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## A Glimpse Inside the Brain's Black Box: Understanding the Role of Neuroscience in Criminal Sentencing

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# A GLIMPSE INSIDE THE BRAIN'S BLACK BOX: UNDERSTANDING THE ROLE OF NEUROSCIENCE IN CRIMINAL SENTENCING

*Bernice B. Donald\* & Erica Bakies\*\**

## INTRODUCTION

It is not a secret: size matters. And where it matters most is within the most complex structure in the universe—the brain, a mass of gray and white matter that controls an extraordinary number of functions and processes that allow us to walk, talk, breathe, reason, feel emotions, and perceive and experience the world around us. While we have made great strides in studying this three-pound ball of cells, it still mostly remains a mystery beyond our grasp of comprehension. But what little we do know has led to great developments in the legal community and especially in the criminal justice system. This Article focuses on the utilization of neuroscience and its developing technology in the courtroom, particularly at the sentencing phase of trial.

While the brain encompasses a wide variety of fields of study, neuroscience offers specific and tangible insight into brain underdevelopment and brain injuries. For example, neuroscience demonstrates that what our childhood was like—whether good, bad, or in between—greatly impacts the full development of this vital organ. Studies show that exposure to stress and instability actually prevents the brain from fully developing. In other words, the brain remains small and those processes it controls immature. Children exposed to trauma face a number of disorders, including “depression, attention-deficit/hyperactivity disorder (ADHD), oppositional defiant disorder (ODD), conduct disorder, anxiety disorders, eating disorders, sleep disorders, communication disorders, separation anxiety disorder, and/or reactive attachment disorder,” to name a few.<sup>1</sup>

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1. Alexandra Cook et al., *Complex Trauma in Children & Adolescents*, 21 *FOCAL POINT* 4, 4 (2007).

Because the effects of childhood trauma stem from one's surroundings, children who live in inner cities that are plagued with violence and racial tension often experience childhood trauma and the diagnoses that follow it.<sup>2</sup> Notably, the same types of experiences are present in children who are exposed to the welfare system.<sup>3</sup> While most people are familiar with posttraumatic stress disorder (PTSD), children who are constantly exposed to trauma and dangerous situations, like those in dangerous inner-city neighborhoods, face a far more compounded scenario: complex trauma.<sup>4</sup> Complex trauma is "the dual problem of children's exposure to multiple traumatic events and the impact of this exposure on immediate and long-term outcomes."<sup>5</sup> Those outcomes include "psychiatric and addictive disorders, chronic medical illness, and legal, vocational, and family problems."<sup>6</sup> In short, neuroscience can identify both childhood trauma and its lasting impression on an individual as they become an adult.

Now that current neuroscience technology has the ability to demonstrate how exposure to childhood trauma affects an individual's brain, the next question is how this science and its conclusions in the courtroom can be effectively utilized. This question becomes very apparent in the context of sentencing, where a judge may consider a wide range of factors in determining an appropriate sentence for those defendants standing before her. Without disregarding the criminal justice system's ability to hold those accountable for their actions, neuroscience can be utilized to demonstrate that certain actions may actually be the result of developmental problems associated with the brain, like the effects of complex trauma on children. A judge may also use neuroscience to combat her implicit biases, which have ways of manifesting themselves in the courtroom and therefore need to be explicitly acknowledged. Neuroscience can offer additional insight into a defendant's thought process and accordingly provide a means for the judge to address and correct those biases.

This Article begins by discussing what neuroscience and the smaller associated field of study, neuropsychology, are and what they can tell us about an individual. It then recounts a brief history of sentencing in the United States. Additionally, it expounds on how the legal system currently utilizes neuroscience in the courts, noting specifically the ways in which neuroscience can be presented during the sentencing phase of trial. Finally, it discusses the use of neuroscience as a mitigating factor during sentencing and how judges can use neuroscience to combat their implicit biases.

## I. BACKGROUND

In conjunction with the National Institute of Health, President Barack Obama launched the Brain Research through Advancing Innovative

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2. *See id.*

3. *See id.*

4. *See id.*

5. *Id.*

6. *Id.*

Neurotechnologies (BRAIN) Initiative, which focuses on revolutionizing our understanding of the human brain.<sup>7</sup> The goal is to fill major gaps in our current knowledge and provide unprecedented opportunities for exploring exactly how the brain enables the human body to record, process, utilize, store, and retrieve vast quantities of information, all at the speed of thought.<sup>8</sup> Recent developments concerning the brain have been historic and far reaching.

#### A. *The Science*

Unsurprisingly, this expansion in funding and focus has contributed to the many fields of study concerning the brain. Relevant here, neuroscientists are not only concerned with the normal functioning of the brain in conjunction with the rest of the nervous system but also with the effects of neurological, psychiatric, and developmental disorders on people's actions.<sup>9</sup> Neuroscience is a branch of the life sciences that addresses the anatomy, physiology, biochemistry, or molecular biology of nerves and nervous tissue within the brain, specifically in relation to behavior and learning.<sup>10</sup> More generally, neuroscience is the study of how processes function within the brain.

Another key area of study that increases our understanding of the complexity of the brain and its effects on behavior is neuropsychology. Neuropsychology adds to the picture outlined by neuroscience, as it is concerned with the integration of psychological observations of behavior and the mind with neurological observations of the brain and nervous system.<sup>11</sup> This is because “[s]tandard neuroimaging is neither specific nor sensitive enough to detect the damage done to the brain.”<sup>12</sup> Basically,

7. THE BRAIN INITIATIVE, <http://braininitiative.nih.gov/> (last visited Oct. 16, 2016) [<https://perma.cc/T3TS-UMQM>].

8. *Id.* (explaining that by “accelerating the development and application of innovative technologies, researchers will be able to produce a revolutionary new dynamic picture of the brain that . . . shows how individual [brain] cells and complex neural circuits interact . . . at the speed of thought”).

9. Christian Nordqvist, *What Is Neuroscience?*, MED. NEWS TODAY (Sept. 26, 2014), <http://www.medicalnewstoday.com/articles/248680.php> [<https://perma.cc/7AQ7-NJTB>].

