constituents, to the imaging of brain structure and function.<sup>2</sup> Perhaps the most significant recent neuroscientific achievement is the ability of neuroimaging technologies, including functional magnetic resonance imaging (fMRI), to image brain function.<sup>3</sup> Clinicians and scientists use fMRI not only to map sensory, motor, and cognitive function, but also to study the neural

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1. JONATHAN D. MORENO, MIND WARS: BRAIN RESEARCH AND NATIONAL DEFENSE 3 (2006).

2. *Id.* at 17. See also Peter Woodruff, *Imaging the Brain: Clinical and Research Implications for Neuropsychiatry*, in BETWEEN TECHNOLOGY AND HUMANITY: THE IMPACT OF TECHNOLOGY ON HEALTH CARE ETHICS 147-50 (Chris Gastmans ed., 2002).

3. WALTER GLANNON, BIOETHICS AND THE BRAIN 45 (2007).

correlates of a range of physical and mental conditions, behaviors, characteristics, and preferences.<sup>4</sup> Due to its recent move outside the clinical and research contexts, fMRI raises a number of ethical, legal, and social issues that are being examined within the overlapping fields of neuroethics<sup>5</sup> and neurolaw.<sup>6</sup>

In March 2007, *New York Times* journalist Jeffrey Rosen identified a number of legal issues raised by advances in neuroscience under the Fourth, Fifth, and Eighth Amendments to the United States Constitution.<sup>7</sup> Scholars are examining these and other issues as part of a burgeoning neurolaw literature that focuses heavily on criminal law,<sup>8</sup>

4. See Stacey A. Tovino, *Functional Neuroimaging Information: A Case for Neuro Exceptionalism?* 47 FLA. ST. U. L. REV. 415, 423-41 (2007).

5. See, e.g., JUDY ILLES, *NEUROETHICS: DEFINING THE ISSUES IN THEORY, PRACTICE, AND POLICY* ix (2006); STEVEN J. MARCUS, *NEUROETHICS: MAPPING THE FIELD* (2004).

6. See, e.g., Jeffrey Rosen, *The Brain on the Stand*, N.Y. TIMES MAG., Mar. 11, 2007 (stating that “[t]he extent of that revolution is hotly debated, but the influence of what some called neurolaw is clearly growing.”); SEMIR ZEKI & OLIVER GOODENOUGH, *LAW & THE BRAIN* vi (2006); BRENT GARLAND, *NEUROSCIENCE AND THE LAW: BRAIN, MIND, AND THE SCALES OF JUSTICE* vii-viii (2004) (noting that neurolaw also has been used to refer to the area of personal injury trial practice dealing with traumatic brain injuries and spinal cord injuries.). See, e.g., J. SHERROD TAYLOR, *NEUROLAW: BRAIN AND SPINAL CORD INJURIES* § 1:04 (1997).

7. Rosen, *supra* note 6.

8. See, e.g., Owen D. Jones et al., *Law, Responsibility, and the Brain*, 5 PLOS BIOLOGY 693 (2007); O. Carter Snead, *Neuroimaging and the “Complexity” of Capital Punishment*, 82 N.Y.U. L. REV. 1265 (2007); O. Carter Snead, *Neuroimaging, Entrapment, and the Predisposition to Crime*, 7(9) AM. J. BIOETHICS-NEUROSCIENCE 60 (2007); Jay D. Aronson, *Brain Imaging, Culpability and the Juvenile Death Penalty*, 13 PSYCHOL. PUB. POL’Y & L. 115 (2007); Melissa S. Caulum, *Postadolescent Brain Development: A Disconnect Between Neuroscience, Emerging Adults, and the Corrections System*, 2007 WIS. L. REV. 729 (2007); Abram S. Barth, *A Double-Edged Sword: The Role of Neuroimaging in Federal Capital Sentencing*, 33 AM. J.L. & MED. 501 (2007); Debra Niehoff, *Invisible Scars: The Neurobiological Consequences of Child Abuse*, 56 DEPAUL L. REV. 847 (2007); Owen D. Jones, *Law, Evolution, and the Brain: Applications and Open Questions*, in *LAW & THE BRAIN* 57 (Semir Zeki & Oliver Goodenough eds., 2006); Joshua Greene and Jonathan Cohen, *For the Law, Neuroscience Changes Nothing and Everything*, in *LAW & THE BRAIN*, 207 (Semir Zeki & Oliver Goodenough eds., 2006); Owen D. Jones & Timothy H. Goldsmith, *Law and Behavioral Biology*, 105(2) COLUM. L. REV. 405 (2005); Stephen J. Morse, *Brain Overclaim Syndrome and Criminal Responsibility: A Diagnostic Note*, 3(2) OHIO ST. J. CRIM. L. 397 (2006); Stephen J. Morse, *Moral and Legal Responsibility and the New Neuroscience*, in *NEUROETHICS: DEFINING THE ISSUES IN THEORY, PRACTICE, AND POLICY* 33 (Judy Illes ed., 2006); Oliver R. Goodenough, *Responsibility and Punishment: Whose Mind? A Response*, in *LAW & THE BRAIN* 259 (Semir Zeki & Oliver Goodenough eds., 2006); Eileen P. Ryan & Sarah B. Berson, *Mental Illness and the Death Penalty*, 25 ST. LOUIS U. PUB. L. REV. 351 (2006); Robert M. Sapolsky, *The Frontal Cortex and the Criminal Justice System*, in *LAW & THE BRAIN* 227 (Semir Zeki & Oliver Goodenough eds., 2006); Richard E. Redding, *The Brain-Disordered Defendant: Neuroscience and Legal Insanity in the Twenty-First Century*, 56 AM. U. L. REV. 51 (2006); James H. Fallon, *Neuroanatomical Background to Understanding the Brain of the Young Psychopath*, 3 OHIO ST. J. CRIM. L. 341 (2006); Staci A. Gruber & Deborah A. Yurgelun-Todd, *Neurobiology and the Law: A Role in Juvenile Justice?* 3 OHIO ST. J. CRIM. L. 321 (2006); Katherine H. Federle, *The Mind of a Child: The Relationship between Brain Development, Cognitive Functioning, and Accountability*

criminal procedure,<sup>9</sup> and evidence law,<sup>10</sup> as well as tort law,<sup>11</sup> property law,<sup>12</sup> intellectual property,<sup>13</sup> confidentiality and privacy,<sup>14</sup> protection of human subjects,<sup>15</sup> the regulation of neuroscience-based technologies,

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*under the Law*, 3(2) OHIO ST. J. CRIM. L. 317 (2006); Jessie A. Seiden, *The Criminal Brain: Frontal Lobe Dysfunction in Capital Proceedings*, 16 CAP. DEF. J. 395 (2004); Lucy C. Ferguson, *The Implications of Developmental Cognitive Research on "Evolving Standards of Decency" and the Imposition of the Death Penalty on Juveniles*, 54 AM. U. L. REV. 441 (2004); Laura Reider, *Toward a New Test for the Insanity Defense: Incorporating the Discoveries of Neuroscience into Moral and Legal Theories*, 46 UCLA L. REV. 289 (1998).

9. See, e.g., Sean Kevin Thompson, *A Brave New World of Interrogation Jurisprudence?*, 33 AM. J.L. & MED. 341 (2007); Sarah E. Stoller & Paul Root Wolpe, *Emerging Neurotechnologies for Lie Detection and the Fifth Amendment*, 33 AM. J.L. & MED. 359 (2007); Michael S. Pardo, *Neuroscience Evidence, Legal Culture, and Criminal Procedure*, 33 AM. J. CRIM. L. 301 (2006); Erich Taylor, *A New Wave of Police Interrogation? "Brain Fingerprinting," The Constitutional Privilege Against Self-Incrimination, and Hearsay Jurisprudence*, 2006 U. ILL. J.L. TECH. & POL'Y 287 (2006); Sean Kevin Thompson, *The Legality of the Use of Psychiatric Neuroimaging in Intelligence Interrogation*, 90(6) CORNELL L. REV. 1601 (2005); Richard G. Boire, *Searching the Brain: The Fourth Amendment Implications of Brain-Based Deception Devices*, 5(2) AM. J. BIOETHICS 62 (2005).

10. See, e.g., Mark Pettit, Jr., *fMRI and BF Meet FRE: Brain Imaging and the Federal Rules of Evidence*, 33 AM. J.L. & MED. 319 (2007); Leo Kittay, *Admissibility of fMRI Lie Detection: The Cultural Bias against "Mind Reading" Devices*, 72 BROOK. L. REV. 1351 (2007); Erin A. Egan, *Neuroimaging as Evidence*, 7(9) AM. J. BIOETHICS-NEUROSCIENCE 62 (2007); Jocelyn Downie & Ronald Murphy, *Inadmissible, Eh?*, 7(9) AM. J. BIOETHICS-NEUROSCIENCE 67 (2007); Charles N.W. Keckler, *Cross-Examining the Brain: A Legal Analysis of Neural Imaging for Credibility Impeachment*, 57 HASTINGS L.J. 509 (2006); Archie Alexander, *Functional Magnetic Resonance Imaging Lie Detection: Is a "Brainstorm" Heading Toward the Gatekeeper?* 7 HOUS. J. HEALTH L. & POL'Y 1 (2006).

11. See, e.g., Betsy J. Grey, *Neuroscience, Emotional Harm, and Emotional Distress Tort Claims*, 7(9) AM. J. BIOETHICS-NEUROSCIENCE 65 (2007); Adrian M. Viens, *The Use of Functional Neuroimaging Technology in the Assessment of Loss and Damages in Tort Law*, 7(9) AM. J. BIOETHICS-NEUROSCIENCE 63 (2007); Adam Kolber, *Pain Detection and the Privacy of Subjective Experience*, 33 AM. J.L. & MED. 433 (2007).

12. See, e.g., Jeffrey Evans Stake, *The Property 'Instinct,'* in LAW & THE BRAIN 185 (Semir Zeki & Oliver Goodenough eds., 2006).

13. See, e.g., Henry T. Greely, *Prediction, Litigation, Privacy, and Property: Some Possible Legal and Social Implications of Advances in Neuroscience*, in NEUROSCIENCE AND THE LAW: BRAIN, MIND, AND THE SCALES OF JUSTICE 114 (Brent Garland ed., 2004).

14. See, e.g., Tovino, *supra* note 4, at 416; Henry T. Greely, *The Social Effects of Advances in Neuroscience: Legal Problems, Legal Perspectives*, in NEUROETHICS: DEFINING THE ISSUES IN THEORY, PRACTICE, AND POLICY 245 (Judy Illes ed., 2006); Stacey A. Tovino, *The Visible Brain: Confidentiality and Privacy Implications of Functional Magnetic Resonance Imaging* (2006) (unpublished Ph.D. dissertation, University of Texas) (on file with author); Stacey A. Tovino, *The Confidentiality and Privacy Implications of Functional Magnetic Resonance Imaging*, 33(4) J.L. MED. & ETHICS 844 (2005); Committee on Science and Law, *Are Your Thoughts Your Own? "Neuroprivacy" and the Legal Implications of Brain Imaging*, 60 CBA RECORD 407 (2005); Greely, *supra* note 13, at 114.

15. See, e.g., Jennifer Kulynych, *Some Thoughts about the Evaluation of Non-Clinical Functional Magnetic Resonance Imaging*, 7(9) AM. J. BIOETHICS-NEUROSCIENCE 57 (2007); Jennifer Kulynych, *The Regulation of MR Neuroimaging Research: Disentangling the Gordian Knot*, 33 AM. J.L. & MED. 295 (2007); Jennifer Kulynych, *Legal and Ethical Issues in*

especially fMRI-based lie detectors,<sup>16</sup> and even practical advice for lawyers and judges regarding the assessment of neuroscience-based legal claims and the evaluation of the training, credentials, and courtroom credibility of neuropsychological experts.<sup>17</sup>

Little attention has been paid, however, to the implications of advances in neuroscience for more traditional civil and regulatory health law issues. I thus explore the ways in which neuroscience impacts a range of health, disability, and benefit law issues, including the scope of public and private health insurance benefits (Part II), the mental health parity debate (Part III), protected status under federal and state disability law (Part IV), and the distribution of benefits under social security and other benefit programs (Part V). I find that patients, patient advocacy organizations, litigants, lobbyists, legislatures, and scholars are relying on advances in neuroscience to characterize traditionally suspect mental health conditions as brain-based conditions worthy of insurance coverage, protected civil status, and disability and other benefits. Although stakeholders, by and large, are not making completely unfounded or speculative claims about neuroscience, what does give me cause for pause is the appropriateness of the subsequent normative argument; that is, that all mental disorders should be treated as covered or protected conditions for purposes of health, disability, and benefit law. I conclude that advances in neuroscience give us reason to revisit age-old health, disability, and benefit law questions (such as, “Which kinds of mental suffering create a legitimate claim for assistance from others through [public or private] health insurance?”),<sup>18</sup> but that neuroscience does not yet answer these questions. Because I anticipate that neuroscience will continue to play a role in the development and shaping of health, disability, and benefit law and policy, I recommend that lawyers and scholars who work in these areas (and not just those who self-identify as neuroethicists or neurolawyers) be mindful of the

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*Neuroimaging Research: Human Subjects Protection, Medical Privacy, and the Public Communication of Research Results*, 50(3) *BRAIN & COGNITION* 345 (2002).

16. See, e.g., Henry T. Greely & Judy Illes, *Neuroscience-Based Lie Detection: The Urgent Need for Regulation*, 33 *AM. J.L. AND MED.* 377 (2007); Henry T. Greely, *Premarket Approval Regulation for Lie Detection: An Idea Whose Time May Be Coming*, 5(2) *AM. J. BIOETHICS* 50 (2005).

17. See, e.g., Daniel R. Orme & George Johnstone, *Clinical Neuropsychologists: Training, Credentials and Courtroom Credibility*, 59 *J. MO. B.* 184 (2003); R.K. McKinzey, *A Judge's Introduction to Neuropsychological Assessments*, 37 *COURT REV.* 24 (2001).

18. James E. Sabin & Norman Daniels, *Determining “Medical Necessity” in Mental Health Practice*, 24(6) *HASTINGS CENTER REP.* 5, 5 (1994).

ways in which stakeholders will use neuroscience to bear on the formulation and interpretation of such law.<sup>19</sup>

A few caveats and prefatory notes are in order. First, the field of health law is extraordinarily broad and rapidly changing.<sup>20</sup> In this Article, I select just a few examples that I think are illustrative, although not exhaustive, of the ways in which stakeholders currently are using neuroscience to impact health law and policy. I hope that readers with background in health law and policy will identify additional, relevant settings in which neuroscience-based arguments may be raised and will question whether such arguments should work in these settings.

Second, I will not be examining the desirability of the health, disability, and benefit legal structures referenced in this Article. The question I am trying to examine is, assuming their continued existence, how might neuroscience impact their application?

Third, my approach in other neuroethics and neurolaw articles has been one of caution, and this Article is no different. I have been careful elsewhere and am careful here not to speculate about the potential of neuroscience. For reasons discussed herein, I anticipate that stakeholders will continue to incorporate neuroscience-based arguments into legal discussions, so I do think that lawyers and policymakers need to be able to assess the traps, pitfalls, and potential merit of such arguments, and recognize the evidentiary, substantive, and normative responses that are available.

Finally, I think it is helpful to state at the outset the impetus for this Article. In addition to teaching an introductory health law course that focuses on health care quality, access, finance, and organization, I teach a range of upper-level courses focused on civil and regulatory health law issues. These include Mental Health Law, Elder Law, Law and Bioethics, Complementary and Alternative Medicine and the Law, Patients' Rights, Comparative Health Law, and HIPAA Privacy. During

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19. See David B. Wexler, *Putting Mental Health into Mental Health Law: Therapeutic Jurisprudence*, in *ESSAYS IN THERAPEUTIC JURISPRUDENCE* 3, 10 (David B. Wexler & Bruce J. Winick eds., 1991) (encouraging stakeholders to consider ways in which the clinical literature might bear on the formulation of legal arrangements).

20. Health law has been described as both an exciting and interdisciplinary field as well as an incoherent discipline. See, e.g., Henry T. Greely, *Some Thoughts on Academic Health Law*, 41(2) WAKE FOREST L. REV. 391, 392 (2006) (stating that "the practice of health law is a huge, growing, and vibrant activity."); Einer R. Elhauge, *Can Health Law Become a Coherent Field of Law?* 41(2) WAKE FOREST L. REV. 365, 365 (2006) (describing health law as incoherent and disjointed); Mark A. Hall, *The History and Future of Health Care Law: An Essentialist View*, 41(2) WAKE FOREST L. REV. 347, 353-54 (2006) (describing the evolution of health law into a coherent sub-discipline of the law); Mark A. Hall et al., *Rethinking Health Law*, 41(2) WAKE FOREST L. REV. 341, 347-48 (2006).

class preparation and discussion, I am surprised by the frequency with which I am confronted with neuroscience-based stories and related policy suggestions. During my fall 2006 Mental Health Law class, for example, a thirty-five-year-old guest lecturer who has bipolar disorder and is dually eligible (*i.e.*, she receives social security disability benefits from the Medicare Program as well as assistance with out-of-pocket medical expenses from the Minnesota Medical Assistance program) explained how she enjoyed participating in a free University of Minnesota neuroimaging study, the purpose of which was to study the efficacy of a drug for bipolar disorder that is covered neither by Medicare nor Medicaid. Because my guest lecturer believes that the experimental drug assisted her in resuming many activities of daily living and enabled her to begin part-time volunteer work at a local mental health facility, which she tremendously enjoys, she believes Medicare and Medicaid should cover the drug. In another Mental Health Law class, devoted to the topic of the civil commitment of pedophiles and other sexually dangerous persons in the State of Minnesota, a guest lecturer referenced recent investigations into the brains of pedophiles to suggest a scheme for the release or permanent commitment, as appropriate, of past pedophiles based on the results of a multi-disciplinary team's traditional psychiatric and (neuroimaging-based) neurological evaluation. In my spring 2008 Complementary and Alternative Medicine and the Law seminar, one student who was questioning the efficacy of a range of alternative medicines and their reimbursement by health insurers piqued the interest of another student, who had recently read a review article examining the correlation between specific acupuncture points and specific areas of brain activation and deactivation, as measured by fMRI and positron emission tomography.<sup>21</sup> In this Article, I hope to show how stakeholders are using advances in neuroscience to make similar, although more formal, legal arguments and to lay the groundwork for analyzing these claims.