10. See Deborah W. Denno, *The Myth of the Double-Edged Sword: An Empirical Study of Neuroscience Evidence in Criminal Cases*, 56 B.C. L. REV. 493, 500 (2015) (defining neuroscience as “the branch of life sciences that studies the brain and nervous systems [including] . . . brain processes such as sensation, perception, learning, memory, and movement” (alterations in original) (quoting BRENT GARLAND, *NEUROSCIENCE AND THE LAW: BRAIN, MIND AND THE SCALES OF JUSTICE*, 206 (2004))); see also *Neuroscience*, MERRIAM-WEBSTER'S DICTIONARY, <http://www.merriam-webster.com/dictionary/neuroscience> (last visited Oct. 16, 2016) [<https://perma.cc/N7LG-5JK7>].

11. *Neuropsychology*, MERRIAM-WEBSTER'S DICTIONARY, <http://www.merriam-webster.com/dictionary/neuropsychology> (last visited Oct. 16, 2016) [<https://perma.cc/4TFQ-BWTC>].

12. Bruce H. Stern, *Neuropsychology & Traumatic Brain Injury*, TRIAL, Oct. 2015, at 48, 49 (“Advanced neuroimaging, such as a PET scan or diffusion tensor imaging, provides evidence about how the brain is functioning . . .”).

neuropsychology objectively analyzes how the mind works in connection with the brain.<sup>13</sup>

Neuroscience and neuropsychology typically involve comprehensive and extensive evaluations. These evaluations have been incorporated into the legal field most notably as “neuroscience evidence.”<sup>14</sup> Two of the most common categories of these tests are (1) neuroimaging, or “‘imaging tests,’ which are generated by computer images of a human brain,” and (2) neuropsychological exams, or “‘non-imaging tests,’ which are based on tests administered by a medical professional to an individual for the purpose of gaining insight into how that person’s brain operates.”<sup>15</sup>

Neuroimaging now allows neurologists to analyze the structural and functional aspects of the brain.<sup>16</sup> Structural neuroimaging involves magnetic resonance imaging (MRI) and computed tomography (CT) scans.<sup>17</sup> These images demonstrate “the brain’s architecture.”<sup>18</sup> Similarly, scans such as the electroencephalography (EEG), positron emission tomography (PET) scans, and functional magnetic resonance imaging (fMRI) display visual images of how the brain works at a particular moment in time.<sup>19</sup>

Neuropsychological exams are more than just scans of the brain. A neuropsychological evaluation is a “comprehensive, objective assessment of a wide range of cognitive, adaptive, and emotional behaviors that reflect the adequacy or inadequacy of higher brain functions.”<sup>20</sup> In other words, neuropsychological testing measures a person’s brain function compared to the normal population in a variety of different areas, including education, standardized test scores, and work history.<sup>21</sup> This variety of tests—also known as a “battery”—requires access to the subject’s school records, medical records, and employment records.<sup>22</sup> Other relevant background information may include the subject’s social and family history.<sup>23</sup> Considering all of these factors, a neuropsychologist can then determine a baseline of brain function for a particular individual, generally before a particular event occurs, such as the committing of a crime.<sup>24</sup> For example, after conducting these tests, neuropsychologists are able to better understand and interpret the consequences of childhood neglect and its

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13. *See id.*

14. Denno, *supra* note 10, at 500.

15. *Id.*

16. *See* Sydney B. Roth, Comment, *The Emergence of Neuroscience Evidence in Louisiana*, 87 TUL. L. REV. 197, 202 (2012).

17. *See id.*

18. *Id.* (quoting Joshua Greene & Jonathan Cohen, *For the Law, Neuroscience Changes Nothing and Everything*, 359 PHIL. TRANSACTIONS ROYAL SOC’Y LONDON B 1775, 1775 (2004)).

19. *See* Roth, *supra* note 16, at 203.

20. Stern, *supra* note 12, at 49.

21. *See id.* at 49–50.

22. *See id.* at 49.

23. *See id.*

24. *See id.*

effects on brain development, particularly when it comes to explaining how those individuals ended up in the criminal justice system.<sup>25</sup>

Because “human behavior is the very currency in which law”—and especially criminal law—deals, there is an unending need for an improved understanding of how and why particular people behave the way that they do.<sup>26</sup> Dubbed “neurolaw,” this “neuroscience revolution” has gained the attention of legal thinkers and is poised to be the catalyst for significant changes in not only the criminal justice system but the legal field generally.<sup>27</sup>

The development of neuroscience includes recent momentous breakthroughs, especially in how certain types of experiences during childhood can drastically affect the rest of a child’s life.<sup>28</sup> In utero and during the first four years of life, a child’s rapidly developing brain organizes to reflect the child’s environment.<sup>29</sup> By the age of four, a child’s brain is 90 percent of its adult size.<sup>30</sup> Accordingly, a child who is exposed to trauma early on in her life organizes her brain around instability and chaos, which is extremely debilitating.<sup>31</sup> For example, receiving “proper nutrition and stimulation during the first three years of life” is critical “for the brain to develop the crucial neurological networks that are foundational to the functioning of an individual.”<sup>32</sup> Because of neuroscience, we now know that having these types of experiences at an early age can lead to “permanent and irreversible consequences,” especially in the “physical, cognitive, emotional, and social domains.”<sup>33</sup> It bears noting that these consequences can weigh heavily not only on the child exposed to such circumstances but also on society itself, a weight that often goes unrecognized.<sup>34</sup>

One of the most interesting aspects of neuroscience is that it can show us actual physical changes in response to childhood trauma.<sup>35</sup> Studies demonstrate that there are differences in the volume of an adult’s prefrontal

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25. Janet Weinstein & Ricardo Weinstein, *Before It's Too Late: Neuropsychological Consequences of Child Neglect and Their Implications for Law and Social Policy*, 33 U. MICH. J.L. REFORM 561, 562 (2000).

26. Owen D. Jones & Timothy H. Goldsmith, *Law and Behavioral Biology*, 105 COLUM. L. REV. 405, 407 (2005).

27. Jean Macchiaroli Eggen & Eric J. Laury, *Toward a Neuroscience Model of Tort Law: How Functional Neuroimaging Will Transform Tort Doctrine*, 13 COLUM. SCI. & TECH. L. REV. 235, 236 (2012).

28. See Weinstein & Weinstein, *supra* note 25, at 562 (“Recent developments in the neurosciences have led to dramatic breakthroughs in the area of brain development and [especially] the understanding of consequences of [childhood] neglect.”).

29. See Bruce D. Perry, *Maltreatment and the Developing Child: How Early Childhood Experience Shapes Child and Culture*, MARGARET MCCAIN LECTURE SERIES 2 (Sept. 23, 2004), <http://www.lfcc.on.ca/mccain/perry.pdf> [<https://perma.cc/PA8T-EYJG>].

30. See *id.*

31. See *id.*

32. Weinstein & Weinstein, *supra* note 25, at 561.

33. *Id.* at 595.

34. See *id.*

35. See O. Carter Snead, *Neuroimaging and the “Complexity” of Capital Punishment*, 82 N.Y.U. L. REV. 1265, 1313 (2007).

cortex depending on whether that individual experienced trauma as child or whether they had a nurturing childhood.<sup>36</sup> Studies also indicate that maltreated children exhibited “higher rates of adult psychopathology and a greater likelihood of engaging in maladaptive and socially disruptive courses of conduct as adults (such as engaging in substance abuse or violating criminal law).”<sup>37</sup> These findings are significant in establishing the connection between childhood trauma and future offenses because the prefrontal cortex is involved in a vast number of functions, such as “executive functionality (for example, planning and controlling behavioral responses, problem-solving, and sustaining mental productivity), attention focusing, working and delayed memory, emotional regulation, and responses to stress.”<sup>38</sup>

A newer development in the cross section of childhood trauma, neuropsychology, and neuroscience is analysis of “complex trauma” and its long-term effects on children. When a child is exposed to any threat, her brain will activate a set of adaptive responses designed to help her survive.<sup>39</sup> “Complex trauma” occurs when a child has been exposed to multiple traumatic events throughout her early life.<sup>40</sup> When a child experiences repetitive activation of the stress response systems, her baseline state of arousal is altered.<sup>41</sup> Thus, even when there is no external threat or demand, she is in a psychological state of alarm, commonly known as “fight or flight.”<sup>42</sup> Although PTSD is similar to the fight-or-flight state of mind that exists with complex trauma, it does not capture the full range of developmental difficulties that traumatized children experience as a result of exposure to repeated traumatic incidents.<sup>43</sup> For instance, when a stressor arises, which could be as simple as an argument with a peer or a demanding school task, a traumatized child’s emotions may rapidly escalate to a state of fear.<sup>44</sup>

Further, when in a state of calm, a person can use the higher, more complex parts of the brain to process and act on information; in contrast, in a state of fear, a person is only able to access the lower, more primitive parts of the brain.<sup>45</sup> An increase in threat level corresponds to “less thoughtful and . . . more reactive” responses.<sup>46</sup> Further, “[a]ctions in this state may be governed by emotional and reactive thinking styles.”<sup>47</sup> Because a traumatized child’s baseline state of arousal is constantly altered,

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36. See Lois A. Weithorn, *Developmental Neuroscience, Children’s Relationships with Primary Caregivers and Child Protection Policy Reform*, 63 HASTINGS L.J. 1487, 1527 (2012).

37. *Id.* at 1508–09.

38. *Id.* at 1526.

39. See Perry, *supra* note 29, at 2.

40. Cook et al., *supra* note 1, at 4.

41. See *id.*

42. See *id.*

43. See *id.*, at 1.

44. Perry, *supra* note 29, at 2.

45. See *id.* at 3.

46. *Id.*

47. *Id.*

she is unable to learn from normal “social, emotional, and other life experiences.”<sup>48</sup>

Complex trauma generally manifests itself in children who experience abuse or neglect, but it can also appear in children who have witnessed domestic violence, ethnic cleansing, or war.<sup>49</sup> The consequences of complex trauma on a child are devastating for both her and her future. That child can experience, among other things, trouble with “accurate identification of internal emotional experiences” and interference “with the formation of a secure attachment bond between a child and her caregiver,” which influences the child’s future relationships and social skills.<sup>50</sup> The child can carry all of these problems forward to adulthood, where she must deal with them as a functional and participating member of society.

Children who have complex trauma or who have survived extreme neglect are among the “hundreds of millions of people around the world living with mental disorders.”<sup>51</sup> The World Health Organization’s (WHO) Mental Health Action Plan 2013–2020 emphasizes that, depending on the local context, certain portions of the population are more susceptible to mental health issues than others.<sup>52</sup> Members of households living in poverty and infants or children exposed to maltreatment and neglect are included in those vulnerable categories.<sup>53</sup> The WHO contextualizes these matters as more than public health issues; it characterizes them as developmental issues.<sup>54</sup> If these issues are not directly addressed, children will continue to suffer from developmental impairments, perhaps by committing crimes or by being unable to positively contribute to society.<sup>55</sup> The number of those suffering continues to increase, and if they are prevented from becoming productive members of society, the global economy will suffer as well.<sup>56</sup>

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48. *Id.*

49. *See id.* at 2; *see also* Cook et al., *supra* note 1, at 1.

50. Cook et al., *supra* note 1, at 4–5.

51. *Making Mental Health a Global Development Priority*, MHGAP NEWSL. 1 (May 2016) [hereinafter MHGAP NEWSLETTER], [http://www.who.int/mental\\_health/mhgap/newsletter\\_may\\_2016.pdf?ua=1](http://www.who.int/mental_health/mhgap/newsletter_may_2016.pdf?ua=1) [https://perma.cc/W86G-ECP7].

52. WORLD HEALTH ORG., MENTAL HEALTH ACTION PLAN 2013–2020, at 7 (2013), [http://www.who.int/mental\\_health/action\\_plan\\_2013/bw\\_version.pdf](http://www.who.int/mental_health/action_plan_2013/bw_version.pdf) [https://perma.cc/C7Y6-MSHR].

53. *See id.*

54. MHGAP NEWSLETTER, *supra* note 51; *see also* *Out of the Shadows: Making Mental Health a Global Priority*, WORLD BANK, <http://www.worldbank.org/en/events/2016/03/09/out-of-the-shadows-making-mental-health-a-global-priority#1> (last visited Oct. 16, 2016) [https://perma.cc/426B-ASXX].