## I. MENTAL DISORDER STATISTICS

Much of this Article involves the civil and administrative treatment of individuals with mental disorders. "Mental disorders are common in the United States" and abroad.<sup>22</sup> According to the National Institute of

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21. George T. Lewith et al., *Investigating Acupuncture Using Brain Imaging Techniques: The Current State of Play*, 2(3) ECAM 315, 315 (2005) (stating that "[f]or example, points associated with hearing and vision stimulate the visual and auditory cerebral areas respectively.").

22. National Institute of Mental Health, Statistics, <http://www.nimh.nih.gov/health>

Mental Health (NIMH), an estimated 26.2% of American adults (or 57.5 million) suffer from a diagnosable mental disorder in a given year.<sup>23</sup> Approximately 6% of American adults (or one in seventeen) suffer from a serious mental illness.<sup>24</sup> And, an estimated 45% of American adults who have one diagnosable mental disorder meet criteria for at least one more diagnosable mental disorder.<sup>25</sup>

Historically, individuals with mental disorders were treated with contempt, fear, and cruelty, perhaps due to the belief that mental disorders stemmed from parental misdeeds, demonic possession, or deficient character.<sup>26</sup> Mental illness remains poorly understood today.<sup>27</sup> The National Mental Health Association, recently renamed Mental Health America (MHA), estimates that 71% of Americans still believe that mental illness is caused by mental weakness, 65% believe that mental illness is the product of poor parenting, and 35% believe that mental illness is a form of retribution for sinful or immoral behavior.<sup>28</sup> Many patients, patient advocacy organizations, litigants, lobbyists, legislators, and scholars believe that the stigma against mental disorders plays a role in their lack of funding for research, their lack of parity in public and private health insurance coverage, and their lack of available and reimbursable treatments.<sup>29</sup> Four sets of mental disorders, including

/statistics/index.shtml (last visited Jan. 29, 2008).

23. *Id.*

24. *Id.*

25. *Id.*

26. *See, e.g.,* Keith Nelson, *Legislative and Judicial Solutions for Mental Health Parity: S. 543, Reasonable Accommodation, and an Individualized Remedy under Title I of the ADA*, 51 AM. U. L. REV. 91, 97 (2001); Brian K. LaFratta, *The Mental Health Parity Act: A Bar to Insurance Benefits for the Elderly?* 8 ELDER L.J. 393, 406 (2000) (stating that “until recently, the public viewed mental illness as a curse or an affliction that one brought upon him or herself.”).

27. *See, e.g.,* Jeffery Fraser, Allegheny County Mental Health Court Project, Executive Summary 2 (Sept. 4, 2004), [http://199.224.17.100/uploadedFiles/DHS/Individual\\_and\\_Community\\_Health/Mental\\_Health\\_Services\\_and\\_Support/Forensic\\_Services/MHCourtExecutiveSummary.pdf](http://199.224.17.100/uploadedFiles/DHS/Individual_and_Community_Health/Mental_Health_Services_and_Support/Forensic_Services/MHCourtExecutiveSummary.pdf) (last visited Jan. 21, 2008).

28. *Id.*

29. *See, e.g.,* Pamela Signorello, *The Failure of the ADA-Achieving Parity with Respect to Mental and Physical Health Care Coverage in the Private Employment Realm*, 10 CORNELL J.L. & PUB. POL’Y 349, 368 (2001) (stating that “[s]ome diseases are more politically ‘in’ than others. We all know the more political backing there is, the more attention, the more funds, and the more patient-protection legislation. My guess is that if AIDS rates a 10, then breast cancer is a 7, prostate cancer is a 6 . . . . Yes, you guessed it. I am unable to assign a number to the mental health category. If I have to judge by the coverage in the popular press, the category is close the bottom of the food chain.”); *id.* at 368, 371 (stating that “[c]ontrary to lingering public perception, mental illnesses are not indicative of personal weakness, lack of character, or poor upbringing . . . . One thing is certain. The stigma associated with mental illness has supported the disparity in health care coverage.”); Nicole Martinson, *Inequality between Disabilities: The Different Treatment of Mental Versus Physical Disabilities in Long-Term Disability Benefit Plans*, 50 BAYLOR L. REV. 361, 361

schizophrenia, bipolar disorder, drug and alcohol dependence, and anorexia nervosa and bulimia nervosa, are frequently used to illustrate these claims. A brief summary of the neuroscientific investigation of these four sets of disorders is set forth at Appendix A to this Article. A careful review of these studies reveals many findings as well as many discrepancies and contradictions.<sup>30</sup> Some of these studies do find that the brains of individuals affected by these conditions are neuroanatomically, neurocognitively, and/or neurochemically “different” when compared to the brains of healthy controls.<sup>31</sup> In the past twenty years, stakeholders have referenced these findings in an attempt to influence health law and policy, especially the scope of private and public health insurance benefits.

## II. THE SCOPE OF HEALTH INSURANCE BENEFITS

Most adult Americans with private health insurance coverage receive coverage through their employers as a benefit of employment.<sup>32</sup> When employers first began offering health insurance benefits,<sup>33</sup> covered employees generally had access to physical and mental health benefits under the same terms and conditions.<sup>34</sup> Beginning in the 1970s, many

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(1998) (stating that “[t]he stigma of mental illness has kept many in need from seeking help, and it has prevented policymakers from providing it.”); Brian D. Shannon, *Paving the Path to Parity in Health Insurance Coverage for Mental Illness: New Law or Merely Good Intentions?*, 68 U. COLO. L. REV. 63, 85 (1997) (citing 142 Cong. Rec. S3590 (Daily ed. Apr. 18, 1996) (statement of Senator Wellstone)) (stating that “[t]he stigma of mental illness has kept many in need from seeking help, and it has prevented policymakers from providing it. And for too long, persons in need of mental health services who reach private coverage discriminatory limits have been dumped onto Government-funded programs.”).

30. See, e.g., Russell T. Loeber et al., *Differences in Cerebellar Blood Volume in Schizophrenia and Bipolar Disorder*, 37 SCHIZOPHRENIA RES. 81, 81 (1999) (reporting findings and contradictions in brain studies of individuals with schizophrenia and bipolar disorder).

31. See, e.g., Richard E. Gardner, *Mind Over Matter? The Historical Search for Meaningful Parity Between Mental and Physical Health Care Coverage*, 49 EMORY L.J. 675, 683 (2000) (quoting Fuller Torrey, one of America’s most famous psychiatrists: “[T]he ‘evidence is now overwhelming that the brains of persons who have schizophrenia are, as a group, different from brains of persons who do not have the disease.’”); Karen Faith Berman, *Functional Neuroimaging in Schizophrenia*, in NEUROPSYCHOPHARMACOLOGY: THE FIFTH GENERATION OF PROGRESS 745, 747 (Kenneth L. Davis et al. eds., 2002); Philip McGuire et al., *Functional Neuroimaging in Schizophrenia: Diagnosis and Drug Discovery*, 29(2) TRENDS IN PHARMACOLOGICAL SCI. 91, 96 (2008).

32. See, e.g., Nelson, *supra* note 26, at 92.

33. See, e.g., PAUL STARR, *THE SOCIAL TRANSFORMATION OF AMERICAN MEDICINE: THE RISE OF A SOVEREIGN PROFESSION AND THE MAKING OF A VAST INDUSTRY* 294-95 (1949) (discussing early examples of employer-based health insurance).

34. Dana L. Kaplan, *Can Legislation Alone Solve America’s Mental Health Dilemma? Current State Legislative Schemes Cannot Achieve Mental Health Parity*, 8 QUINNIPIAC L. REV.

employers reduced their mental health benefits, which were thought to be more expensive than physical health benefits.<sup>35</sup> The Jackson Hole Group, an influential body of health care executives and policy analysts, even recommended that employers limit their mental health benefits to twenty outpatient visits and thirty inpatient days each year.<sup>36</sup> Some employers also increased deductibles and lowered lifetime and daily limits applicable to mental health care.<sup>37</sup>

These benefit package changes resulted in a disparity between the private insurance coverage that was provided for employees' physical illnesses and mental disorders.<sup>38</sup> Health insurance plans that covered 365 days of inpatient care for physical illnesses might cover only 45 days of inpatient care for mental disorders.<sup>39</sup> Plans that provided unlimited outpatient visits for treatment of physical illnesses might allow only twenty outpatient visits for treatment of mental disorders.<sup>40</sup> And plans that contained a \$1 million lifetime cap for treatment of physical illnesses might contain only a \$50,000 lifetime cap for treatment of mental disorders.<sup>41</sup> These coverage disparities adversely affected individuals with both "traditional" and "suspect" mental health conditions.<sup>42</sup> Many individuals with disabling bipolar disorder and severe anorexia nervosa, for example, were forced to discontinue their inpatient and outpatient treatments when they had reached their mental health benefit caps.<sup>43</sup> The lack of treatment exacerbated underlying illnesses and symptoms, sometimes leading to unemployment, homelessness, incarceration, and premature death.<sup>44</sup>

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325, 328 (2005).

35. See, e.g., Allan Beigel & Steven S. Sharfstein, *Mental Health Care Providers: Not the Only Cause or Only Cure for Rising Costs*, 142(5) AM. J. PSYCHIATRY 668, 668 (May 1984) (stating that "[i]n 1955 mental health expenditures were estimated to be \$1.2 billion, or 6% of all expenditures. By 1977 the total amount of expenditures for mental health care had risen to \$19.6 billion, 12% of all expenditures. Even with a correction for population growth and price increases, this amounts to a fourfold increase in mental health expenditures."); Kaplan, *supra* note 34, at 328 (stating that mental health benefits are two to three times as expensive as physical illness benefits).

36. See Robert Pear, *White House Plan Would Cover Costs of Mental Illness*, N.Y. TIMES, Mar. 16, 1993, at A1.

37. See, e.g., Beigel & Sharfstein, *supra* note 35, at 668 (stating that "[c]osts have risen, resulting in resistance to financing treatment of mental illness in both public and private sectors."); Kaplan, *supra* note 34, at 328.

38. See, e.g., Kaplan, *supra* note 34, at 328.

39. See Shannon, *supra* note 29, at 68.

40. See *id.*

41. See *id.*

42. See *id.*

43. See, e.g., Beth A. Brunalli, *Anorexia Killed Her, but the System Failed Her: Does the American Insurance System Suffer from Anorexia?*, 12 CONN. INS. L.J. 583, 591, 597-98 (2006).

44. See, e.g., John V. Jacobi, *Parity and Difference: The Value of Parity Legislation for the*

In the late 1980s and early 1990s, some patients who were denied additional mental health benefits sued their insurers, arguing that their conditions were physical rather than mental in nature and thus covered under the “better” set of benefits.<sup>45</sup> In these contract-based lawsuits, the plaintiffs’ experts routinely referenced advances in the behavioral and brain sciences to support their testimony. In a 1987 case out of Arkansas, for example, an insured father sued Blue Cross Blue Shield (BCBS) when it denied additional benefits to his dependent daughter, who had a diagnosis of bipolar affective disorder.<sup>46</sup> The BCBS plan at issue in *Arkansas Blue Cross and Blue Shield, Inc. v. Doe* provided liberal benefits for hospitalization and medical treatment for physical illnesses and accidental injuries, but only limited benefits for “mental, psychiatric, and nervous conditions,” which the plan did not define.<sup>47</sup> At trial, the father called three psychiatrists and two clinical psychologists to testify that bipolar disorder is a physical disease of the brain.<sup>48</sup> The experts referenced advances in “medical research” to support their testimony that bipolar affective disorder is an illness of the brain that stems from physical and biological causes.<sup>49</sup> The court ultimately agreed that the daughter’s illness was a physical condition within the meaning of the BCBS plan,<sup>50</sup> but the victory was short-lived.<sup>51</sup> Following the *Doe* decision, BCBS re-wrote its Arkansas policy and clarified that the coverage limitation for psychiatric conditions applied whether the condition was “organic or non-organic, whether of biological, non-biological, chemical or non-chemical origin, and irrespective of cause, basis or inducement.”<sup>52</sup>

Two years later, in 1989, a New York appellate court came to a similar result by focusing instead on the nature of the medical treatment provided to the patient.<sup>53</sup> In *Simons v. Blue Cross Blue Shield of Greater*

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*Seriously Mentally Ill*, 29 AM. J.L. & MED. 185, 185 (2003); Nelson, *supra* note 26, at 99.

45. See, e.g., Brunalli, *supra* note 43, at 598.

46. Ark. Blue Cross and Blue Shield, Inc. v. Doe, 733 S.W.2d 429, 431 (Ark. Ct. App. 1987).

47. *Id.* at 430.

48. *Id.* at 431.

49. *Id.* at 431 (stating that “Dr. Thomas Harris, a treating psychiatrist . . . stated it is in fact a physical disorder. ‘The medical research is now, in my opinion, overwhelming in that regard.’ He stated that it was an illness of the brain and body rather than of the mind and stemmed from a chemical imbalance which responds to medication. This illness, like many others he described, manifests some behavioral or emotional disturbances, but the causes of those manifestations are physical and biological in nature as distinguished from mental.”).

50. *Id.* at 432.

51. Shannon, *supra* note 29, at 76.

52. *Id.*

53. *Simons v. Blue Cross and Blue Shield of Greater N.Y.*, 536 N.Y.S.2d 431, 431-32 (N.Y.

*New York*, an insured father sued BCBS after it denied coverage for additional inpatient days for his dependent teenage daughter, Amy, who had anorexia nervosa.<sup>54</sup> The BCBS plan at issue covered 120 days each year of inpatient hospitalization for “appropriate medical treatment,” but only thirty days of inpatient hospitalization for “psychiatric disorders.”<sup>55</sup> At trial, several pediatricians testified that the additional inpatient treatments Amy received, including nasogastric feedings and intravenous fluids, were necessary because of her physical condition, which was extremely emaciated, malnourished, dehydrated, and hypotensive.<sup>56</sup> The court agreed and ruled that Amy’s inpatient hospitalization was covered because it involved medical, not psychiatric, treatment.<sup>57</sup> Other courts faced with similar claims also have focused on the nature of the treatment provided. In cases in which the treatment involved psychotherapy, psychotropic medications, and electroconvulsive therapy, the courts tend to rule in favor of the insurer.<sup>58</sup>

Some courts focus not on the origin of the plaintiff’s condition or the nature of the treatments provided but, instead, on the ways in which the plaintiff’s condition manifests itself. In *Equitable Life Insurance Society v. Berry*, a plaintiff, who became totally disabled as a result of his bipolar disorder, sued his insurance company for both long-term disability benefits and medical benefits.<sup>59</sup> The long-term disability plan expressly excluded coverage for “mental and nervous disorders.”<sup>60</sup> The

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App. Div. 1989).

54. *Id.*

55. *Id.* at 432.

56. *Id.* at 433.

57. *Id.* at 434 (stating that “[t]he plain, ordinary meaning of ‘psychiatric’ care is the sort of treatment, such as electroshock therapy and psychotropic medication, rendered to a patient who has been admitted to a psychiatric ward in order to attend to his or her psychiatric disorder. Amy was hospitalized because of malnutrition and hypotension, not depression or some other psychological malady, and, in that respect, she was provided with the medical treatment necessary to alleviate her particular physical problems. The fact that Amy’s physical disability was the result of the psychiatric condition known as anorexia nervosa does not transform what is customarily medical treatment into psychiatric treatment; malnutrition and hypotension necessitate the same medical care regardless of whether the condition is attributable to anorexia nervosa, some organic source or simply the financial inability to procure food. It is the physical condition, and the treatment required to deal with that condition, which is crucial, not the reason for the disorder.”).

58. *See, e.g.,* *Blake v. Unionmutual Stock Life Ins. Co.*, 906 F.2d 1525, 1530 (11th Cir. 1990) (treating the insured’s postpartum depression as a mental illness because the insured received individual psychotherapy, psychoactive drug therapy, electroconvulsive therapy, and participated in group counseling sessions).

59. *Equitable Life Assurance Soc’y v. Berry*, 212 Cal. App. 3d 832, 834-35 (Cal. Ct. App. 1989).