55. MHGAP NEWSLETTER, *supra* note 51.

56. *See id.* (noting that the World Bank, which is composed of ministers of finance and development agencies, decided to join the WHO in its efforts to move mental health into the mainstream developmental agenda).



*B. Sentencing in the United States*

Imprisonment in the United States and elsewhere was uncommon prior to the eighteenth century and was not used as a primary form of punishment until around the American Revolution.<sup>57</sup> Punishment prior to prisons often focused on retaliation and vengeance.<sup>58</sup> The Quakers, as pacifists, were against capital punishment and, accordingly, crusaded for reform by suggesting replacing traditional punishment with confinement and labor in prisons.<sup>59</sup> This stance abruptly changed during the mid-twentieth century, and instead of confinement and labor, punishment focused on rehabilitation.<sup>60</sup> About thirty to forty years ago, sentencing was again reformed.<sup>61</sup> Pivoting from a focus on rehabilitation during the 1970s and 1980s, public policy instead began applying severe penalties associated with the penological goals of deterrence and incapacitation.<sup>62</sup>

The pivot in the 1970s and 1980s corresponded with an increase in street drugs, such as crack cocaine.<sup>63</sup> It was this rise in drug use that led to the marked “War on Drugs.”<sup>64</sup> The War on Drugs drastically increased the incarceration rate in numerous ways:

- (1) the direct incarceration of drug offenders, (2) the re-incarceration of all types of offenders due to drug-related parole violations, (3) the impact of drug incarcerations on prison admissions instead of prison populations, (4) the extent to which prior drug offenses trigger repeat-offender enhancement, even for non-drug crimes, and (5) the effects of large-scale drug arrests and incarcerations on neighborhood social cohesion, and the connections between social stability and incarceration.<sup>65</sup>

In all, drug convictions increased tenfold between 1980 and 1996.<sup>66</sup>

The War on Drugs also had an unintended but formidable effect on individuals with mental health issues who were susceptible to coming into

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57. See Harry Elmer Barnes, *Historical Origin of the Prison System in America*, 12 J. AM. INST. CRIM. L. & CRIMINOLOGY 35, 36–37 (1922).

58. See George Fisher, *The Birth of the Prison Retold*, 104 YALE L.J. 1235, 1238–39 (1995) (discussing the English “Bloody Code” in which most felonies were capital crimes).

59. See Matthew W. Meskell, Note, *The American Revolution: The History of Prisons in the United States from 1777 to 1877*, 51 STAN. L. REV. 839, 846–49 (1999) (explaining the early American prison reform in Pennsylvania and New York).

60. See *id.* at 849.

61. See Albert W. Alschuler, *The Changing Purposes of Criminal Punishment: A Retrospective on the Past Century and Some Thoughts About the Next*, 70 U. CHI. L. REV. 1, 9–10 (2003).

62. See *id.*

63. See Paul Butler, *Retribution, for Liberals*, 46 UCLA L. REV. 1873, 1884 (1999). But see Doris Marie Provine, *Race and Inequality in the War on Drugs*, 7 ANN. REV. L. & SOC. SCI. 41, 4849 (2011) (“The war on drugs is thus distinctive from, though not incompatible with, the hardening of attitudes toward crime and punishment that began to take form in the 1970s.”).

64. See Butler, *supra* note 63, at 48–49.

65. John F. Pfaff, *The War on Drugs and Prison Growth: Limited Importance, Limited Legislative Options*, 52 HARV. J. ON LEGIS. 173, 175 (2015).

66. Shima Baradaran, *Drugs and Violence*, 88 S. CAL. L. REV. 227, 230 (2015).

contact with the criminal justice system.<sup>67</sup> Prior to the War on Drugs, the United States began deinstitutionalizing psychiatric facilities with the hope of returning those individuals to nursing homes, assisted living facilities, and home care.<sup>68</sup> When the last penny of government funding was spent, these asserted alternatives were underutilized and many of the mentally ill ended up on the streets where they self-medicated their illnesses.<sup>69</sup> The War on Drugs started soon thereafter, in the 1970s.<sup>70</sup> The culmination of these two trends led to a jump in the percentage of inmates with serious mental illness as well as a large decrease in the number of individuals hospitalized for serious mental illness.<sup>71</sup>

The positive correlation between mental health issues and addiction is embodied in the concept of “dual diagnosis,” a situation where a person has both a mood disorder and an addiction problem; thus, the War on Drugs’s high incarceration periods for drug convictions disproportionately impacted those individuals living with mental health issues.<sup>72</sup> The National Alliance on Mental Illness estimates that “[a]bout a third of all people experiencing mental illnesses and about half of people living with severe mental illnesses also experience substance abuse.”<sup>73</sup>

Prior to 1984, judges had almost unlimited discretion when it came to sentencing.<sup>74</sup> One commentator noted that the system was one that had “the absence of rational ordering,” with various sentences applied “arbitrar[ily] and discriminator[ily].”<sup>75</sup> Accordingly, in 1984, Congress attempted to stem judges’ broad sentencing discretion by replacing it with a more uniform application of prescribed sentences.<sup>76</sup> As part of the Comprehensive Crime Control Act, Congress passed the Sentencing Reform Act.<sup>77</sup> That statute, in turn, established the U.S. Sentencing Commission (“the Sentencing Commission” or “the Commission”), an agency of the judicial branch that became responsible for developing uniform guidelines for sentencing.<sup>78</sup> The Sentencing Commission kept

67. See Terry A. Kupers, *A Community Mental Health Model in Corrections*, 26 STAN. L. & POL’Y REV. 119, 123 (2015) (noting that the War on Drugs “captured many individuals with serious mental illness in its dragnet”).

68. Anisha Lewis, *Incarceration and Mental Health*, CTR. PRISONER HEALTH & HUM. RTS., <http://www.prisonerhealth.org/educational-resources/factsheets-2/incarceration-and-mental-health/> (last visited Oct. 16, 2016) [<https://perma.cc/4P72-7HQD>].

69. See *id.*

70. See *id.*

71. See *id.*

72. *Dual Diagnosis*, NAT’L ALLIANCE ON MENTAL ILLNESS, <http://www.nami.org/Learn-More/Mental-Health-Conditions/Related-Conditions/Dual-Diagnosis> (last visited Oct. 16, 2016) [<https://perma.cc/3KLM-CCKN>].

73. *Id.*

74. MARVIN E. FRANKEL, *CRIMINAL SENTENCES: LAW WITHOUT ORDER* 49 (1973).

75. *Id.*

76. Wanda A. Luetgen, Topical Survey, *Criminal Law—Right to Collaterally Challenge Prior Convictions Not Guaranteed by Sentencing Guidelines—United States v. Issacs*, 143 F.3d 106 (1st Cir. 1994), 28 SUFFOLK U. L. REV. 892, 893–94 (1994).

77. Pub. L. No. 98-473, 98 Stat. 1987 (1984).

78. See *Mistretta v. United States*, 488 U.S. 361, 363–70 (1989) (discussing the background, purpose, and operation of the Sentencing Reform Act and the Commission).

some of the more traditional goals in mind when developing guidelines: punishment, deterrence, incapacitation, and rehabilitation.<sup>79</sup> At the same time, the Commission also focused on “minimizing disparity in sentencing, and accounting for ‘advancement in the knowledge of human behavior as it relates to the criminal justice system.’”<sup>80</sup> Thus, the Commission promulgated the U.S. Sentencing Guidelines (“the Sentencing Guidelines” or “the Guidelines”), which sought to correct the discriminatory application of sentences and provide for more predictable sentences.<sup>81</sup> These mandatory Guidelines were promulgated in 1987, ending an era in which a trial judge’s prescribed sentence was “virtually unquestioned.”<sup>82</sup> It was not until 2005 that the U.S. Supreme Court ruled that the Sentencing Guidelines, which Congress had made mandatory for judges to follow, were unconstitutional.<sup>83</sup> The Court held that requiring judges to sentence within a set time period violated defendants’ Sixth Amendment rights.<sup>84</sup> As a result, the Guidelines became “effectively advisory.”<sup>85</sup> This brought a sea of change to the federal appellate courts. Some took the “*Booker* maximalism” stance, the view that “the Guidelines no longer had a privileged place in sentencing.”<sup>86</sup> Others applied a “*Booker* minimalism” approach, which gave the Guidelines more weight than other factors, arguing that “they had a special role in promoting sentencing uniformity,” and they “accounted for the other § 3553(a) factors.”<sup>87</sup>

The effects of the Sentencing Guidelines—both when they were mandatory and now that they are advisory—and the War on Drugs are not all positive and their combined effect on society, some argue, has been grave.<sup>88</sup> Large differences in the length of sentences still exist on the basis of race, gender, education, income, and citizenship, despite the Guidelines’ command that these characteristics not affect the sentence length.<sup>89</sup> For

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79. *Id.*

80. *An Overview of the United States Sentencing Commission*, U.S. SENT’G COMMISSION, [http://www.ussc.gov/sites/default/files/pdf/about/overview/USSC\\_Overview.pdf](http://www.ussc.gov/sites/default/files/pdf/about/overview/USSC_Overview.pdf) (last visited Oct. 16, 2016) [https://perma.cc/85V7-VTB5].

81. *Id.*

82. Judge Nancy Gertner, *A Short History of American Sentencing: Too Little Law, Too Much Law, or Just Right*, 100 J. CRIM. L. & CRIMINOLOGY 691, 695–96 (2010).

83. See *United States v. Booker*, 543 U.S. 220, 237 (2005); see also Francis X. Shen, *The Law and Neuroscience Bibliography: Navigating the Emerging Field of Neurolaw*, 38 INT’L J. LEGAL INFO. 352, 358 (2010). See generally Craig Green, *Booker and Fanfan: The Untimely Death (and Rebirth?) of the Federal Sentencing Guidelines*, 93 GEO. L.J. 395 (2005).

84. See *Booker*, 543 U.S. at 245.

85. *Id.*

86. Jeffrey S. Hurd, *Federal Sentencing and the Uncertain Future of Reasonableness Review*, 84 DENV. U. L. REV. 835, 837 (2007).

87. *Id.* at 836.

88. See, e.g., Crystal S. Yang, *Free at Last?: Judicial Discretion and Racial Disparities in Federal Sentencing*, 44 J. LEGAL STUD. 75, 76 (2015) (“While the guidelines reduced inter judge sentencing disparities in their early years, . . . many criticized them for being rigid . . . and for shifting power to prosecutors in their charging and plea-bargaining decisions.”).

89. David B. Mustard, *Racial, Ethnic, and Gender Disparities in Sentencing: Evidence from the U.S. Federal Courts*, 44 J.L. & ECON. 285, 311 (2001).

example, racial disparities in sentencing continue to exist, and some studies suggest that they have actually increased since *Booker*.<sup>90</sup> African Americans account for approximately 12 percent of the population of the United States, but almost 40 percent of those incarcerated are African American.<sup>91</sup> There are more African American men in prison today than there were African American slaves in 1850.<sup>92</sup> Lower-income offenders are less likely to receive downward departures and more likely to receive upward departures.<sup>93</sup> Evidence suggests that even when judges have awarded departures from the recommended sentences to lower-earning offenders, these departures are typically only small reductions in sentencing.<sup>94</sup> Because the Guidelines allow judges to reduce or increase the recommended sentence, over half of the unaccounted for differences in sentences are generated by departures from the Guidelines, rather than from sentencing within the Guidelines.<sup>95</sup> While the Guidelines are certainly Congress's attempt to combat these disparities, they clearly still exist, and there is at least the suggestion that implicit bias in sentencing and prosecution play a role in maintaining that disparity today.<sup>96</sup>

Legal commentators suggested that the Guidelines had a similar effect on the mentally ill.<sup>97</sup> The Guidelines provided for a downward departure from the calculated sentencing Guidelines range for individuals with a mental illness.<sup>98</sup> In considering whether to apply this downward departure, the Guidelines instruct judges to consider "if such [mental and emotional] conditions, individually or in combination with other offender characteristics, are present to an unusual degree and distinguish the case from the typical cases covered by the guidelines."<sup>99</sup> The Guidelines are careful to focus on mental and emotional conditions, which were previously deemed irrelevant to determining whether a downward departure was warranted in a particular situation.<sup>100</sup> In addition to those considerations,

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90. Yang, *supra* note 88, at 77 ("I find that *Booker* significantly increased racial disparities after controlling for extensive offender and crime characteristics.").