60. *Id.* at 835.

medical plan stated that it would pay only 50% of physician charges for “mental and/or nervous treatment,” which the plan defined as “treatment for a neurosis, psycho-neurosis, psychopathy, psychosis, or mental or nervous disease or disorder of any kind.”<sup>61</sup> At trial, the plaintiff called an expert witness who testified that the plaintiff’s disorder was an organic disease caused by a chemical imbalance and other physiological disease processes.<sup>62</sup> The court, taking judicial notice of the then-current edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM), which listed bipolar disorder as a mental disorder,<sup>63</sup> disagreed, stating that the test was whether the manifestation, not the origin, of the disorder was mental or physical in nature.<sup>64</sup> Because the plaintiff’s disorder manifested itself in very high moods and very low moods, the court classified his disorder as a mental disorder.<sup>65</sup>

In 1990, the Eighth Circuit Court of Appeals also focused on symptoms, reasoning that most laypersons understand illnesses in terms of their symptoms, not their origin. In *Brewer v. Lincoln National Life Insurance Company*, an insured father sued Lincoln National Life Insurance Company when it denied additional benefits to his dependent son, who had an affective mood disorder that manifested itself in a sharp decline in grades, repeated incidents of lying, mood swings, and aberrant behavior in and out of school.<sup>66</sup> One of the applicable insurance plans limited coverage for hospital charges associated with ““mental illness(es), functional nervous disorder(s) . . . or for psychiatric or psychoanalytic care.””<sup>67</sup> A second applicable plan limited coverage for the care of ““mental illness(es).””<sup>68</sup> Neither plan defined mental illness.<sup>69</sup> At trial, the father called three physicians of various specialties to testify that “mounting medical evidence suggest[s] that affective mood disorder is genetically or biologically caused.”<sup>70</sup> Notwithstanding,

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61. *Id.*

62. *Id.* at 839-40.

63. *Id.* at 840.

64. *Id.* (stating that “[e]very reasonable layman would view a person manifesting such derangement as suffering from a mental disease. The policies here in question exclude all mental disease from coverage . . . regardless of whether the disability was caused by a chemical imbalance, a blow on the head, being frightened by a black cat, inability to cope or whatever . . . . In the disability policy, mental disorders are expressly ‘not covered’. Period . . . . Manifestation, not cause, is the yardstick.”).

65. *Id.* at 839-40.

66. *Brewer v. Lincoln Nat’l Life Ins. Co.*, 921 F.2d 150, 152, 154 (8th Cir. 1990).

67. *Id.* at 152.

68. *Id.*

69. *Id.*

70. *Id.*

the Eighth Circuit found that the son's affective mood disorder was a mental illness subject to the more limited coverage because symptoms, not origin, mattered, and because most laypersons would agree that the symptoms of affective mood disorder are behavioral, rather than physical, in nature.<sup>71</sup> Other courts also have followed the layperson approach en route to ruling in favor of the insurer.<sup>72</sup>

In a 1992 case, the Seventh Circuit blamed the insurer for failing to adequately define "mental illness" in its contractual provisions that provided lower lifetime benefits, lower annual benefits, and lower daily benefits for mental illnesses.<sup>73</sup> In *Phillips v. Lincoln National Life Insurance Company*, an insured father sued Lincoln National, the same defendant in the previous case, when Lincoln National denied additional benefits to the father's dependent son, James, who had a diagnosis of congenital encephalopathy that gave rise to a range of behavioral problems.<sup>74</sup> To prove that James' condition was a physical illness, subject to the better benefit package, the father submitted evidence of a brain scan that revealed a portion of James' brain that was "not putting out the electrical impulses or processing electrical stimuli and impulses the way it would normally."<sup>75</sup> The Seventh Circuit ultimately affirmed the district court's decision to construe the "mental illness" provision against the insurer because the provision did not define mental illness.<sup>76</sup>

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71. *Id.* at 154 (stating that "[t]he cause of a disease is a judgment for experts, while laymen know and understand symptoms. Laymen undoubtedly are aware that some mental illnesses are organically caused while others are not; however, they do not classify illnesses based on their origins. Instead, laypersons are inclined to focus on the symptoms of an illness; illnesses whose primary symptoms are depression, mood swings and unusual behavior are commonly characterized as mental illnesses regardless of their cause . . . . [The son's] disease manifested itself in terms of mood swings and aberrant behavior. Regardless of the cause of his disorder, it is abundantly clear that he suffered from what laypersons would consider to be a 'mental illness.'").

72. *See, e.g.,* *Tolson v. Avondale Indus., Inc.*, 141 F.3d 604, 609-10 (5th Cir. 1998) (following the layperson approach in concluding that depression is a mental illness); *Lynd v. Reliance Std. Life Ins. Co.*, 94 F.3d 979, 983-84 (5th Cir. 1996) (stating that "[l]aypersons are inclined to focus on the symptoms of an illness; illnesses whose primary symptoms are depression, mood swings and unusual behavior are commonly characterized as mental illness regardless of their cause."); *Pelletier v. Fleet Fin. Group*, 2000 WL 1513711, at \*5 and n. 7 (D.N.H. Sept. 19, 2000) (following the layperson approach in concluding that a major depressive disorder is a mental illness); *Attar v. Unum Life Ins. Co.*, 1997 WL 446439, at \*5 (N.D. Tex. July 19, 1997) (following the layperson approach in concluding that bipolar disorder is a mental illness).

73. *Phillips v. Lincoln Nat'l Life Ins. Co.*, 978 F.2d 302, 310, 314 (7th Cir. 1992).

74. *Id.* at 304.

75. *Id.*

76. *Id.* at 314 (stating that "[i]nsurance policies are almost always drafted by insurers, and they should be certain that limitations in their coverage are clear enough for a layperson to understand. Insurers should not be permitted to exploit policy term ambiguities, which they could have avoided, to deny coverage to an unsuspecting insured.").

Although the Seventh Circuit did not address the value of the brain scan to the issue of whether congenital encephalopathy that manifests itself through a range of behavioral problems is a physical or mental illness, the Court did reference the competing standards—cause of the condition versus how the average layperson perceives the condition<sup>77</sup>—before deciding to hold that the plan’s use of the undefined phrase “mental illness” is ambiguous as applied to patients like James who have mental disorders caused by organic illnesses.<sup>78</sup>

Finally, in a pair of decisions issued in 2006 and 2007, in the case of *Fitts v. Unum Life Insurance Company*, the United States District Court for the District of Columbia addressed several questions relating to the insurance coverage of bipolar disorder.<sup>79</sup> The issue before the District Court in the 2006 decision was whether bipolar disorder, if proved, would be subject to the mental illness cap set forth in the defendant’s disability insurance policy.<sup>80</sup> The plaintiff called a physician to testify that bipolar disorder is a neurobiological disorder that affects the physical and chemical structures of the brain:

He explain[ed] that it may be characterized by certain physical occurrences, including degenerative changes observed in the brain, and a progressive loss of hippocampal cells in the brain. In addition, he stated that depressive episodes associated with bipolar disorder are generally accompanied by large outpourings of corticosteroids (stress hormones) from the adrenal gland, which are damaging to a number of areas of the brain. . . . [He] ultimately conclude[d] that bipolar disorder is a physical illness because it is a disease afflicting a physical organ of

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77. *Id.* at 308 (stating that “Lincoln acknowledges that the *Plan provides no definition of mental illness*, but nevertheless insists that the term plainly encompasses illnesses like the one afflicting James because ‘the average layperson, by merely observing James’ broad range of psychiatric and behavioral symptoms and the nature of his treatment, would conclude that he was suffering from and being treated for a mental illness or disorder.’ In Lincoln’s view, the *cause* of an illness is irrelevant in determining whether an illness is physical or mental. This is in direct conflict with Phillips’ view that because James’ condition flows from an organic defect, he is suffering from a physical illness, with behavioral and emotional manifestations.”) (italicized emphasis in original; internal references omitted).

78. *Id.* at 310-11.

79. *Fitts v. Unum Life Ins. Co.*, 2007 U.S. Dist. LEXIS 33397, at \*2 (D.C. May 7, 2007); *Fitts v. Unum Life Ins. Co.*, 2006 U.S. Dist. LEXIS 9235, at \*12 (D.C. Feb 23, 2006).

80. *Fitts*, 2006 U.S. Dist. LEXIS 9235, at \*12 (stating “[the insured] alleges that the term ‘mental illness’ should be defined to exclude any ailment that has a physical or biological basis. Pursuant to that definition, she maintains that her sickness, bipolar disorder, is not a mental illness because it has physical, biological, and genetic components.”).

the body, just like diseases affecting the heart, the kidneys, or the liver.<sup>81</sup>

Several of the insurer's witnesses also conceded in deposition testimony that bipolar disorder has biological components.<sup>82</sup> The insurer, on the other hand, contended that bipolar disorder is a mental illness subject to the lower benefit caps because bipolar disorder is included within the DSM-IV's classification of mental disorders<sup>83</sup> (even though the DSM-IV acknowledges that no good distinction between physical and mental disorders exists<sup>84</sup>), and because "there are no physical conditions that must be present for a person to be diagnosed with the disorder."<sup>85</sup> In the end, the District Court construed the definition of mental illness against the insurer and held that bipolar disorder was covered under the better set of benefits.<sup>86</sup>

The issue before the District Court in the 2007 opinion was whether the plaintiff actually had bipolar disorder.<sup>87</sup> The insurer contended that the plaintiff did not have bipolar disorder for two alternative reasons; that is, that no brain scans showed any changes in the plaintiff's brain and, in the alternative, that bipolar disorder cannot yet be diagnosed with a brain scan.<sup>88</sup> The Court, perhaps confused by the insurer's pro-brain scan and then con-brain scan argument, ruled in favor of the plaintiff.<sup>89</sup>

Since the time of these cases, and as discussed in more detail below in Part III, both Congress and many state legislatures have passed laws that require some (but certainly not all) health insurance plans to provide some (but not necessarily complete) parity in their coverage of physical

81. *Id.* at \*12-13 (internal citations omitted).

82. *Id.* at \*13, n. 6.

83. *Id.* at \*15.

84. AMERICAN PSYCHIATRIC ASSOCIATION, DIAGNOSTIC AND STATISTICAL MANUAL OF MENTAL DISORDERS, Fourth Edition xxx (4th ed., Text Rev., 2000) (stating that "[a]lthough this volume is titled the *Diagnostic and Statistical Manual of Mental Disorders*, the term *mental disorder* unfortunately implies a distinction between 'mental' disorders and 'physical' disorders that is a reductionistic anachronism of mind/body dualism. A compelling literature documents that there is much 'physical' in 'mental' disorders and much 'mental' in 'physical' disorders. The problem raised by the term 'mental' disorders has been much clearer than its solution, and, unfortunately, the term persists in the title of the DSM-IV because we have not found an appropriate substitute.") (emphasis in original).

85. *Fitts*, 2006 U.S. Dist. LEXIS 9235, at \*16.

86. *Id.* at \*24-25.

87. *Fitts*, 2007 U.S. Dist. LEXIS 33397, at \*2.

88. *Id.* at \*25.

89. *Id.* at \*25-26. (stating that "[a]lthough bipolar disorder is an organic brain disorder associated with physiological changes in the brain, there is no test that reveals or confirms the diagnosis of bipolar disorder, and [the plaintiff] cannot be required to produce what does not exist in order to prevail.") (internal citations omitted).

and mental health conditions. For those health insurance plans that are not regulated by a federal or state parity law (including public programs such as the Medicaid Program<sup>90</sup>) and for regulated insurance plans based in states with incomplete parity laws, the outcome of a plaintiff's case against the insurer for the better set of benefits will depend on whether and how the plan defines mental illness and how the court interprets either the definition or the undefined phrase.

One question is whether and how advances in neuroscience, including structural and functional neuroimaging, will impact the scope of insurance coverage disputes. Based on litigants' liberal use of psychiatric, psychological, and neuroimaging evidence to support brain-based claims, starting in the late 1980s, as well as stakeholders' use of neuroimaging evidence in mental health parity debates and disability claim proceedings, as discussed in Parts III-V, *infra*, I would anticipate plaintiffs' continued use of the behavioral and brain sciences to argue that certain mental disorders are biological in nature and therefore deserving of benefits applicable to physical illnesses. Given decisions in cases such as *Arkansas Blue Cross and Blue Shield, Inc. v. Doe*,<sup>91</sup> which found that bipolar disorder was an illness of the brain that stemmed from physical and biological causes,<sup>92</sup> I also anticipate that plaintiffs' neuroscience-based claims may have some success in jurisdictions that look to the cause or origin of the plaintiff's disorder, especially if the disorder is one of the better known DSM-IV Axis I clinical disorders (such as schizophrenia or bipolar disorder), or Axis III general medical conditions that plays a role in the development, continuance, or exacerbation of an Axis I and II disorder (such as a brain injury or AIDS that can result in symptoms of mental illness).

In cases involving other mental disorders, I suspect that the outcome will depend on whether that jurisdiction focuses on origin, treatment, manifestation, or symptoms,<sup>93</sup> as well as whether the "first

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90. See, e.g., Brunalli, *supra* note 43, at 622 (discussing the non-application of many state parity laws to public health insurance programs); TREATMENT ADVOCACY CENTER, MEDICAID DISCRIMINATION AGAINST PEOPLE WITH SEVERE MENTAL ILLNESSES, <http://www.psychlaws.org/GeneralResources/fact12.htm> (last visited Feb. 3, 2008) (noting that "[w]hile the federal government seeks 'parity' for treatment of lesser forms of mental illness by private insurers, it continues to discriminate against those with severe mental illnesses by denying them coverage under Medicaid when they require hospitalization in a psychiatric hospital.").

91. Ark. Blue Cross and Blue Shield, Inc. v. Doe, 733 S.W.2d 429, 431 (Ark. Ct. App. 1987).

92. *Id.*

93. See, e.g., *Phillips*, 978 F.2d at 310-11 (noting that different jurisdictions use competing definitions of mental illness); *Fitts*, 2006 U.S. Dist. LEXIS 9235, at \*19 (noting that the courts have relied on at least three different approaches for defining mental illness).

impression” symptoms are physical (e.g., starvation and dehydration) or behavioral (e.g., delusions and hallucinations) and, if behavioral, the ability of the plaintiff’s experts to convince the jury that such behavior is brain-based. Given the ready (Internet) availability of neuroimaging studies finding that emotion may be correlated with blood oxygenation level dependent (BOLD) activity in the limbic system,<sup>94</sup> attention may be correlated with BOLD activity in the right caudate nucleus and globus pallidus,<sup>95</sup> motor activity may be correlated with BOLD activity in the primary motor cortex,<sup>96</sup> perception may be correlated with changes in the sensory association cortex,<sup>97</sup> working memory may be correlated with BOLD activity in the prefrontal cortex,<sup>98</sup> and so on,<sup>99</sup> I anticipate that aggressive plaintiffs may try to argue the brain-basis of the many signs and symptoms of mental illness, including those relating to emotion (e.g., depression, mania, anxiety, and flat affect), consciousness (e.g., decreased attention span, disorientation, and delirium), motor behavior (e.g., underactivity, overactivity, and compulsive movements), perception (e.g., auditory and visual hallucinations and other distortions of real events), long- and short-term memory impairments, speech, insight, and thinking (including thoughts of persecution or Apocryphal doom).<sup>100</sup> I also anticipate that defendants, like the defendant in *Fitts v. Unum Life Insurance Company*, may respond by arguing either that mental disorders cannot yet be diagnosed by a brain scan or that the plaintiff failed to introduce a brain scan that would have provided objective evidence of a mental disorder.<sup>101</sup>

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94. NEIL R. CARLSON, *PHYSIOLOGY OF BEHAVIOR* 335 (6th ed. 1998).

95. J.M. De La Fuente et al., *Brain Glucose Metabolism in Borderline Personality Disorder*, 31 J. PSYCHIATRIC RES. 531, 537 (1997).

96. CARLSON, *supra* note 94, at 234.

97. *Id.* at 437.

98. *Id.*

99. Brian Doherty, ‘*You Can’t See Why on an fMRI: What Science Can and Can’t Tell Us about the Insanity Defense*, REASON ONLINE, July 2007, <http://www.reason.com/news/show/120266.html> (last visited Feb. 4, 2008) (noting the frequency with which expert witnesses testify in legal proceedings and “reclassify complicated moral and legal questions as seemingly clear-cut, [brain-based,] scientific matters.”).

100. See, e.g., Appendix A (summarizing recent structural and functional neuroimaging studies in the context of mental disorders); Dawn Capp & Joan G. Esnayra, *It’s All in Your Head—Defining Psychiatric Disabilities as Physical Disabilities*, 23 T. JEFFERSON L. REV. 97, 106-14 (2000) (examining the neuroanatomical, neurochemical, and genetic correlates of the signs and symptoms of many mental disorders).

101. See *Fitts*, 2007 U.S. Dist. LEXIS 33397, at \*25 (stating that “Unum contends that [the plaintiff] does not have bipolar disorder because there are no brain studies showing changes in her brain. Yet Unum concedes that bipolar disorder ‘cannot be diagnosed with a brain scan.’”) (internal references omitted).

How should we assess these neuroscience-based claims? Scholars already have laid the groundwork for evaluating claims made about fMRI-lie detectors in terms of meeting relevance and reliability requirements set forth in civil and criminal rules of evidence.<sup>102</sup> In scope-of-insurance lawsuits involving functional neuroimaging evidence, litigants very well may have similar evidentiary defenses based on many of the same relevancy and reliability problems. These include, but certainly are not limited to, underlying problems with the theory of neurovascular coupling, the time lag associated with blood flow, the localization of neuronal activity, the statistical averaging of images, paired image subtraction, subject selection, the number of subjects and implications for statistical significance, as well as broader philosophical concerns relating to the inherent sociocultural and historical subjectivity of diagnosing and classifying psychiatric conditions.<sup>103</sup> A review of structural and functional neuroimaging studies involving individuals with mental disorders reveals several additional limitations, including the effect that different psychotropic drug regimens, alcohol and illegal drug use (given the large number of individuals who have mental disorders and co-occurring substance abuse disorders), cigarette smoking, endocrine changes, nutritional differences, and activity levels have for study results, as well as the extent to which the duration and severity of the subjects' mental illnesses may have contributed to the magnitude of any structural changes or functional differences identified during the study.<sup>104</sup> Finally, insurers also have a range of substantive and normative defenses; that is, that statutory cost containment,<sup>105</sup> lack of medical necessity,<sup>106</sup> and other reasons justify the

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102. See, e.g., Pettit, *supra* note 10; Kittay, *supra* note 10; Egan, *supra* note 10; Downie & Murphy, *supra* note 10; Keckler, *supra* note 10; Alexander, *supra* note 10.

103. See, e.g., Grace E. Jackson, *A Curious Consensus: "Brain Scans Prove Disease?"*, L. PROJECT PSYCHIATRIC RTS., <http://psychrights.org/Articles/GEJacksonMDBrainScanCuriousConsensus.pdf> (last visited Feb. 5, 2008) (discussing limitations on the use of functional neuroimaging for psychiatric diagnosis).

104. See, e.g., Robert B. Zipursky, *Imaging Mental Disorders in the 21st Century*, 52 CANADIAN J. PSYCHIATRY 133, 133 (2007).

105. See, e.g., Mental Health Parity Act of 1996, 29 U.S.C. § 1185a(c)(2) (allowing insurers to opt out of parity if parity raises overall plan costs by more than one percent); Mental Health Parity Act of 2007, S. 558, 110th Cong., § 712a(e)(1-2) (2007) (exempting from parity group health plans whose compliance would increase total costs by more than 2% during the first year or by more than 1% each subsequent year).

106. See, e.g., William M. Glazer, *Psychiatry and Medical Necessity*, 22(7) PSYCHIATRIC ANNALS 362, 362-65 (1992) (discussing insurers' application of the medical necessity requirement in the context of reimbursement for treatment of psychiatric conditions; identifying key factors that underlie the concept of medical necessity in psychiatric practice); Nancy W. Miller, *What Is Medical Necessity?*, PHYSICIAN'S NEWS DIG. (Aug. 2002) (stating that "[there are] as many

insurers' coverage refusal regardless of the merit of plaintiffs' neuroscience-based claims.

Finally, I anticipate that increased public understanding of the behavioral and brain sciences may impact the application of the layperson standard in jurisdictions that follow it. Remember the Eighth Circuit case in which the court stated that the test of whether a condition is physical or mental depends on how a reasonable layperson would understand or perceive the condition?<sup>107</sup> That case was decided in 1990, at the beginning of the Decade of the Brain,<sup>108</sup> when the public may not have known too much about the causes of mental illness. In the eighteen years since then, the public has been inundated with information regarding the treatable organic basis of many mental disorders. For example, on March 16, 1993, *The New York Times* made public the findings of a confidential government report exploring health reform for individuals with mental disorders.<sup>109</sup> The report, authored by the National Advisory Mental Health Council, stated that, "contrary to persistent myth, mental illnesses are both real and definable"<sup>110</sup> and that "the efficacy of an extensive array of treatments for specific mental disorders has been systematically tested in controlled clinical trials [and] demonstrate[s] that mental disorders can now be diagnosed and treated as precisely and effectively as are other disorders in medicine."<sup>111</sup> Steven Hyman, former Director of the NIMH, referenced several neuroimaging studies when he told Congress in 1996 that mental disorders are diseases of the brain:

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definitions of medical necessity as there are payors, laws and courts to interpret them. Generally speaking, though, most definitions incorporate the principle of providing services which are 'reasonable and necessary' or 'appropriate' in light of clinical standards of practice . . . . Medicare defines 'medical necessity' as services or items reasonable and necessary for the diagnosis or treatment of illness or injury or to improve the functioning of a malformed body member. While that sounds like a hard and fast rule, consider that CMS (formerly HCFA) has the power under the Social Security Act to determine if the method of treating a patient in the particular case is reasonable and necessary on a case-by-case basis."); Sabin & Daniels, *supra* note 18, at 5 (examining medical necessity in the context of mental health care).

107. *Brewer*, 921 F.2d at 154 (stating that "laypersons are inclined to focus on the symptoms of an illness; illnesses whose primary symptoms are depression, mood swings and unusual behavior are commonly characterized as mental illnesses regardless of their cause .").

108. Library of Congress, Project on Decade of the Brain, <http://www.loc.gov/loc/brain/> (last visited Jan. 30, 2008).

109. Pear, *supra* note 36, at A1 (citing National Advisory Mental Health Council, *Health Care Reform for Americans with Severe Mental Illnesses*, 150 AM. J. PSYCHIATRY 1447 (1993)).

110. Pear, *supra* note 36, at A1.

111. National Advisory Mental Health Council, *Health Care Reform for Americans with Severe Mental Illnesses: Report of the National Advisory Mental Health Council*, 150 AM. J. PSYCHIATRY 1447, at Abstract (1993).

[T]he accumulating weight of the evidence [and] the great bulk of it resulting from NIMH-sponsored research demonstrates that mental disorders are brain diseases. . . . We now know that individuals with schizophrenia have abnormalities in the size of their cerebral ventricles, those fluid-filled cavities in the brain; simply put, in schizophrenia, we see irregularities in the ratio of brain tissue to fluid in the brain. NIMH-sponsored research also has provided compelling evidence that the connections of nerve cells in the brain, the circuits that underlie the processing of thoughts and emotions, do not develop or function normally in patients with schizophrenia. . . . [Current] scientific techniques demonstrate beyond doubt that schizophrenia is a primary brain disorder.<sup>112</sup>

In 1999, Surgeon General David Satcher released an influential report in which he referenced research in basic neuroscience, behavioral science, and behavioral genetics to support the characterization of mental health disorders as “real health conditions” for which “a range of treatments exist.”<sup>113</sup> And, since 1999, the public has been overwhelmed with news regarding advances in neuroimaging, neurointerventions, and the behavioral and brain sciences:<sup>114</sup>

An endless stream of news stories about the latest advances in brain scans and the chemical conquest of personality enhances the experts’ credibility and feeds into a belief that we have come to a sophisticated understanding of the intersection between mind, brain, and behavior.<sup>115</sup>

As the public continues to receive this information, I suspect the application of the reasonable layperson test in health insurance coverage

112. Hearing before the Subcomm. on Labor, Health & Human Serv., Educ. & Related Agencies of the H. Comm. on Appropriations, 104th Cong. 363, 375 (1996) (statement of Steven Hyman, Dir., Nat’l Inst. Mental Health, Dep’t of Health & Human Servs.).

113. U.S. DEP’T HEALTH & HUMAN SERVS., MENTAL HEALTH: A REPORT OF THE SURGEON GENERAL, Executive Summary at vii (1999), <http://www.surgeongeneral.gov/library/mentalhealth/pdfs/ExSummary-Final.pdf> (last visited Feb. 2, 2008) (stating that “[t]he U.S. Congress declared the 1990s the Decade of the Brain. In this decade we have learned much through research—in basic neuroscience, behavioral science, and genetics—about the complex workings of the brain. Research can help us gain a further understanding of the fundamental mechanisms underlying thought, emotion, and behavior—and an understanding of what goes wrong in the brain in mental illness. It can also lead to better treatments and improved services for our diverse population.”); *id.* at iv.

114. See, e.g., Jason Pontin, *Mind Over Matter, with a Machine’s Help*, N.Y. TIMES, Aug. 26, 2007, at F3; Sandra Blakeslee, *A Small Part of the Brain and Its Profound Effects*, N.Y. TIMES, Feb. 6, 2007, at F6; Sandra Blakeslee, *Just What’s Going on Inside that Head of Yours?* N.Y. TIMES, Mar. 14, 2000, at F6; Holcomb B. Noble, *Pain at Work: Startling Images and New Hope*, N.Y. TIMES, Aug. 10, 1999, at F1.

115. Doherty, *supra* note 99.

disputes may begin to swing in favor of plaintiffs who claim that their mental disorders are physical in nature.<sup>116</sup>

### III. THE MENTAL HEALTH PARITY DEBATE

In the early 1990s, many patients and patient advocacy organizations began to lobby Congress and state legislatures for health insurance parity, reasoning that there is no biological justification for the unequal insurance coverage of mental and physical conditions by health insurance plans.<sup>117</sup> Insurers responded with a multi-layered cost-containment defense. By limiting mental health coverage, insurers claimed that they could reduce costs, maintain premium levels, and cover more individuals.<sup>118</sup> Insurers also claimed that increased mental health benefits would give rise to adverse selection; that is, that consumers with mental health conditions that required expensive treatments would select those plans that provided coverage for such treatments.<sup>119</sup> Insurers also expressed concern that consumer demand for mental health treatment would be highly responsive to the presence of insurance coverage<sup>120</sup> and that consumers would seek treatment and reimbursement for “frivolous” emotional conditions and other mental disorders characterized by diagnostic ambiguity and uncertain treatment success.<sup>121</sup> Indeed, the Commerce and Industry Association of New Jersey opposed legislative efforts to expand mental health benefits in the State of New Jersey for fear that the legislation “would uncover unworthy disorders such as shyness, boastfulness, fetishism, and impulsiveness.”<sup>122</sup> The New Jersey Business and Industry Association

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116. Shannon, *supra* note 29, at 75.

117. See, e.g., Nelson, *supra* note 26, at 99 (stating that “[n]owhere is the gap between science and society more pronounced than in health benefit coverage for mental illness.”); LaFratta, *supra* note 26, at 405-06 (setting forth arguments in favor of parity); Kaplan, *supra* note 34, at 328 (noting that “[t]he parity movement came to popular attention in the early 1990s.”).

118. See, e.g., Jacobi, *supra* note 44, at 186 (stating that “[r]esistance to such legislation centers on concerns over cost, diagnostic and prognostic indeterminacy, and ambiguity at the line dividing medical from non-medical treatments important to the seriously mentally ill.”); Maggie D. Gold, *Must Insurers Treat All Illnesses Equally? – Mental vs. Physical Illness: Congressional and Administrative Failure to End Limitations to and Exclusions from Coverage for Mental Illness in Employer-Provided Health Benefits under the Mental Health Parity Act and the Americans with Disabilities Act*, 4 CONN. INS. L.J. 767, 773 (1998) (explaining insurer arguments against parity legislation).

119. See, e.g., Gold, *supra* note 118, at 774-77 (1998) (applying theories of moral hazard to mental health insurance coverage); LaFratta, *supra* note 26, at 405 (applying the same).

120. See, e.g., Jonathan Klick & Thomas Stratmann, *Subsidizing Addiction: Do State Health Insurance Mandates Increase Alcohol Consumption?*, 35 J. LEGAL STUD. 175, 176 (2006).

121. See, e.g., Gold, *supra* note 118, at 774-77; LaFratta, *supra* note 26, at 405.

122. See Kaplan, *supra* note 34, at 338, n. 97.

similarly worried that the legislation would require insurers to cover less serious mental disorders listed in the DSM-IV, including “sibling relational problems and caffeine addiction.”<sup>123</sup> Stakeholders in favor of mental health parity responded, of course, by offering evidence that the diagnosis and treatment of mental disorders is precise, effective, and successful.<sup>124</sup>

By the mid-1990s, proponents of mental health parity had achieved some success at the federal and state level.<sup>125</sup> At the federal level, Congress passed the Mental Health Parity Act of 1996 (the 1996 MHPA), which required group health plans offering a mental health benefit in conjunction with medical and surgical benefits to provide equality for any annual or lifetime aggregate spending caps imposed within the plan.<sup>126</sup> A regulated group health plan that offered a lifetime cap of \$1 million for treatment for physical illnesses, for example, would be required to establish a \$1 million cap for treatment of mental disorders. The 1996 MHPA did not, however, require covered health plans to actually offer a mental health benefit.<sup>127</sup> Nor did it prohibit covered plans from imposing higher copayments or deductibles for mental health services, placing different limits on numbers of visits or days of coverage, or otherwise establishing different cost-sharing ratios.<sup>128</sup> Thus, a regulated group health plan could reimburse a patient 100% of the cost of a visit to an orthopedic surgeon, but only 50% of the cost of a visit to a psychiatrist.<sup>129</sup> The 1996 MHPA also did not apply to small businesses that employed between two and fifty employees.<sup>130</sup> Its parity provisions did not extend to substance abuse treatments.<sup>131</sup> It also contained a provision allowing insurers to opt out of parity if parity raised overall plan costs by more than one percent<sup>132</sup> and, finally, a sunset provision which phased out parity requirements for benefits

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123. *See id.* at 338, n. 98.

124. *See, e.g.,* Gold, *supra* note 118, at 777.

125. *See, e.g.,* Nelson, *supra* note 26, at 94-95. *See also* Mental Health America, Mental Health Parity Timelines, <http://www1.nmha.org/state/parity/parityTimeline.cfm> (last visited Jan. 3, 2008).

126. Mental Health Parity Act of 1996, Pub. L. No. 104-204, 702(a), 110 Stat. 2944 (Sept. 26, 1996), *codified at* 29 U.S.C. § 1185a(a)(1-2) (1996).

127. 29 U.S.C. § 1185a(b)(1) (1996).

128. *Id.* § 1185a(b)(2).

129. *See, e.g.,* The Senate Approves the “2007 Mental Health Parity Act”: Achieving Equal Treatment for the Mentally Ill, [http://writ.news.findlaw.com/scripts/printer\\_friendly.pl?page=/colb/20071001.html](http://writ.news.findlaw.com/scripts/printer_friendly.pl?page=/colb/20071001.html) (last visited Feb. 3, 2008).

130. 29 U.S.C. § 1185a(c)(1)(A) and (B).

131. *Id.* at § 1185a(e)(4).

132. *Id.* at § 1185a(c)(2).

furnished on or after September 30, 2001 and, after renewal of the sunset provision, after December 31, 2006.<sup>133</sup>

Mental health parity continues to be an issue at the federal level. As of early February 2008, there are competing versions of a new mental health parity bill in the House and the Senate.<sup>134</sup> Some mental health advocates believe that the new legislation, if passed, will represent a substantial improvement over the 1996 MHPA. The Senate version, for example, extends the federal parity mandate to deductibles, coinsurance, and the number of visits each year.<sup>135</sup> The Senate version still does not require regulated group health plans to offer a mental health benefit, however,<sup>136</sup> and it also contains an exemption for group health plans whose compliance would increase total costs by more than two percent during the first year or by more than one percent each subsequent year.<sup>137</sup>

Many state legislatures have enacted their own mental health parity laws, which vary widely in scope.<sup>138</sup> Some of these laws require insurers to offer mental health benefits and to provide full parity between physical and mental health benefits; some laws require insurers to offer optional mental health coverage; some laws require insurers to offer mental health benefits equal to medical health benefits but only if mental health benefits are offered; some laws require a minimum level

133. *Id.* at § 1185a(f). *See generally* Nelson, *supra* note 26, at 103-05 (discussing the limitations of the 1996 MHPA).

134. Paul Wellstone Addiction and Mental Equity Act of 2007, H.R. 1424, 110th Cong., (1st Sess. 2007); Mental Health Parity Act, S. 558, 110th Cong. §558 (1st Sess. 2007) (being “a bill to provide parity between health insurance coverage of mental health benefits . . . for medical and surgical services . . .”).

135. *See, e.g.*, The Senate Approves the “2007 Mental Health Parity Act”: Achieving Equal Treatment for the Mentally Ill, [http://writ.news.findlaw.com/scripts/printer\\_friendly.pl?page=/colb/20071001.html](http://writ.news.findlaw.com/scripts/printer_friendly.pl?page=/colb/20071001.html) (last visited Feb. 3, 2008) (stating that “the new law would signal progress in the acceptance of mental illness as a ‘real’ medical condition, one that deserves the same accommodation and concern as heart disease or cancer. Such acceptance could diminish the stigma attached to people who suffer from these conditions and could, accordingly, motivate people who might otherwise feel ashamed to seek care when they need it.”).

136. Mental Health Parity Act, S. 558, 110th Cong. § 712a(a), (2007) (requiring only parity for a group health plan that “provides both medical and surgical benefits and mental health benefits”).

137. *Id.* at § 712a(e)(1)-(2).

138. *See, e.g.*, Jacobi, *supra* note 44, at 190-91 (summarizing state mental health parity laws); Michele Garvin et al., *Mental Health Parity: The Massachusetts Experience in Context*, 47 B. B.J. 18, 19 (May/June 2003) (summarizing the same); National Conference of State Legislatures, *State Laws Mandating or Regulating Mental Health Benefits* (Nov. 1, 2007), <http://www.ncsl.org/programs/health/mentalben.htm> (last visited Feb. 4, 2008) (summarizing the same).

of coverage for mental health benefits; and some laws contain yet other variations.<sup>139</sup>

One question is whether advances in neuroscience will impact mental health parity interpretations or applications at the federal or state level. I think they may in three different ways. The first way relates to the way in which litigants or courts interpret the mental health benefits that are subject to a parity mandate. Note that the original 1996 MHPA defined mental health benefits as “benefits with respect to mental health services, as defined under the terms of the plan or coverage (as the case may be), but [not including] benefits with respect to treatment of substance abuse or chemical dependency.”<sup>140</sup> In the Senate version of the 2007 mental health parity bill, mental health benefits are similarly defined, although substance abuse benefits are now included as are any other benefits required under state law.<sup>141</sup> If the Senate version passes, then regulated group health plans may have the flexibility to define narrowly the mental health conditions subject to the parity mandate unless State law contains a broader definition.<sup>142</sup>

Many State laws do contain (not necessarily broader but) more specific descriptions of the mental health benefits that are subject to the State’s parity mandate.<sup>143</sup> Connecticut, for example, mandates insurance coverage for most conditions listed in the DSM-IV.<sup>144</sup> Mississippi mandates insurance coverage for any psychiatric disease identified in the current edition of The International Classification of Diseases.<sup>145</sup> Montana mandates parity for seven disorders: schizophrenia, schizoaffective disorder, bipolar disorder, major depression, panic

139. Garvin et al., *supra* note 138, at 19.

140. 29 U.S.C. § 1185a(e)(4) (1996).