91. John Tyler Clemons, Note, *Blind Injustice: The Supreme Court, Implicit Racial Bias, and the Racial Disparity in the Criminal Justice System*, 51 AM. CRIM. L. REV. 689, 690 (2014).

92. Michelle Alexander: *More Black Men Are in Prison Today Than Were Enslaved in 1850*, HUFFINGTON POST (Oct. 13, 2011), [http://www.huffingtonpost.com/2011/10/12/michelle-alexander-more-African-American-men-in-prison-slaves-1850\\_n\\_1007368.html](http://www.huffingtonpost.com/2011/10/12/michelle-alexander-more-African-American-men-in-prison-slaves-1850_n_1007368.html) [<https://perma.cc/UN7X-2SUM>].

93. See Mustard, *supra* note 89, at 312.

94. See *id.*

95. See *id.*

96. See Clemons, *supra* note 91, at 696.

97. See *Developments in the Law—The Law of Mental Illness*, 121 HARV. L. REV. 1114, 1133 (2008) [hereinafter *The Law of Mental Illness*] (arguing "that judges have imposed prison sentences beyond what the Guidelines recommend on some mentally ill offenders they view as dangerous or in need of treatment instead of supplementing Guidelines sentences as necessary with civil commitment").

98. See U.S. SENTENCING GUIDELINES MANUAL § 5H1.3 (U.S. SENTENCING COMM'N 2016); see also *The Law of Mental Illness*, *supra* note 97, at 1133.

99. U.S. SENTENCING GUIDELINES MANUAL § 5H1.3.

100. *Id.*

the Guidelines account for diminished capacity in section 5K2.13,<sup>101</sup> which also allows for downward departures from the recommended Guidelines sentencing range.<sup>102</sup>

Despite these lofty goals and far-reaching considerations for mental health, pundits suggest that these outcomes have not been realized. Instead of providing for further consideration of mental illness, legal commentators have observed, “*Booker*’s main effect may have been to create a second pathway for judges to impose above-Guidelines sentences.”<sup>103</sup> Some say this reaction can be traced back to one of the main impetuses for establishing the Guidelines: John Hinckley’s acquittal and the subsequent public distaste for the insanity defense.<sup>104</sup> The War on Drugs also may have played a role here, as “the Guidelines were crafted to ensure that drug dependence, which is perhaps most reasonably viewed as mental illness, would not act to mitigate sentences.”<sup>105</sup>

Even though there may be issues with the Sentencing Guidelines, they are the current method by which the judiciary bases sentencing decisions. Utilizing neuroscience in this space requires consideration and knowledge of the Guidelines’ advantages as well as their disadvantages.

### C. Current Utilization of Neuroscience in the Criminal Justice System

Lawyers recently have begun utilizing neuroscience in the courtroom, and, almost more notably, courts have embraced it. For instance, in 2005, the Supreme Court considered neuroscientific theories of child development to support its reasoning in prohibiting the death penalty for older juveniles.<sup>106</sup> More recently, in a 2011 case, *Brown v. Entertainment Merchants Ass’n*,<sup>107</sup> Justice Breyer wrote a dissent that relied heavily on neuroscience research demonstrating a correlation between virtual violence in video games and aggressive tendencies of those children who played them.<sup>108</sup> While “law and neuroscience” is useful as a general descriptive phrase, it is too vague to be applicable in particular research and applied contexts. In practice, it is particular aspects of law that may be affected by particular types of neuroscience research.<sup>109</sup>

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101. *See id.* § 5K2.13.

102. *See id.*

103. *The Law of Mental Illness*, *supra* note 97, at 1138.

104. *Id.* at 1135.

105. *Id.* at 1136.

106. *See generally* *Roper v. Simmons*, 543 U.S. 551 (2005).

107. 564 U.S. 786 (2011).

108. *Id.* at 850–56 (Breyer, J., dissenting).

109. Shen, *supra* note 83, at 4.

### 1. At Trial

Neuroscience has slowly crept into the trial phase of court cases, in both the criminal and civil dockets.<sup>110</sup> In the criminal docket, it has been introduced in all three phases of trial: preliminary determinations of competency, the guilt phase, and the sentencing phase.<sup>111</sup> Most notably, neuroscience has been utilized to negate an ability to form the mens rea necessary for premeditation and deliberation and to bolster a defense for not guilty by reason of insanity.<sup>112</sup> Even though these types of cases are few and far between, and the science is still in its infancy, they demonstrate the roles that neuroscience could one day play on a grander scale.

In the civil docket, neuroscience has proved itself to be equally beneficial. For example, in *P.P. v. Compton Unified School District*,<sup>113</sup> the plaintiffs, students in the Compton Unified School District in Los Angeles, California, utilized neuroscience to bolster their complaint.<sup>114</sup> The district court relied on the scientific evidence to deny a motion dismiss for failure to state a claim.<sup>115</sup> The students' claim was that their exposure to childhood trauma<sup>116</sup> and their likely diagnosis of complex trauma "impair[ed] their ability to perform activities essential to education—including, but not limited to, learning, thinking, reading, and concentrating," resulting in a violation of the Individuals with Disabilities Education Act (IDEA).<sup>117</sup> All sorts of claims have utilized neuroscience in the civil arena: personal injury, medical malpractice, and toxic exposure cases, to name a few.<sup>118</sup> In short, neuroscience's applications are widespread, and lawyers should consider whether it could play a crucial role in litigation.

### 2. At Sentencing

Neuroscience can also play a unique role in sentencing, although the scope of that role is still somewhat vague. There is, of course, the issue of admissibility, which is currently being debated in state courts. Like other experts presented during sentencing, either Federal Rule of Evidence 702 or the associated state rule usually applies to expert testimony provided by neuropsychologists regarding diagnosis and causation.<sup>119</sup> While most states

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110. See E. Spencer Compton, Note, *Not Guilty by Reason of Neuroimaging: The Need for Cautionary Jury Instructions for Neuroscience Evidence in Criminal Trials*, 12 VAND. J. ENT. & TECH. L. 333, 340–41 (2010).