141. Mental Health Parity Act of 2007, S. 558, 110th Cong. summary of legislation, (1st Sess. 2007) (defining mental health benefits as “benefits with respect to mental health services (including substance abuse treatment) as defined under the terms of the group health plan or coverage, and when applicable as may be defined under State law when applicable to health insurance coverage offered in connection with a group health plan.”). The House version of the bill would use chapter 89 of title 5 of the United States Code to determine those mental health benefits subject to parity. Paul Wellstone Addiction and Mental Equity Act of 2007, H.R. 1424, 110th Cong. (1st Sess. 2007). *See generally* Kevin Diaz, *With Mental Health Bill Mired, Ramstad’s Legacy at Stake*, MINNEAPOLIS STAR TRIBUNE, Jan. 29, 2008 (discussing the Senate and House versions and their likelihood of passing).

142. *See* Diaz, *supra* note 141.

143. *See, e.g.*, Brunalli, *supra* note 43, at 601 (describing different states’ definitions of mental illness); Michael J. Carroll, *The Mental Health Parity Act of 1996: Let It Sunset if Real Changes Are Not Made*, 52 DRAKE L. REV. 553, 570-71 (2004) (describing the same).

144. CONN. GEN. STAT. § 38a-514(a) (2008) (excluding caffeine use disorders and other less serious mental disorders).

145. MISS. CODE ANN. § 83-9-37(f) (2008).

disorder, obsessive-compulsive disorder, and autism.<sup>146</sup> New Hampshire adds to that list anorexia nervosa, bulimia nervosa, pervasive developmental disorder, and chronic post-traumatic stress disorder.<sup>147</sup> New Jersey mandates insurance coverage for

a mental or nervous condition that is caused by a biological disorder of the brain and results in a clinically significant or psychological syndrome or pattern that substantially limits the functioning of the person with the illness, including, but not limited to, schizophrenia, schizoaffective disorder, major depressive disorder, bipolar disorder, paranoia and other psychotic disorders, obsessive-compulsive disorder, panic disorder and pervasive developmental disorder or autism.<sup>148</sup>

Nebraska expressly ties its current definition of serious mental illness to the state of medical science: “any mental health condition that current medical science affirms is caused by a biological disorder of the brain and that substantially limits the life activities of the person with the serious mental illness.”<sup>149</sup> Many scholars also urge the adoption of mental disorder definitions that are tied to the current state of medical science:

Congress should pass legislation requiring full parity between certain biologically based mental illnesses and physical illnesses. Such a bill should initially include a very small list of disorders with the clearest scientific backing for their biological bases . . . . [I]t would be a relatively simple matter to amend the law in the future to add any other diagnoses that achieve wide scientific recognition as a biologically based brain disorder.<sup>150</sup>

Given litigants’ liberal use of expert psychiatric, psychological, and neuroimaging evidence to support brain-based claims starting in the late 1980s, I suspect that in States such as New Jersey that mandate insurance coverage for “a mental or nervous condition that is caused by a biological disorder of the brain,”<sup>151</sup> plaintiffs may rely on structural and functional neuroimaging findings in an attempt to prove that their mental disorders are biological and therefore subject to the parity mandate. Note that any neuroscience-based “evidence” would not necessarily be sufficient for the plaintiff; in some states, she still would

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146. MONT. CODE ANN. § 33-22-706(1) and (6)(a)-(g) (2007).

147. N.H. REV. STAT. ANN. § 417-E:1.III(a)-(i) (2008).

148. N.J. STAT. ANN. § 17B:27A-7.5 (2007).

149. NEB. REV. STAT. § 44-792(5)(b) (2008).

150. Carroll, *supra* note 143, at 579, 582.

151. N.J. STAT. ANN. § 17B:27A-7.5 (2007).

be required to prove that her mental disorder substantially limits her functioning, which may require additional medical or social evidence regarding her inability to work or complete other activities of daily living.<sup>152</sup>

In States such as Nebraska that expressly define protected mental health benefits in terms of whether “current medical science affirms [that the disorder] is caused by a biological disorder of the brain,”<sup>153</sup> or in States that follow some pieces of scholarly advice and define protected mental health benefits in terms of those disorders “with the clearest scientific backing for their biological bases” and “that achieve wide scientific recognition as a biologically based brain disorder,”<sup>154</sup> I suspect that aggressive plaintiffs also may rely on recent structural or functional neuroimaging studies in an attempt to establish a scientific backing for their claims in light of the dozens of well-publicized and readily available neuroimaging studies finding structural differences or functional associations between changes in regional blood oxygenation and conditions such as mild geriatric depression,<sup>155</sup> post-traumatic stress,<sup>156</sup> panic attacks,<sup>157</sup> borderline personality disorder,<sup>158</sup> eating disorders,<sup>159</sup> substance use disorders (in states that do not expressly include substance use disorders within their illustrative list of protected mental health benefits),<sup>160</sup> and so on. Again, insurers would have an

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152. See, e.g., N.J. STAT. ANN. § 17B:27A-7.5 (2007) (mandating insurance coverage for “a mental or nervous condition . . . that substantially limits the functioning of the person with the illness . . .”).

153. NEB. REV. STAT. § 44-792(5)(b) (2008).

154. Carroll, *supra* note 143, at 579, 582.

155. See, e.g., Yonggui Yuan et al., *White Matter Integrity of the Whole Brain Is Disrupted in First-Episode Remitted Geriatric Depression*, 18(17) NEUROREPORT 1845 (2007).

156. See, e.g., Noriyuki Kitayama et al., *Morphologic Alterations in the Corpus Callosum in Abuse-Related Posttraumatic Stress Disorder: A Preliminary Study*, 195(12) J. NERVOUS & MENTAL DISORDERS 1027 (2007).

157. See, e.g., Shutaro Nakaaki et al., *A Case of Frontotemporal Lobar Degeneration (FTLD) with Panic Attack as the First Symptom*, 19(4) J. NEUROPSYCHIATRY & CLINICAL NEUROSCIENCES 485, 486 (2007).

158. See, e.g., Jon E. Grant et al., *Frontal White Matter Integrity in Borderline Personality Disorder with Self-Injurious Behavior*, 19(4) J. NEUROPSYCHIATRY & CLINICAL NEUROSCIENCES 383 (2007).

159. See, e.g., Mark Mühlau et al., *Gray Matter Decrease of the Anterior Cingulate Cortex in Anorexia Nervosa*, 164(12) AM. J. PSYCHIATRY 1850 (2007); Angela Wagner et al., *Altered Reward Processing in Women Recovered from Anorexia Nervosa*, 164(12) AM. J. PSYCHIATRY 1842 (2007); Section 4 of Appendix A to this Article (summarizing recent neuroimaging findings in the context of eating disorders).

160. See, e.g., Section 3 of Appendix A to this Article (summarizing recent neuroimaging findings in the context of substance use and abuse).

evidentiary defense<sup>161</sup> as well as a range of substantive and normative defenses; that is, that cost containment,<sup>162</sup> lack of medical necessity,<sup>163</sup> or other reasons justify insurers' refusal to cover the extra mental disorders regardless of the merit of plaintiffs' neuroscience-based claims.

Thus, one way in which advances in neuroimaging may impact mental health parity law relates to the interpretation of the mental health benefits that are subject to a parity mandate. A second way such advances may impact mental health parity law is to provide support for the passage of parity legislation in states that do not have such legislation or support for more stringent parity legislation at the federal or state level. When the Texas Legislature was considering a mental health parity bill in 1991, Senator Mike Moncrief (D-Fort Worth), the bill's sponsor, wanted the Texas Legislature to understand why he was concerned about insurers' willingness to cover treatments for neurological disorders such as Parkinson's disease but not mental disorders such as schizophrenia.<sup>164</sup> Senator Moncrief told the Legislature that the disparate treatment was illogical because both conditions involve an imbalance of the same chemical: "[The] chemical factor in the brain involved in both of these diseases is the same; it's dopamine. One disease involves an overabundance of dopamine while the other is a shortage of the identical neurotransmitter."<sup>165</sup> I anticipate that proponents of mental health parity legislation will continue to use neuroscience to illustrate what they perceive to be illogical or unjust coverage discrepancies.<sup>166</sup> For example, in a 2004 essay published in the *Harvard Journal on Legislation*, Representative Patrick Kennedy (D-R.I.) argued that, "In the face of a growing body of scientific literature documenting the biochemical nature of mental illnesses, the status quo of insurance discrimination against those who suffer from such illnesses

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161. See, e.g., Pettit, *supra* note 10; Kittay, *supra* note 10; Egan, *supra* note 10; Downie & Murphy, *supra* note 10; Keckler, *supra* note 10; Alexander, *supra* note 10.

162. See, e.g., the Mental Health Parity Act of 1996, 29 U.S.C. § 1185a(c)(2) (allowing insurers to opt out of parity if parity raises overall plan costs more than one percent); Mental Health Parity Act of 2007, S. 558, 110th Cong. § 712a(e)(1) and (2) (2007) (exempting from parity group health plans whose compliance would increase total costs by more than 2% during the first year or by more than 1% each subsequent year).

163. See, e.g., Sabin & Daniels, *supra* note 18, at 5 (discussing medical necessity in the context of mental health care).

164. Carroll, *supra* note 143, at 579 (citing Tex. Floor Debate, 71st Leg. Reg. Sess. (Apr. 25, 1991) (Statement of Sen. Moncrief) (transcript available from Senate Journal Office)).

165. *Id.*

166. Beth Mellen Harrison, *Mental Health Parity*, 39 HARV. J. ON LEGIS. 255, 265 (2002) (stating that "given these advances in research, there is no scientific justification for treating mental health services differently than general medical services.").

is indefensible.”<sup>167</sup> Kennedy cited three National Institute of Mental Health (NIMH) research summaries noting that NIMH investigators had discovered “specific, subtle abnormalities in the structure and function of the brains of patients with schizophrenia,” that “one of the most consistent findings to date has been the appearance of specific abnormalities, or lesions, in the white matter of the brain in patients with bipolar disorder,” and that “animal research suggests that ‘different anxiety disorders may be associated with activation in different parts of the amygdala.’”<sup>168</sup> Kennedy concluded: “In an era when researchers are churning out ever more science exploring the biochemical and physiological causes and effects of mental illnesses, there is no excuse for such differential treatment.”<sup>169</sup> Kennedy is now the lead sponsor of the House version of the 2007 mental health parity bill.<sup>170</sup>

A third way in which mental health parity advocates may use neuroscience is to argue that federal and state disability law provisions applicable to employers and places of public accommodation should prohibit insurers from offering unequal benefits. Given that courts have long held that unequal benefits do not violate disability law, including the federal Americans with Disabilities Act (ADA),<sup>171</sup> even though these laws were designed to prevent discrimination against qualified individuals with disabilities on the basis of such disabilities, I do not think these efforts will be successful. However, I anticipate that scholars and other disability advocates will continue to emphasize the legitimacy of mental disorders and advances in neuroscience in an attempt to gather support for ADA-mandated mental health parity.<sup>172</sup>

In summary, stakeholders are using advances in neuroscience to impact the scope of insurance benefits and the mental health parity

167. Representative Patrick J. Kennedy, *Why We Must End Insurance Discrimination Against Mental Health Care*, 41 HARV. J. ON LEGIS. 363, 367 (2004).

168. *Id.* at 367, n.39.

169. *Id.* at 374-75.

170. Paul Wellstone Addiction and Mental Equity Act of 2007, H.R. 1424, 110th Cong. (1st Sess. 2007).

171. See, e.g., Jacobi, *supra* note 44, at 188-89 (discussing the non-application of the ADA to insurance disparities); Diane Serritella, *Employer and Insurers Not Obligated by the ADA to Provide Equal Benefit Plans for Physical and Mental Disabilities*, 26 AM. J.L. & MED. 112, 112-14 (2000) (discussing the 2000 *Weyer v. Twentieth Century Fox Film Corp.* case, in which the Ninth Circuit held that a group disability insurance policy offered as a fringe benefit that provided better benefits for physical disabilities did not violate the ADA and analogous state law).

172. See, e.g., Signorello, *supra* note 29, at 350 (calling for the recognition of mental illness as “the legitimate, typically treatable, and widespread ailment that it is.”); Gardner, *supra* note 31, at 708 (stating that “modern neuroscience is leading the charge in allowing us to understand mental illness, and it continues to provide evidence that the distinction between mental and physical illness is often false.”).

debate in a variety of ways. The major theme underlying these efforts is that mental disorders are biological in nature and therefore any disparate treatment is illogical, unjust, or both. Note that if stakeholders convince “the law” that physical and mental illnesses are one and the same, then many mental health insurance coverage disputes and the mental health parity debate will be moot.<sup>173</sup>

#### IV. THE SCOPE OF PROTECTED STATUS UNDER DISABILITY LAW

Elsewhere I have examined relatively low-hanging neuro-disability law fruit, such as which physical and mental health conditions examined during structural and functional neuroimaging studies may constitute disabilities under the ADA, whether an fMRI examination would be considered a regulated medical examination under the ADA, and whether the ADA and other disability, health, and civil rights laws provide any confidentiality and privacy protections to individuals whose brains are scanned using fMRI.<sup>174</sup> Here, I would like to examine the broader question of whether and how neuroscience might impact the scope of protected status under federal and state disability law.

A range of discrimination protections and accommodations are available to qualified individuals who have physical and mental disabilities under a number of different federal and state laws. The federal Rehabilitation Act of 1973, for example, prohibits employers and organizations that receive federal financial assistance from discriminating on the basis of disability against qualified individuals with disabilities.<sup>175</sup> The ADA, passed by Congress in 1990, prohibits certain employers, state and local government agencies, and places of public accommodation from discriminating on the basis of disability against qualified individuals with disabilities and requires the provision of reasonable accommodations unless it would cause an undue hardship.<sup>176</sup> State laws such as the California Fair Housing and Employment Act also provide individuals with protection from harassment and discrimination in employment because of physical or

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173. See, e.g., Kaplan, *supra* note 34, at 360 (stating “[i]ronically, when these misconceptions disappear, the federal and state governments may not have to mandate coverage for mental disorders.”).

174. Tovino, *supra* note 4, at Parts IV & V.

175. 29 U.S.C. § 701 (2007).

176. 42 U.S.C. § 12101 (2007); EQUAL OPPORTUNITY EMPLOYMENT COMMISSION, SMALL EMPLOYERS AND REASONABLE ACCOMMODATIONS, <http://www.eeoc.gov/facts/accommodation.html> (last visited Feb. 4, 2008).

mental disability.<sup>177</sup> One theme underlying these federal and state laws is that it is “wrong” to discriminate against individuals who have physical and mental conditions over which they have no control, and that it is “right” to accommodate them to help them participate more fully in society.<sup>178</sup>

One question is how advances in neuroscience may impact federal and state disability law. Neuroscience already is impacting policy discussions about the scope of protected disability status. For illustrative purposes only, let us consider Title I of the ADA, which prohibits certain employers from discriminating on the basis of disability against qualified individuals with disabilities<sup>179</sup> and requires the provision of reasonable accommodations unless such accommodations pose an undue hardship.<sup>180</sup> The ADA defines a disability as “a physical or mental impairment that substantially limits one or more of the major life activities of such individual; a record of such an impairment; or being regarded as having such an impairment.”<sup>181</sup> The statute,<sup>182</sup> several different portions of the implementing regulations promulgated by the Equal Employment Opportunity Commission (EEOC),<sup>183</sup> a lengthy set of interpretive guidelines,<sup>184</sup> and hundreds of judicial opinions<sup>185</sup> are

177. CAL. GOV'T CODE § 12940 (2007).

178. See, e.g., Ramona L. Paetzold, *Mental Illness and Reasonable Accommodations at Work: Definition of a Mental Disability under the ADA*, 56(10) PSYCHIATRIC SERVS. 1188, 1190 (2005) (noting that individuals with mental impairments who can completely control their symptoms through medication may not be protected because they have control over their otherwise limiting conditions). *But see* Bazelon Center for Mental Health Law, *The Supreme Court's 1999 ADA Decisions*, <http://bazelon.org/issues/disabilityrights/resources/99scotus.htm> (last visited Feb. 4, 2008) (noting, on the other hand, that the ADA generally protects individuals with bipolar disorder whose symptoms periodically arise even while taking medication). See also Timothy P. Ward, *Needing a Fix: Congress Should Amend the Americans with Disabilities Act of 1990 to Remove a Record of Addiction as a Protected Disability*, 36 RUTGERS L.J. 683, 719 (2005) (stating that “[i]mplicit in Congress’s legitimate goal of protecting the disabled from discrimination is the idea that discrimination against disabled persons is unfair because it is wrong to treat a person differently based on circumstances or conditions over which he has no control.”).

179. 29 C.F.R. § 1630.4 (2005).

180. 29 C.F.R. § 1630.9 (2005).

181. 42 U.S.C. § 12102(2) (2007) (Title I definition of disability).

182. See, e.g., 42 U.S.C. § 12102(2) (defining disability); § 12111(8) (defining “[q]ualified individual with a disability”); § 12114(a) (interpreting the definition of “[q]ualified individual with a disability” in light of alcoholism and illegal drug use).

183. See, e.g., 29 C.F.R. Part 1630.2(h)(2) (2007) (clarifying that a protected mental impairment includes “any mental or psychological disorder, such as mental retardation, organic brain syndrome, emotional or mental illness, and specific learning disabilities.”).