111. See *id.* at 341.

112. See *id.* at 341–42.

113. 135 F. Supp. 3d 1126 (C.D. Cal. 2015).

114. *Id.* at 1147–49.

115. *Id.*

116. Some representative examples include a child being "repeatedly physically and sexually abused by his mother's boyfriends," witnessing the physical abuse of family members, watching a best friend be shot and killed, being "stabbed with a knife while trying to protect a friend," and being "sexually assaulted on the bus on her way home from school," among other horrible experiences. *Id.* at 1130.

117. *Id.* at 1131.

118. See Compton, *supra* note 110, at 341.

119. See Stern, *supra* note 12, at 50.

accept neuropsychological testimony from experts, a minority of states—such as Florida, Georgia, and Virginia—prohibit it, instead concluding that only medical experts, such as physicians, are qualified to testify on diagnosis, causation, and prognosis.<sup>120</sup>

At the federal level, the Sixth Circuit has weighed in on the debate. In *Fautenberry v. Mitchell*,<sup>121</sup> the dissenting opinion stated that a neuropsychological examination is “the most effective means possible of determining whether [the defendant] had a brain impairment” stemming from her unstable family environment, emotionally abusive upbringing, and undocumented physical abuse.<sup>122</sup> Although the defendant declined to submit to any neurological exams in that particular case, the dissent went on to acknowledge that a neuropsychologist could presumably have discovered, verified, and revealed such brain damage.<sup>123</sup> Further, the dissenting opinion argued that this evidence could have been admitted to aid the defendant’s case as mitigating evidence during the sentencing stage of trial.<sup>124</sup>

Perhaps unsurprisingly, neuroscience is mostly utilized in very serious cases, generally where the defendant is facing a death sentence, life imprisonment, or a substantially long term of imprisonment.<sup>125</sup> Specifically with respect to the death penalty, the Supreme Court has recognized the opportunity to consider offenders’ past life experiences and other evidence.<sup>126</sup> It has concluded the following:

[T]he Eighth and Fourteenth Amendments require that the sentencer, in all but the rarest kind of capital case, not be precluded from considering, as a mitigating factor, any aspect of a defendant’s character or record and any of the circumstances of the offense that the defendant proffers as a basis for a sentence less than death.<sup>127</sup>

The Court described these types of considerations in death penalty cases “far more important than in noncapital cases.”<sup>128</sup>

Jurisprudence and legal commentators have noted that considering mitigating circumstances is critical because they suggest that the defendant is not fully culpable for the crime charged, and therefore, the defendant is worthy of a lower sentence than the average person who has no neurological issues.<sup>129</sup> A prime example of this logic is reflected in the Supreme Court’s 2002 case *Atkins v. Virginia*.<sup>130</sup> There, the Court held that

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120. *See id.*

121. 515 F.3d 614 (6th Cir. 2008).

122. *Id.* at 625 (Moore, J., dissenting).

123. *Id.*

124. *Id.* at 645.

125. *See Denno, supra* note 10, at 502 (“In sum, my analysis indicates that neuroscience evidence is typically used in cases where defendants face the death penalty, a life sentence, or a substantial prison sentence.”).

126. *See id.* at 499.

127. *Lockett v. Ohio*, 438 U.S. 586, 604 (1978).

128. *Id.* at 605.

129. *Denno, supra* note 10, at 502.

130. 536 U.S. 304 (2002).

execution of anyone who suffers from mental retardation is barred under the Eighth Amendment's prohibition of cruel and unusual punishment.<sup>131</sup>

While neuroscience may offer some answers regarding mitigating circumstances, it is imperative that lawyers utilizing this technology understand how to effectively communicate its findings. For instance, successfully presenting an *Atkins* claim is exceptionally complex.<sup>132</sup> Not only does "[i]t require[] tremendous preparation involving many hours of consultation with . . . expert forensic psychologists, neuropsychologists, and/or psychiatrists," it also requires an attorney's understanding of these concepts and ability to synthesize these issues for presentment to the court and the jury.<sup>133</sup> The same concerns are true where neuroscience is used to offer evidence of mitigating circumstances.

While such a concern addresses *how* neuroscience is used, there have also been concerns about *who* uses neuroscience. Some legal theorists have voiced concern over the possibility of neuroscience being a negative influence in court.<sup>134</sup> Designating neuroscience as a "double-edged sword," these commentators have suggested that it "will either get defendants off the hook altogether or unfairly brand them as posing a future danger to society."<sup>135</sup> As one commentator put it, "[a] major concern is that prosecutors will seek the death penalty based on neuroscience evidence indicating that a defendant is likely to commit future crimes."<sup>136</sup> But in the end, neuroscience has thus far been used only to "provide fact-finders with more complete, reliable, and precise information when determining a defendant's fate."<sup>137</sup>

Lastly, there have been articulated concerns about what neuroscience can show regarding the ingrained tendencies of individuals.<sup>138</sup> Neuroscience demonstrates that certain brain regions may serve multiple cognitive functions and, vice versa, some cognitive functions may activate different areas of the brain. This knowledge allows neuroscientists to surmise what is going on with the brain and how those cognitive functions affect behavior, all by examining neuroimaging data. Still, just as in any young scientific field, this information is not completely reliable, and it may go so far as to expose information that we were not looking for.<sup>139</sup> Two specialists in the field, Martha J. Farah and Paul Root Wolpe, stated that

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131. *Id.* at 321.

132. See John Matthew Fabian, William W. Thompson & Jeffrey B. Lazarus, *Life, Death, and IQ: It's Much More Than Just a Score: Understanding and Utilizing Forensic Psychological and Neuropsychological Evaluations in Atkins Intellectual Disability/Mental Retardation Cases*, 59 CLEV. ST. L. REV. 399, 401 (2011).

133. *Id.* at 400.

134. See, e.g., Denno, *supra* note 10, at 503.

135. *Id.*

136. See Deborah W. Denno, *The Place for Neuroscience in Criminal Law*, in PHILOSOPHICAL FOUNDATIONS OF LAW & NEUROSCIENCE 69, 74 (Dennis Patterson & Michael S. Pardo eds., 2016).