184. See, e.g., Appendix to 29 C.F.R. § 1630 -- Interpretive Guidance on Title I of the Americans with Disabilities Act Background (distinguishing protected mental impairments from unprotected characteristics for purposes of 29 C.F.R. § 1630.2(h): “It is important to distinguish between conditions that are impairments and physical, psychological, environmental, cultural and

dedicated to distinguishing the conditions that will and will not result in an individual's protection under the statute.

For example, the statute itself clarifies that an employee or applicant who is currently engaging in the illegal use of drugs is not protected, although an individual is protected if she has successfully completed a supervised drug rehabilitation program (or has otherwise been successfully rehabilitated or is participating in a supervised rehabilitation program) and is no longer engaging in the illegal use of drugs.<sup>186</sup> The interpretive guidelines also clarify that the illegal use of drugs refers to both the use of unlawful drugs, such as cocaine, and the unlawful use of prescription drugs.<sup>187</sup> The interpretive guidelines specify that the definition of "rehabilitation program" includes both inpatient and outpatient programs, employee assistance programs, professionally recognized self-help programs such as Narcotics Anonymous, and other programs that provide professional (although not necessarily medical) assistance and counseling to individuals who illegally use drugs.<sup>188</sup> At the end of the day, an individual who currently uses (and may be addicted) to cocaine is not a protected individual with a disability; however, an individual who previously used cocaine and has been rehabilitated may bring an ADA claim against a covered employer if the employer's discriminatory action was taken because of the individual's record of addiction and the individual is qualified to obtain or keep the job in question with or without reasonable accommodations.<sup>189</sup>

Although few argue that current drug users should be protected under disability law, there is some debate about the appropriateness of protecting individuals with a past record of addiction. Over the past decade, stakeholders have begun to use neuroscience to support opposing views regarding the protection that should be afforded to past drug addicts.

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economic characteristics that are not impairments . . . . The definition, likewise, does not include characteristic predisposition to illness or disease . . . . Similarly, the definition does not include common personality traits such as poor judgment or a quick temper where these are not symptoms of a mental or psychological disorder. Environmental, cultural, or economic disadvantages such as poverty, lack of education or a prison record are not impairments.").

185. *See, e.g.*, 42 U.S.C.A. § 12102, Notes of Decisions, 44-149 (2005) (listing hundreds of cases that distinguish protected disabilities from unprotected conditions).

186. 42 U.S.C. § 12114(a)-(b).

187. 29 C.F.R. § 1630.3(a)-(c), Appendix to Part 1630.

188. *Id.*

189. *See, e.g.*, Ward, *supra* note 178, at 692.

Consider the disease model of drug abuse and addiction put forth by Richard Millstein, the former Deputy Director of the National Institute on Drug Abuse (NIDA), and his coauthor Alan Leshner, former Director of the NIDA, in a 1999 article published in a top-ranked health law journal.<sup>190</sup> In the second section of the article, Millstein and Leshner reference an fMRI study to illustrate how cocaine use changes the brain by leaving a “signature” on it.<sup>191</sup> Throughout the remainder of the article, the authors reference several other fMRI and positron emission tomography (PET) studies investigating short and long-term changes in individuals’ brains following use of Ecstasy, methamphetamine, cocaine, and heroin as support for their two-part argument; that is, drug addiction is a brain disease with contributions of biology, behavior, and environment; and compulsive and uncontrollable drug craving, seeking, and use is responsible for disruption, crime, and other negative drug correlates.<sup>192</sup> The authors’ thesis is that a disconnect exists between the public’s perception of drug abuse and addiction (that addicts “d[o] it to themselves”) and the scientific bases of drug abuse and addiction, and that this disconnect has created barriers to treatment and re-entrance into society.<sup>193</sup>

Not everyone buys Millstein’s and Leshner’s argument that health and disability law should incorporate the disease model of drug addiction.<sup>194</sup> While opponents of Millstein and Leshner do recognize

190. Richard A. Millstein and Alan I. Leshner, *The Science of Addiction: Research and Public Health Perspectives*, 3 J. HEALTH CARE L. & POL’Y 151, 152, 165 (1999).

191. *Id.* at 156 (stating that “[w]e no longer need to use inexact metaphors of eggs in a frying pan. A study at the Massachusetts General Hospital utilizing functional Magnetic Resonance Imaging (MRI) brain scans provides a modern day depiction of your brain on drugs. MRI permits you literally to look into the brain of a living . . . human being while that individual is experiencing cocaine and to see the ‘signature’ in the brain of the drug experience as compared to that of the same individual given an infusion of saline . . . . The nucleus accumbens, an area at the base of the brain that is very important in drug abuse, not only because it is in an area that is activated during any pleasurable experience, but also because every drug of abuse has an effect on it, showed increased activity.”).

192. *Id.* at 158-60.

193. *Id.* at 152, 165 (stating that “[p]ervasive misconception about the nature of drug abuse and addiction have created barriers to its adequate treatment coverage under most health care systems. If we are going to make any real progress in this country we need to overcome that disconnect between the scientific facts and the ideology, intuition, and so-called common sense-based approaches to dealing with this problem. Now that we have the science base, we can in fact mount a much more rational approach, and science can replace ideology as the foundation for drug abuse and addiction prevention, treatment, and policy strategies.”).

194. See, e.g., Ward, *supra* note 178, at 694, 701-02, 704 (stating that “[t]hough it is popular, the concept that addicts lose the ability to regulate drug consumption is false — they can and, when properly motivated, often do . . . . All of the evidence advanced in favor of the idea that addicts lose control describes factors that predict addiction or physical changes that result from drug use. What

recent neuroimaging studies finding brain changes as a result of drug use,<sup>195</sup> they argue that any changes in the brain that result from drug use did not cause the individual to use drugs in the first place or, even more controversially, do not cause the individual to continue using drugs. Opponents thus argue that disability law should not protect rehabilitated addicts: “Congress should amend the ADA to remove the Act’s protection of past addicts—they had and made their choices; employers deserve the same opportunity.”<sup>196</sup>

I anticipate that scholars and other stakeholders will continue to debate the value of neuroscience to the question of which physical and mental impairments should constitute protected disabilities. Notwithstanding the persuasiveness of Millstein- and Leshner-type arguments, it is unlikely that just any condition or symptom associated with a neuroanatomical change or correlated with local BOLD-signal activity will result in protected disability status. First, the ADA requires claimed physical and mental impairments to substantially limit at least one major life activity,<sup>197</sup> and the courts have found that many claimants with traditional mental disorders were not protected because of evidence showing that the claimant was still able to work, attend school, and engage in other major life activities.<sup>198</sup> Plaintiffs thus may attempt to use neuroscience to provide evidence of a physical or mental impairment, but neuroscience cannot provide evidence of the existence or significance of any work or other social limitations. Second, the ADA’s Interpretive Guidance expressly excludes from protection certain physical characteristics such as “left-handedness . . . that are within ‘normal’ range and are not the result of a physiological disorder”; “physical, psychological, environmental, cultural and economic characteristics”; and “characteristic predisposition to illness or

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is missing is evidence that these factors or physical changes cause, rather than merely result from, the behavior that we call the disease of addiction. Brain chemistry, genetics, and psychological and environmental factors do not cause the addict to consistently perform complex activities against his will . . . . It is true that drugs change the internal chemistry of the brain. It does not follow from that observation that the addict is therefore forced to take drugs.”)

195. *Id.* at 704 (stating that “[i]t is true that drugs change the internal chemistry of the brain.”).

196. *Id.* at 720.

197. 42 U.S.C. § 12102(2)(A) (2007) (stating that “the term disability means, with respect to an individual, a physical or mental impairment that substantially limits one or more of the major life activities of such individual . . .”).

198. *See, e.g.,* *Olson v. Gen. Elec. Astrospace*, 101 F.3d 947, 952-53 (3rd Cir. 1996) (stating that neither multiple personality disorder nor a sleep disorder constitutes a disability without proof that the disorder also substantially limits a major life activity).

disease,<sup>199</sup> and some plaintiffs' claims may fall within these express exclusions.

## V. THE DISTRIBUTION OF SOCIAL SECURITY AND OTHER BENEFITS

The hypothetical I gave in the previous section involved the application of the ADA's anti-discrimination and reasonable accommodation provisions to individuals who have a record of drug use, but litigants already are using advances in neuroscience, especially neuroimaging, to impact disputes about the receipt of benefits under public and private disability, social security, and welfare programs.

To prevent healthy plaintiffs from receiving benefits when they do not have a disability, disability plans and programs tend to define disability in terms of an abnormality that is "demonstrable by medically acceptable clinical and laboratory diagnostic techniques."<sup>200</sup> Medical evidence is *the* cornerstone of disability determinations.<sup>201</sup> Social Security Disability Insurance (SSDI), for example, is only available to claimants who can furnish medical and other evidence of the existence of a disability, including "medical signs and findings, established by medically acceptable clinical or laboratory diagnostic techniques."<sup>202</sup> Because the Social Security Administration (SSA) will not consider claimants' subjective pain or other claims as conclusive evidence of disability<sup>203</sup> but will consider more objective evidence<sup>204</sup> such as

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199. 29 C.F.R. § 1630.2(h) (Appendix to § 1630--Interpretive Guidance on Title I of the Americans with Disabilities Act: Background).

200. 42 U.S.C. § 423(d)(3) (2007); *see also, e.g.*, 42 U.S.C. § 423(d)(1)(A) (defining disability for purposes of Social Security Disability Insurance as an "inability to engage in any substantial gainful activity by reason of any medically determinable physical or mental impairment which can be expected to result in death or which has lasted or can be expected to last for a continuous period of not less than 12 months . . .").

201. *See, e.g.*, Social Security Administration, *Disability Evaluation under Social Security*, BLUE BOOK, at Part II, Evidentiary Requirements (June 2006; amended April 2007), available at <http://www.ssa.gov/disability/professionals/bluebook/evidentiary.htm> (last visited Feb. 7, 2008) (providing that "[u]nder both the Title II and Title XVI programs, medical evidence is the cornerstone for the determination of disability.").

202. 42 U.S.C. § 423(d)(5)(A) (2007).

203. *Id.* § 423(d)(5)(A) (2007) (providing that "[a]n individual's statement as to pain or other symptoms shall not alone be conclusive evidence of disability as defined in this section.").

204. *Id.* (providing that "there must be medical signs and findings, established by medically acceptable clinical or laboratory diagnostic techniques, which show the existence of a medical impairment that results from anatomical, physiological, or psychological abnormalities which could reasonably be expected to produce the pain or other symptoms alleged and which, when considered with all evidence required to be furnished under this paragraph (including statements of the individual or his physician as to the intensity and persistence of such pain or other symptoms which may reasonably be accepted as consistent with the medical signs and findings), would lead to a

“abnormal magnetic resonance imaging (MRI) brain scan[s],”<sup>205</sup> I anticipate that more plaintiffs will attempt to offer neuroimaging “evidence” of their disabilities, especially in light of cases denying disability benefits when neuroimaging or other objective evidence was not offered.

In a 2003 case, for example, the Sixth Circuit Court of Appeals reviewed a district court’s decision to affirm the Social Security Commissioner’s denial of the plaintiff’s claim for SSDI benefits based on her cervical strain, L5 radiculopathy, dysthymic disorder, reading disorder, somatization disorder, borderline intellectual functioning, fibromyalgia, associated pain, and chronic fatigue syndrome.<sup>206</sup> In reviewing the administrative law judge’s assessment of the plaintiff’s subjective complaints relating to her fibromyalgia, pain, and chronic fatigue, the Sixth Circuit quoted the SSA’s statutory standard for assessing pain and fatigue, which requires objective clinical or laboratory manifestations versus subjective first-person complaints.<sup>207</sup> Given that no available laboratory tests confirm diagnoses such as chronic fatigue syndrome, the SSA stated below that it would allow findings from an “abnormal magnetic resonance imaging MRI brain scan.”<sup>208</sup> The Sixth Circuit ultimately affirmed the district court’s conclusion that the claimant did not provide sufficient evidence of her disability status because she did not submit sufficient objective evidence of her pain.<sup>209</sup>

The issue of whether alcohol and drug dependence can constitute compensable disabilities under the Social Security Act has been hotly debated for decades. “Early decisions under the Social Security Act demonstrated reluctance to award benefits to an alcoholic.”<sup>210</sup> In 1975, however, the Ninth Circuit held in *Griffis v. Weinberger* that chronic

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conclusion that the individual is under a disability.”).

205. *Bartyzel v. Commissioner*, 74 Fed. Appx. 515, 527 (6th Cir. 2003) (stating that “the following findings will be sufficient, although not required, to establish a medically determinable impairment under the Act . . . . An abnormal magnetic resonance imaging (MRI) brain scan . . .”).

206. *Id.* at 518-19.

207. *Id.* at 525 (citing 42 U.S.C. § 423(d)(5)(A) (2008) (stating that “there must be medical signs and findings, established by medically acceptable or clinical or laboratory diagnostic techniques, which show the existence of a medical impairment that results from anatomical, physiological, or psychological abnormalities which could reasonably be expected to produce the pain.”)); *id.* at 527 (stating that “evidence of an impairment must include objective clinical or laboratory manifestations.”).

208. *Id.* at 527.

209. *Id.* at 528-29.

210. *McShea v. Schweiker*, 700 F.2d 117, 118 (3rd Cir. 1983) (citing *Mays v. Ribicoff*, 206 F. Supp. 170, 171 (S.D. W.Va. 1962)).

alcoholism can, standing alone, constitute a disability: “The proposition that chronic acute alcoholism is itself a disease, ‘a medically determinable physical or mental impairment,’ is hardly debatable today.”<sup>211</sup> In 1981, the Fifth Circuit clarified that alcoholism, alone or with other causes, can constitute a compensable disability as long as “it prevents a claimant from engaging in substantial gainful activity.”<sup>212</sup> More recent case law involving drug dependence has emphasized the need for objective evidence of addiction: “A claimant must show a behavioral or physical change associated with the regular use of substances affecting the central nervous system.”<sup>213</sup> In 1990, the Third Circuit clarified that the claimant must show that she is addicted to a substance, has lost the ability to control the abuse, and that “the addiction renders the claimant unable to perform any gainful activity.”<sup>214</sup> As discussed in more detail in Appendix A to this Article, scientists have conducted dozens of neuroimaging studies in populations that use and abuse alcohol and illegal drugs. Some of these studies find neurochemical and functional changes in the brains of individuals with drug and alcohol dependence.<sup>215</sup> Based on courts’ liberal use of the alcoholism-and-drug-dependence-are-diseases rationale to uphold disability determinations,<sup>216</sup> I would anticipate that future plaintiffs may reference more specific neuroimaging findings in the context of alcohol and drug use and abuse, especially because neuroimaging evidence already has worked itself into private disability benefit claims involving other conditions.

In 2005, the Ninth Circuit Court of Appeals reviewed a district court’s grant of summary judgment in favor of the NFL Players Retirement Plan and the NFL Players Supplemental Disability Plan (Plans) in a lawsuit filed by former Minnesota Viking Brent Boyd for disability benefits.<sup>217</sup> Boyd claimed that he suffered organic brain problems after he was knocked unconscious in a preseason football

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211. *Griffis v. Weinberger*, 509 F.2d 837, 838 (9th Cir. 1975).

212. *Ferguson v. Schweiker*, 641 F.2d 243, 248 (5th Cir. 1981).

213. *Matullo v. Bowen*, 926 F.2d 240, 245 (3rd Cir. 1990).

214. *Id.*

215. See, e.g., Nora D. Volkow et al., *The Addicted Human Brain: Insights from Imaging Studies*, 111(10) J. CLINICAL INVESTIGATION 1444, 1444 (May 2003) (stating that “[i]maging studies have revealed neurochemical and functional changes in the brains of drug-addicted subjects that provide new insights into the mechanisms underlying addiction.”).

216. *Griffis*, 509 F.2d at 837 (stating that “[t]he proposition that chronic acute alcoholism is itself a disease, ‘a medically determinable physical or mental impairment,’ is hardly debatable today.”).

217. *Boyd v. Bell*, 410 F.3d 1173, 1174 (9th Cir. 2005).

game in August 1980, and that his “constant flu-like feeling, fatigue, headaches, queasiness, forgetfulness, intermittent blurred vision, difficulty reading, lack of concentration, learning difficulty, memory loss, dizziness and light-headedness” qualified him for total and permanent disability benefits under the Plans.<sup>218</sup> As part of the lawsuit, Boyd was subjected to nearly two days of neuropsychological testing.<sup>219</sup> Some of the physicians agreed with Boyd that his single photon emission computed tomography (SPECT) scan showed “decreased brain activity ‘consistent with head trauma’”<sup>220</sup> and that he was disabled due to his August 1980 brain injury.<sup>221</sup> Other physicians agreed with the Plans that Boyd’s depression, untreated hypertension and physical deconditioning, and not the alleged August 1980 head injury, caused his symptoms.<sup>222</sup> In the end, the Ninth Circuit upheld the district court’s grant of summary judgment in favor of the Plans.<sup>223</sup>

Based on the *Boyd* case and a number of other disability cases in which structural and functional brain scans have been ordered, used, or requested,<sup>224</sup> I anticipate with trepidation the extent to which plaintiffs will attempt to introduce both structural and functional neuroimaging evidence in support of traditional and novel<sup>225</sup> disabilities, especially

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218. *Id.* at 1175.

219. *Id.* at 1177.

220. *Id.*

221. *Id.*

222. *Id.*

223. *Id.* at 1179.

224. *See, e.g.,* *Kearney v. Standard Ins. Co.*, 175 F.3d 1084, 1092 (9th Cir. 1999) (describing an instance in which a physician recommended a brain scan to clarify the disability insurance claimant’s diagnosis of possible metabolic disturbance, early Alzheimer’s disease, episode of ischemia, or embolus to the brain).

225. The health, disability, and welfare case law is filled with claims by plaintiffs for benefits based on a range of novel conditions and behaviors, such as phobia of driving in unfamiliar locations, known propensity to engage in risky behavior, ability to become angered easily, sensitivity to fragrances, cat and dog allergies, other allergies and chemical sensitivities, fear of cancer, grief, conversion disorder, albinism, eosinophilia, generalized stress, and so on. *See, e.g.,* *Kaufmann v. GMAC Mortgage*, 229 Fed. Appx. 164, 165 (3rd Cir. 2007) (claiming disability of fragrance sensitivity); *Sinkler v. Midwest Prop. Mgmt.*, 209 F.3d 678, 687 (7th Cir. 2000) (holding the phobia of driving anywhere unfamiliar did not substantially limit plaintiff’s ability to work and therefore is not a disability); *Christian v. St. Anthony Med. Center*, 117 F.3d 1051, 1051 (7th Cir. 1997) (considering the plaintiff’s claim of disability based on high cholesterol level); *Bukta v. J.C. Penney Co., Inc.*, 359 F. Supp.2d 649, 655 (N.D. Ohio 2004) (considering the plaintiff’s claim that conversion disorder was disability); *Baker v. Greyhound Bus Line*, 240 F. Supp.2d 454, 455 (D. Md. 2003) (holding that albinism not disability); *Gallagher v. Sunrise Assisted Living of Haverford*, 268 F. Supp.2d 436, 443 (E.D. Pa. 2003) (holding that the plaintiff’s allergy to cats and dogs not a disability); *Fenton v. Pritchard Corp.* 926 F. Supp. 1437, 1443, 1446 (D. Kan. 1996) (holding that the plaintiff’s propensity to “go postal” or “go ballistic” not a disability); *Shah v. Upjohn Co.*, 922 F. Supp. 15, 40-41 (W.D. Mich. 1995) (holding that the plaintiff’s allergy to job and fear of cancer

since many public and private disability plans define a disability in terms of whether there exists a “physiological disorder or conditions” or personality trait that is a symptom of a mental or psychological disorder.<sup>226</sup>

How might we assess these claims? Many of the limitations mentioned in the previous sections will apply, but note that the SSA requires disability claimants to be unable to engage in any substantial gainful activity for a continuous period of not less than twelve months.<sup>227</sup> Courts have found many claimants with traditional mental disorders not protected because they were able to engage in some type of gainful work activity. The burden of establishing disability is on the claimant, and substantial evidence of disability is required.<sup>228</sup> Plaintiffs thus may offer neuroimaging evidence, but neuroscience cannot provide evidence of the existence or significance of any work or other social limitation.<sup>229</sup>

## VI. CONCLUSION

In this Article, I have shown that stakeholders already are relying on advances in the behavioral and brain sciences to characterize traditionally suspect mental health conditions as brain-based conditions worthy of insurance coverage, statutory parity, protected disability status, and disability benefits. By and large, the plaintiffs in the cases I reviewed were not making completely unfounded or speculative claims about neuroscience. Most of the plaintiffs (or their experts) were making general although supported references to scientific research

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do not constitute disabilities); 42 U.S.C.A. § 12102, Notes of Decisions, 44-149 (2005) (providing annotated list of hundreds of cases in which plaintiffs claim traditional and novel disabilities).

226. 29 C.F.R. § 1630.2(h) (Appendix to Part 1630--Interpretive Guidance on Title I of the Americans with Disabilities Act Background).

227. 42 U.S.C. § 423(d)(1)(A); 42 U.S.C. § 423 (d)(2) (2007) (providing that “[a]n individual shall be determined to be under a disability only if his physical or mental impairment or impairments are of such severity that he is not only unable to do his previous work but cannot, considering his age, education, and work experience, engage in any other kind of substantial gainful work which exists in the national economy, regardless of whether such work exists in the immediate area in which he lives, or whether a specific job vacancy exists for him, or whether he would be hired if he applied for work. For purposes of the preceding sentence (with respect to any individual), ‘work which exists in the national economy’ means work which exists in significant numbers either in the region where such individual lives or in several regions of the country.”).

228. *Carter v. Schweiker*, 649 F.2d 937, 940 (2d Cir. 1981).

229. *Id.* at 940-41 (stating that “[t]he record contains substantial evidence to support the ALJ’s determination that Carter’s seizures were not disabling. None of the physicians who treated or examined Carter indicated that her seizures so severely restricted her ability to engage in ‘substantial gainful activity’ as to be disabling.”).

showing that the brains of individuals who have a range of mental disorders may be neuroanatomically, neurocognitively, and/or neurochemically “different” when compared to the brains of healthy controls. Although a careful review of the underlying studies does reveal many discrepancies and contradictions, the plaintiffs in the cases I discussed were alluding to general trends that are based in the scientific literature. One of the defendant’s arguments—the argument of the insurance company in *Fitts v. Unum Life Insurance Company* that the insured did not have bipolar disorder because no brain scans showed any changes in the plaintiff’s brain—did concern me.<sup>230</sup> The argument (and its alternative argument—that brain scans cannot yet detect bipolar disorder) concerns me because it shows the extent to which litigants are willing to throw into the ring just any neuroscience-based claim in the hope that something will stick with the judge or the jury. One of the reasons I am excited about the emerging neuroethics and neurolaw literature is that I hope judges will read the many careful philosophical, evidentiary, and other analyses and issue opinions that are more reasoned as a result.

What gives me real cause for pause, though, is the appropriateness of many of the stakeholders’ subsequent normative or substantive arguments; that is, that all mental disorders should be treated as covered or protected conditions for purposes of health, disability, and benefit law. I do think that neuroscience gives stakeholders one additional source of ammunition, perhaps some will refer to it as evidence, in support of the normative argument that mental disorders should be treated more like physical illnesses for purposes of health, disability, and benefit law. I also think that advances in neuroscience do give us reason to revisit age-old health, disability, and benefit law questions, such as “[w]hich kinds of mental suffering create a legitimate claim for assistance from others through [public or private] health insurance?”<sup>231</sup> But neuroscience does not yet and probably never will answer a range of questions that are more important to the future of health law and policy. For example, neuroscience does not tell us how we should allocate finite health care dollars among all of the different physical and mental disorders, including the expanding category of biologically-based mental disorders. Even with advances in neuroscience, we are still left to weigh the value of knowing that many mental disorders may have a biological component against the cost of providing equal insurance benefits, the

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230. *Fitts*, 2007 U.S. Dist. LEXIS 33397, at \*25.

231. Sabin & Daniels, *supra* note 18, at 5.

cost of expanding the scope of protected status under disability law, and the cost of distributing additional benefits under other legal schemes.

Neuroscience also does not give us a better definition of “medical necessity,” which is the key to reimbursement under most public and private health insurance programs and plans. Neuroscience does not, for example, tell us when a structural or functional difference becomes significant enough such that its treatment should be reimbursed by the Medicare and Medicaid Programs or a private health insurance plan. Neuroscience also does not tell us whether we should take a “hard-line” or “expansive” view of medical necessity.<sup>232</sup> For example, should our health insurers only reimburse treatments for impairments that significantly interfere with an individual’s ability to live and function? Or, should our health insurers reimburse treatments that would enhance healthy individuals’ current level of functioning? Should we adopt a “normal function model” of health care (in which the target of clinical action is a medically-defined deviation and the goal of health care is to decrease the impact of disease or disability), a “capability model” (in which the target of clinical action is an unchosen constraint of personal capability and the goal of health care is to enhance personal capability) or a “welfare model” (in which the target of clinical action is an unchosen constraint of potential for happiness and the goal of health care is to enhance potential for happiness)?<sup>233</sup> Neuroscience, as we all know, raises many new questions about the differences between treatment and enhancement.<sup>234</sup> Even with neuroscience, then, health policymakers will continue to struggle with how best to identify health care’s goals, define medically necessary care, and determine how much medically necessary care public and private programs should provide.<sup>235</sup>

The extent to which health law ultimately consults neuroscience to achieve its goals remains to be seen. In the meantime, I urge policymakers not to completely defer to neuroscience due to, among other things, differences between the disciplines’ orientations and professional vocabularies. Note in this Article how frequently statutory, regulatory, and contractual authorities differentiate between physical and

232. *Id.*; see also Glazer, *supra* note 106, at 362.

233. See Sabin & Daniels, *supra* note 18, at 10-11 (offering three approaches to health care).

234. See, e.g., Robert Klitzman, *Clinicians, Patients, and the Brain*, in *NEUROETHICS: DEFINING THE ISSUES IN THEORY, PRACTICE, AND POLICY* 229, 236 (Judy Illes ed., 2006) (stating “[w]hat if clinicians can improve upon a person’s baseline level of cognitive functioning? Should clinicians be limited in doing so in any way?”); Erik Parens, *How Far Will the Treatment/Enhancement Distinction Get Us as We Grapple with New Ways to Shape Our Selves?* in *NEUROETHICS: MAPPING THE FIELD* 152, 153-54 (Steven J. Marcus ed., 2002) (stating the same).

235. See Sabin & Daniels, *supra* note 18, at 12.

mental illnesses. Even though health law contains dozens of such differential definitions (with the result that less legal protection and fewer benefits flow to individuals who have a condition that falls within the legal definition of a psychiatric illness or mental disorder), the behavioral and brain sciences are not that rigid. In its *Introduction* to the DSM-IV, the American Psychiatric Association admits that the concept of mental disorder, like so many other concepts in medicine and science, lacks a consistent operational definition that works in all situations.<sup>236</sup> For example, medical conditions may be based on various levels of abstraction, such as “structural pathology (*e.g.*, ulcerative colitis), symptom presentation (*e.g.*, migraine), deviance from a physiological norm (*e.g.*, hypertension), and etiology (*e.g.*, pneumococcal pneumonia).”<sup>237</sup> Mental disorders also may be defined in terms of a number of different concepts, such as “distress, dysfunction, dyscontrol, disadvantage, disability, inflexibility, irrationality, syndromal pattern, etiology, and statistical deviation.”<sup>238</sup> Although each is a useful indicator for a mental disorder, none is equivalent to the concept of mental disorder.<sup>239</sup> In the end, the American Psychiatric Association decided to use the term mental disorder in the DSM-IV only because it “is as useful as any other” and “has helped to guide decisions regarding which conditions on the boundary between normality and pathology should be included.”<sup>240</sup>

Medicine and science recognize the blending of the physical and the mental, but health law is only starting down that road. Because I anticipate that neuroscience will continue to play a role in the development and shaping of health law, I recommend that traditional health lawyers and scholars (and not just the few who self-identify as neuroethicists or neurolawyers) be mindful of the ways in which stakeholders will use neuroscience to bear on the formulation and interpretation of the law.<sup>241</sup>

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236. AMERICAN PSYCHIATRIC ASSOCIATION, *supra* note 84, at xxx.

237. *Id.*

238. *Id.*

239. *Id.* at xxx-xxxii.

240. *Id.* at xxxii.

241. See Wexler, *supra* note 19, at 10 (encouraging stakeholders to consider ways in which the clinical literature might bear on the formulation of legal arrangements).

## APPENDIX A

Many patients, patient advocacy organizations, litigants, lobbyists, legislators, and scholars believe that the stigma against mental disorders plays a role in their lack of funding for research, their lack of parity in public and private health insurance coverage, and their lack of available and reimbursable treatments.<sup>242</sup> Four sets of mental disorders, including schizophrenia, bipolar disorder, alcohol and drug dependence, and anorexia nervosa and bulimia nervosa, are frequently used to illustrate these claims. This Appendix briefly examines these conditions and summarizes their neuroscientific investigation.

## 1. Schizophrenia

The NIMH defines schizophrenia as “a chronic, severe, and disabling brain disorder” that affects approximately 1.1% of American adults (or 2.4 million) in a given year.<sup>243</sup> Symptoms of schizophrenia include “hallucinations, delusions, disordered thinking, movement

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242. See, e.g., Pamela Signorello, *The Failure of the ADA-Achieving Parity with Respect to Mental and Physical Health Care Coverage in the Private Employment Realm*, 10 CORNELL J.L. & PUB. POL’Y 349, 368 (2001) (stating that “[s]ome diseases are more politically ‘in’ than others. We all know the more political backing there is, the more attention, the more funds, and the more patient-protection legislation. My guess is that if AIDS rates a 10, then breast cancer is a 7, prostate cancer is a 6 . . . . Yes, you guessed it. I am unable to assign a number to the mental health category. If I have to judge by the coverage in the popular press, this category is close to the bottom of the food chain.”); *id.* at 368, 371 (stating that “[c]ontrary to lingering public perception, mental illnesses are not indicative of personal weakness, lack of character, or poor upbringing . . . . One thing is certain. The stigma associated with mental illness has supported the disparity in health care coverage.”); Nicole Martinson, *Inequality between Disabilities: The Different Treatment of Mental Versus Physical Disabilities in Long-Term Disability Benefit Plans*, 50 BAYLOR L. REV. 361, 361 (1998) (stating that “[t]he stigma of mental illness has kept many in need from seeking help, and it has prevented policymakers from providing it.”); Brian D. Shannon, *Paving the Path to Parity in Health Insurance Coverage for Mental Illness: New Law or Merely Good Intentions?*, 68 U. COLO. L. REV. 63, 85 (1997) (citing 142 Cong. Rec. S3590 (daily ed. Apr. 18, 1996) (statement of Senator Wellstone)) (stating that “[t]he stigma of mental illness has kept many in need from seeking help, and it has prevented policymakers from providing it. And for too long, persons in need of mental health services who reach private coverage discriminatory limits have been dumped onto Government-funded programs.”).

243. National Institute of Mental Health, *What Is Schizophrenia?*, <http://www.nimh.nih.gov/health/topics/schizophrenia/index.shtml> (last visited Jan. 31, 2008); National Institute of Mental Health, *The Numbers Count: Mental Disorders in America*, <http://www.nimh.nih.gov/health/publications/the-numbers-count-mental-disorders-in-america.shtml> (last visited Jan. 31, 2008); see also Philip McGuire et al., *Functional Neuroimaging in Schizophrenia: Diagnosis and Drug Discovery*, 29(2) TRENDS IN PHARMACOLOGICAL SCI. 91, 91 (2008).

disorders, flat affect, social withdrawal, and cognitive deficits.”<sup>244</sup> Individuals who have schizophrenia may hear voices that other individuals do not hear or may believe that others are plotting to harm them.<sup>245</sup> These experiences can make individuals who have schizophrenia fearful and withdrawn and cause difficulties when these individuals try to have relationships with others.<sup>246</sup> Although scientists have not yet uncovered the cause or causes of schizophrenia, current treatments, including antipsychotic drugs, can minimize the symptoms of schizophrenia and help affected individuals live independent and fulfilling lives.<sup>247</sup>

Elsewhere, I examined the scientific<sup>248</sup> and social<sup>249</sup> history of a variety of body and brain imaging technologies and the reasons for their use by investigators with varying backgrounds and interests, including psychiatry. I suggested that scientists began using neuroimaging to investigate psychiatric conditions when explanations for these conditions were in transition, “as if this might settle once and for all whether illnesses such as schizophrenia are really brain diseases.”<sup>250</sup> To this end, dozens of studies have used structural and functional neuroimaging in an attempt to better understand schizophrenia<sup>251</sup> and to develop new drugs that will better treat it.<sup>252</sup>

These studies have resulted in many discrepancies and contradictions,<sup>253</sup> although some trends have emerged.<sup>254</sup> A number of structural neuroimaging studies find that individuals who have

244. National Institute of Mental Health, What Is Schizophrenia?, <http://www.nimh.nih.gov/health/topics/schizophrenia/index.shtml> (last visited Jan. 31, 2008).

245. *Id.*

246. *Id.*

247. *Id.*

248. Tovino, *The Visible Brain*, *supra* note 14, at Chapters 1 and 2.

249. Stacey A. Tovino, *Imaging Body Structure and Mapping Brain Function: A Historical Approach*, 33 *AM. J.L. & MED.* 193, 193-95 (2007).

250. Robert B. Zipursky, *Imaging Mental Disorders in the 21st Century*, 52 *CANADIAN J. PSYCHIATRY* 133, 133 (2007).

251. Karen Faith Berman, *Functional Neuroimaging in Schizophrenia*, in *NEUROPSYCHOPHARMACOLOGY: THE FIFTH GENERATION OF PROGRESS* 745, 748 (Kenneth L. Davis et al. eds., 2002) (summarizing dozens of studies involving frontal lobe findings with activation paradigms in schizophrenia since 1985).

252. McGuire et al., *supra* note 31, at 94-95.

253. See, e.g., Russell T. Loeber et al., *Differences in Cerebellar Blood Volume in Schizophrenia and Bipolar disorder*, 37 *SCHIZOPHRENIA RES.* 81, 81 (1999) (stating that “[b]rain morphometry has been studied extensively in schizophrenic patients, and among the cortical differences identified two consistent findings are decreased cerebellar vermal volume and increased volume of the fourth ventricle; although contradictory findings are reported as well.”).

254. Berman, *supra* note 251, at 747.

schizophrenia have whole-brain gray matter volume deficits<sup>255</sup> and enlarged ventricles.<sup>256</sup> Volume reductions have been found to be most notable in the frontotemporal regions, medial temporal lobe structures, and sometimes the prefrontal cortex and other parts of the temporal lobe, including the superior temporal gyrus.<sup>257</sup> Some neuroimaging studies find that “brain abnormalities associated with schizophrenia progress as the disorder develops.”<sup>258</sup> Some neuroimaging studies show that individuals with schizophrenia have abnormal prefrontal activity during tests involving working memory and, during other tasks, deficits in cingulate cortex as well as alterations in frontal-temporal and other intracortical functional relationships.<sup>259</sup> Some neuroimaging abnormalities are evident before the onset of the disorder, which may suggest that neuroimaging could be used to detect pathophysiological changes associated with the disorder before the onset of frank illness.<sup>260</sup> Many neuroimaging studies have been devoted to studying the effects of antipsychotic drugs (especially Clozapine) on the brains of individuals with schizophrenia, with some findings relating to the primary site of therapeutic action and optimal dosages of antipsychotics.<sup>261</sup> It is not unusual for a study or review article to conclude that chronic schizophrenia is associated with “extensive neuroanatomical, neurocognitive and neurochemical abnormalities,”<sup>262</sup> but also to emphasize the challenges presented by the diagnosis and treatment of schizophrenia.<sup>263</sup>

Many neuroimaging studies have been heavily criticized for failing to take into account the confounding effects of antipsychotic and other medication regimens, illicit drug use, cigarette smoking, endocrine changes, activity level, and diet.<sup>264</sup> Notwithstanding, many scientists

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255. See, e.g., Robert B. Zipursky et al., *Widespread Cerebral Gray Matter Volume Deficits in Schizophrenia*, 49(3) ARCHIVES GEN. PSYCHIATRY 195 (1992); Raquel E. Gur et al., *Deconstructing Psychosis with Human Brain Imaging*, 33(4) SCHIZOPHRENIA BULL. 921, 922 (2007).

256. See, e.g., Zipursky, *supra* note 250, at 133; Loeber et al., *supra* note 253, at 81.

257. See, e.g., Gur et al., *supra* note 255, at 922.

258. See, e.g., McGuire et al., *supra* note 243, at 96.

259. Berman, *supra* note 251, at 747.

260. McGuire et al., *supra* note 243, at 92 (stating that “[t]he ability of neuroimaging to detect pathophysiological changes in advance of clinical symptoms points to its potential as an aid to diagnosis.”).

261. *Id.* at 95.

262. *Id.* at 96.

263. *Id.*

264. See, e.g., Birgit Abler et al., *Abnormal Reward System Activation in Mania*, NEUROPSYCHOPHARMACOLOGY 2217, 2226 (2007); Zipursky, *supra* note 250, at 133.

now believe that schizophrenia is “associated with measurable, objective signs of altered brain function.”<sup>265</sup> Although some scientists are pessimistic about treatment outcomes due to the reported structural and functional differences found between the brains of individuals with schizophrenia and healthy controls,<sup>266</sup> others are confident that future neuroimaging studies will lead to information that has “the potential to lead to direct intervention.”<sup>267</sup>

## 2. Bipolar Disorder

Approximately 2.6% of American adults (or 5.7 million) suffer from bipolar disorder in a given year.<sup>268</sup> The NIMH defines bipolar disorder, also known as manic-depressive disorder, as a serious mental disorder “that causes shifts in a person’s mood, energy, and ability to function.”<sup>269</sup> Bipolar disorder can cause dramatic mood swings from overly “high” and/or irritable (mania) to sad and hopeless (depression), and then back again, often with periods of normal mood in between.<sup>270</sup> Although scientists have not yet uncovered the cause of bipolar disorder, they have developed drugs that, combined with psychosocial treatment, do help many individuals with bipolar disorder stabilize their mood swings and related symptoms over time.<sup>271</sup>

Like schizophrenia, bipolar disorder has been the focus of many structural and functional neuroimaging studies. Although whole brain volumes of patients with mood disorders, including bipolar disorder, may not differ from those of healthy controls, some structural neuroimaging studies show that regional deficits may exist in the frontal lobe, particularly in the anterior cingulate and the orbitofrontal cortex.<sup>272</sup> Some functional neuroimaging studies also have found the neural

265. See, e.g., Berman, *supra* note 251, at 745. Fuller Torrey, one of America’s most famous psychiatrists, has stated that, the “evidence is now overwhelming that the brains of persons who have schizophrenia are, as a group, different from brains of persons who do not have the disease.” See Richard E. Gardner, *Mind Over Matter? The Historical Search for Meaningful Parity Between Mental and Physical Health Care Coverage*, 49 EMORY L.J. 675, 683 (2000).

266. See, e.g., Zipursky, *supra* note 250, at 133.

267. Berman, *supra* note 251, at 754.

268. National Institute of Mental Health, *Mental Disorders in America*, <http://www.nimh.nih.gov/health/publications/the-numbers-count-mental-disorders-in-america.shtml> (last visited Jan. 31, 2008).

269. National Institute of Mental Health, *What Is Bipolar Disorder?* <http://www.nimh.nih.gov/health/topics/bipolar-disorder/index.shtml> (last visited Jan. 31, 2008).

270. *Id.*

271. *Id.*

272. Jakub Z. Zonarski et al., *Volumetric Neuroimaging Investigations in Mood Disorders: Bipolar Disorder Versus Major Depressive Disorder*, 10 BIPOLAR DISORDERS 1, 3-4 (2008).

correlates of altered reward processing or dysfunctional reward pathways (including elevated activation of dopaminergic brain areas when expecting high rewards compared to anticipation of no rewards and decreased ventral striatum activation when an expected reward was omitted) in individuals who have bipolar disorder.<sup>273</sup> Some pediatric functional neuroimaging studies have found that bipolar disorder is “associated with abnormalities in a circuit thought to be involved in mood regulation that encompasses the amygdala, striatum and ventral PFC.”<sup>274</sup> Like the schizophrenia studies, the bipolar studies have many limitations. It is not uncommon for a bipolar study or review article to conclude, for example, that future studies must strive to more definitively establish the effect on findings of age, medication, and other variables.<sup>275</sup>

### 3. Alcohol and Drug Dependence

An estimated fourteen to fifteen million Americans meet diagnostic criteria for alcohol use disorders and more than eighteen percent of Americans experience alcohol abuse or alcohol dependence at some time in their lives.<sup>276</sup> An estimated sixteen million Americans use illicit drugs.<sup>277</sup> A huge literature is devoted to documenting the results of structural and functional studies of the brains of individuals who use and abuse, depend on and withdraw from, and are abstinent from and crave alcohol and illicit drugs.<sup>278</sup> For example, many structural neuroimaging

273. Abler et al., *supra* note 264, at 2222, 2224, 2226.

274. Jane Avery Serene et al., *Neuroimaging Studies of Children with Serious Emotional Disturbances: A Selective Review*, 52(3) CANADIAN J. PSYCHIATRY 135, 135 (2007).

275. Zonarski et al., *supra* note 272, at 1.

276. Greater Dallas Council on Alcohol & Drug Abuse, Alcohol, <http://www.gdcada.org/statistics/alcohol.htm> (last visited Feb. 8, 2008).

277. SUBSTANCE ABUSE & MENTAL HEALTH SERVS. ADMIN., NATIONWIDE SURVEY SHOWS MOST ILLICIT DRUG USERS AND HEAVY ALCOHOL USERS ARE IN THE WORKPLACE AND MAY POSE SPECIAL PROBLEMS, <http://www.samhsa.gov/newsroom/advisories/070713survey0610.aspx> (last visited Feb. 8, 2008).

278. See, e.g., Yoshihide Akine et al., *Altered Brain Activation by a False Recognition Task in Young Abstinent Patients with Alcohol Dependence*, 31(9) ALCOHOLISM: CLINICAL & EXPERIMENTAL RES. 1589 (2007); Joanna S. Fowler et al., *Imaging the Addicted Human Brain*, SCI. & PRACTICAL PERSPECTIVES 4 (2007); Andreas J. Bartsch et al., *Manifestations of Early Brain Recovery Associated with Abstinence from Alcoholism*, 130 BRAIN 36 (2007); Rita Z. Goldstein et al., *Role of the Anterior Cingulate and Medial Orbitofrontal Cortex in Processing Drug Cues in Cocaine Addiction*, 144(4) NEUROSCIENCE 1153 (2007); Sandra Chanraud et al., *Brain Morphometry and Cognitive Performance in Detoxified Alcohol-Dependents with Preserved Psychosocial Functioning*, 32 NEUROPSYCHOPHARMACOLOGY 429 (2007); Dardo Tomasi et al., *Thalamo-Cortical Dysfunction in Cocaine Abusers: Implications in Attention and Perception*, 155 PSYCHIATRY RES.: NEUROIMAGING 189 (2007); G. Dom et al., *Substance Use Disorders and the*

studies find “brain shrinkage” with chronic alcoholism.<sup>279</sup> Some structural neuroimaging studies find an increase in hippocampal, cerebral, and cerebellar volume after abstinence from alcohol.<sup>280</sup> Some studies find that changes in brain volume during short-term abstinence in chronic alcohol-dependent patients are confined to the white matter.<sup>281</sup> Some neurochemical studies have shown that

large and fast increases in dopamine are associated with the reinforcing effects of drugs of abuse, but also that after chronic drug abuse and during withdrawal, brain dopamine function is markedly decreased and these decreases are associated with dysfunction of prefrontal regions.<sup>282</sup>

Some functional neuroimaging studies find that “cocaine cues lead to abnormally high cingulate and low frontal lobe activation in cocaine addicts.”<sup>283</sup> Many neuroimaging studies and review articles conclude that individuals who are addicted to alcohol and drugs have neurochemical and functional brain changes.<sup>284</sup> Many neuroimaging

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*Orbitofrontal Cortex*, 187 BRIT. J. PSYCHIATRY 209 (2005); Peter S. Kufahl et al., *Neural Responses to Acute Cocaine Administration in the Human Brain Detected by fMRI*, 28 NEUROIMAGE 904 (2005); Nikos Makris et al., *Decreased Absolute Amygdala Volume in Cocaine Addicts*, 44 NEURON 729 (2004); D.J. Meyerhoff et al., *Effects of Heavy Drinking, Binge Drinking, and Family History of Alcoholism on Regional Brain Metabolites*, 28(4) ALCOHOLISM: CLINICAL & EXPERIMENTAL RES. 650 (2004); Clinton D. Kilts et al., *The Neural Correlates of Cue-Induced Craving in Cocaine-Dependent Women*, 161(2) AM. J. PSYCHIATRY 233 (2004); Andreas Heinz et al., *Correlation between Dopamine D2 Receptors in the Ventral Striatum and Central Processing of Alcohol Cues and Craving*, 161(10) AM. J. PSYCHIATRY 1783 (2004); Nora D. Volkow et al., *The Addicted Human Brain Viewed in the Light of Imaging Studies: Brain Circuits and Treatment Strategies*, 47 NEUROPHARMACOLOGY 3 (2004); Nora D. Volkow et al., *The Addicted Human Brain: Insights from Imaging Studies*, 111(10) J. CLINICAL INVESTIGATION 1444 (2003); A.R. Lingford-Hughes et al., *Addiction*, 65 BRIT. MED. BULL. 209 (2003); Ingrid Agartz et al., *MR Volumetry during Acute Alcohol Withdrawal and Abstinence: A Descriptive Study*, 38(1) ALCOHOL & ALCOHOLISM 71 (2003); Rita Z. Goldstein et al., *Drug Addiction and Its Underlying Neurobiological Basis: Neuroimaging Evidence for the Involvement of the Frontal Cortex*, 159(10) AM. J. PSYCHIATRY 1642 (2002); Stephen J. Uftring et al., *An fMRI Study of the Effect of Amphetamine on Brain Activity*, 25(6) NEUROPSYCHOPHARMACOLOGY 925 (2001); Bruce E. Wexler et al., *Functional Magnetic Resonance Imaging of Cocaine Craving*, 158(1) AM. J. PSYCHIATRY 86 (2001); R.S.N. Liu et al., *Association between Brain Size and Abstinence from Alcohol*, 355 (9219) LANCET 1969 (2000); Daniel W. Hommer, *Functional Imaging of Craving*, ALCOHOL RES. & HEALTH (Fall 1999).

279. See, e.g., Liu, *supra* note 278, at 1969.

280. *Id.*

281. See, e.g., Agartz, *supra* note 278, at 76.

282. See, e.g., Volkow et al., *supra* note 278, at 1444.

283. See, e.g., Wexler et al., *supra* note 278, at 86.

284. See, e.g., Volkow et al., *supra* note 282, at 1444.

studies propose models that attempt to explain the loss of control and compulsive alcohol and drug intake that characterize addiction.<sup>285</sup>

#### 4. Anorexia Nervosa and Bulimia Nervosa

The National Institutes of Health (NIH) defines anorexia nervosa as “an eating disorder marked by an intense fear of gaining weight, a refusal to maintain a healthy weight, and a distorted body image.”<sup>286</sup> Bulimia nervosa is characterized by recurrent periods of binge eating, in which large amounts of food are consumed during a short period of time, followed by self-induced vomiting, abuse of diuretics or laxatives, or fasting.<sup>287</sup> An estimated three tenths to one percent of young American women have anorexia nervosa, and an estimated one percent to three percent of young women have bulimia nervosa.<sup>288</sup> Although “eating disorders are more common in women, they do occur in men.”<sup>289</sup>

Anorexia nervosa and bulimia nervosa have been the focus of many structural and functional neuroimaging studies. Some structural neuroimaging studies have found decreased gray and white matter volumes and increased cerebrospinal fluid volumes in individuals who have anorexia nervosa, as well as gray matter deficits in individuals who are weight-recovered from anorexia nervosa, which suggests that there may be an irreversible component to the structural brain changes associated with the illness.<sup>290</sup> Some studies have found that the “region-specific gray matter loss in the anterior cingulate cortex is directly related to the severity of anorexia nervosa, indicating an important role of this area in the pathophysiology of the disorder.”<sup>291</sup> Other studies have not found a cerebral tissue decrease in weight-recovered individuals who suffered from anorexia nervosa.<sup>292</sup> Some studies have

285. *Id.*

286. Nat’l Inst. of Health, Nat’l Cancer Inst., Anorexia Nervosa, [http://www.cancer.gov/Templates/db\\_alpha.aspx?CdrID=426405](http://www.cancer.gov/Templates/db_alpha.aspx?CdrID=426405) (last visited Feb. 8, 2008).

287. Nat’l Inst. of Health et al., Bulimia Nervosa, PSYCHOL. TODAY, available at <http://psychologytoday.com/conditions/bulimia.html> (last visited Feb. 8, 2008).

288. Eating Disorders Coalition, *Statistics and Study Findings*, <http://www.eatingdisorderscoalition.org/reports/statistics.html> (last visited Feb. 8, 2008).

289. *Id.*

290. Mark Mühlau et al., *Gray Matter Decrease of the Anterior Cingulate Cortex in Anorexia Nervosa*, 164(12) AM. J. PSYCHIATRY 1850 (2007) (concluding that “[i]n anorexia nervosa, part of the global gray matter loss persists over the long run.”); E.K. Lambe et al., *Cerebral Gray Matter Volume Deficits after Weight Recovery from Anorexia Nervosa*, 54(6) ARCHIVES GEN. PSYCHIATRY 537 (1997).

291. Mühlau et al., *supra* note 290, at 1850.

292. *See, e.g., id.* (stating, however, that “data regarding the reversibility of this cerebral tissue decrease are conflicting.”).

found that “individuals who have recovered from anorexia nervosa may have difficulties in differentiating positive and negative feedback.”<sup>293</sup> Some, but not all, studies using PET have found brain serotonin and other alterations in patients who have recovered from anorexia nervosa<sup>294</sup> and bulimia nervosa.<sup>295</sup> Almost all neuroimaging studies involving individuals with anorexia nervosa and bulimia nervosa conclude that further research is warranted to determine the cause, specificity, and functional consequences of the structural and/or functional brain changes associated with these disorders.<sup>296</sup>

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293. See, e.g., Angela Wagner et al., *Altered Reward Processing in Women Recovered from Anorexia Nervosa*, 164(12) AM. J. PSYCHIATRY 1842, 1842 (Dec. 2007) (stating that “[t]he exaggerated activation of the caudate, a region involved in linking action to outcome, may constitute an attempt at ‘strategic’ (as opposed to hedonic) means of responding to reward stimuli. The authors hypothesize that individuals with anorexia nervosa have an imbalance in information processing, with impaired ability to identify the emotional significance of a stimulus but increased traffic in neurocircuits concerned with planning and consequences.”).

294. See, e.g., Ursula F. Bailer et al., *Exaggerated 5-HT1A but Normal 5-HT2A Receptor Activity in Individuals Ill with Anorexia Nervosa*, 61(9) BIOLOGICAL PSYCHIATRY 1090, 1090 (May 1, 2007); Ursula F. Bailer et al., *Altered Brain Serotonin 5-HT1A Receptor Binding after Recovery from Anorexia Nervosa Measured by Positron Emission Tomography*, 62(9) ARCHIVES GEN. PSYCHIATRY 1032, 1032 (2005); G.K. Frank et al., *Reduced 5-HT2A Receptor Binding after Recovery from Anorexia Nervosa*, 52(9) BIOLOGICAL PSYCHIATRY 896, 896, 901 (Nov. 1, 2002).

295. See, e.g., Walter H. Kaye et al., *Altered Serotonin 2A Receptor Activity in Women Who Have Recovered from Bulimia Nervosa*, 158(7) AM. J. PSYCHIATRY 1152, 1152-153(2001).

296. See, e.g., Mühlau et al., *supra* note 290, at 1850-851.