137. See Denno, *supra* note 10, at 544.

138. See Snead, *supra* note 35, at 1287.

139. See *id.* at 1288.



“[a]lthough brainwaves do not lie, neither do they tell the truth.”<sup>140</sup> In other words, the fear is that neuroscience could someday “unfairly brand”<sup>141</sup> an individual as dangerous. However, our society’s criminal justice system does not punish actions a person may take; it only punishes those that an individual has taken.

Even though there may be gaps in our knowledge of how the brain works, the future holds possibility, and the more we learn about the brain and how it operates, the more the legal field can adapt to and embrace these scientific advancements regarding mitigating circumstances. As for now, commentators and courts have accepted that neuroscience offers a window into the mindset of the individual standing before the court, and the greater a court’s understanding of the individual, the greater the court’s ability to assess and apply an appropriate sentence. This cumulates in greater justice to society and, ultimately, the individual themselves.

## II. ANALYSIS

The extensive development of neuroscience and the proliferation of analysis regarding how we do and should use it in a courtroom has captured the legal community’s attention.<sup>142</sup> At this point, the question is not whether we should utilize the advancements in technology and insight into defendants that neuroscience offers, the question is when and how.<sup>143</sup> However, there is one area of law that has not been thoroughly discussed and could directly benefit from the addition of neuroscience and neuropsychology: sentencing for non-death-penalty-eligible defendants.

To do so, neuroimaging experts contribute to “defendants’ claims that, although legally guilty, they do not deserve to die because the abnormal structure and/or function of their brains diminishes their culpability.”<sup>144</sup> As previously discussed, since the 1800s, the criminal justice system has generally embarked on a journey away from mandatory sentences and toward one of discretionary application of sentencing factors, especially in the context of the death penalty.<sup>145</sup> Today, public policy is to apply discretionary sentencing based on an individual’s background and

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140. *Id.*

141. *See* Denno, *supra* note 10, at 494.

142. *See* Shen, *supra* note 83, at 357 (“Looking at historical trend[s] in scholarship, it is evident that there has been consistent growth since 2000, strong growth since 2005, and incredibly strong growth in the past two years in the annual number of articles published per year.”); *see also id.* at 352 (“In the past five years, we have witnessed extraordinary growth in the amount of legal scholarship, legal practice, and public policy at the intersection of law and neuroscience.”).

143. *See* Denno, *supra* note 10, at 499; *see also* Porter v. McCollum, 558 U.S. 30, 40 (2009) (indicating that counsel’s failure to discover and present evidence regarding the defendant’s mental health, mental impairments, family, or military service did not “reflect reasonable professional judgment”). In *Porter*, a neuropsychologist “concluded that [the defendant] suffered from brain damage that could manifest in impulsive, violent behavior.” *Id.* at 36.

144. Snead, *supra* note 35, at 1269.

145. *See* Furman v. Georgia, 408 U.S. 238, 402 (1972) (Burger, C.J., dissenting).

circumstances, a stance recognized by both Congress and the judiciary.<sup>146</sup> Judges are encouraged to “consider any relevant mitigating evidence regarding the defendant’s character or background, and the circumstances of the particular offense.”<sup>147</sup> Neuroscience can speak to all of these considerations.

#### A. Neuroscience as a Mitigating Factor at Sentencing

Based on neurological evidence, cognitive neuroscientists are now seeking “to assist defendants’ mitigation claims by invoking cutting-edge brain imaging research on the neurobiological roots of criminal violence” within offenders’ brains.<sup>148</sup> Because neuroscience expands upon how and why a person may act or think the way she does, it can offer insight into a defendant’s true culpability.<sup>149</sup> Whether true culpability should be at the core of sentencing considerations was perhaps best analyzed by Justice Sandra Day O’Connor. In her concurrence in *California v. Brown*,<sup>150</sup> Justice O’Connor stated, “In my view, evidence about the defendant’s background and character is relevant because of the belief, long held by this society, that defendants who commit criminal acts that are attributable to a disadvantaged background, or to emotional and mental problems, may be less culpable than defendants who have no such excuse.”<sup>151</sup> She questioned whether our criminal justice system should focus more on the individual or focus more on righting a wrong committed against society, asserting that the Supreme Court has been responsive to developing a method for reviewing and applying capital punishment that is “sensible to the uniqueness of the individual.”<sup>152</sup> Although the case she discussed related to capital punishment, she suggested that the Supreme Court’s decisions in *Lockett v. Ohio*<sup>153</sup> and *Eddings v. Oklahoma*<sup>154</sup> “reflect the belief that punishment should be directly related to the personal culpability of the criminal defendant.”<sup>155</sup> Justice O’Connor concluded that “the sentence imposed at the penalty stage should reflect a reasoned *moral* response to the defendant’s background, character, and crime rather than mere sympathy or

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146. See *Lockett v. Ohio*, 438 U.S. 586, 604–05 (1978) (“We recognize that, in noncapital cases, the established practice of individualized sentences rests not on constitutional commands, but on public policy enacted into statutes. The considerations that account for the wide acceptance of individualization of sentences in noncapital cases surely cannot be thought less important in capital cases.”).

147. *California v. Brown*, 479 U.S. 538, 544 (1987) (O’Connor, J., concurring).

148. Snead, *supra* note 35, at 1269.

149. See, e.g., Stern, *supra* note 12, at 49 (“Neuropsychological testing plays an important role in explaining to a jury the existence and extent of the plaintiff’s problems with work and other daily activities.”).

150. 479 U.S. 538 (1987).

151. *Id.* at 545 (O’Connor, J., concurring).

152. *Id.* (quoting *Eddings v. Oklahoma*, 455 U.S. 104, 110 (1982)).

153. 438 U.S. 586 (1978).

154. 455 U.S. 104 (1982).

155. *Brown*, 479 U.S. at 545 (O’Connor, J., concurring).

emotion.”<sup>156</sup> The Supreme Court has since quoted Justice O’Connor’s sentiments with approval.<sup>157</sup>

Those sentiments are precisely what lawyers are using to ask courts to consider neuroscience as a mitigating factor at sentencing. Legal minds have argued the following:

[N]eurolaw’s promise to reveal why people think and behave as they do is inescapably built on the idea that people are not agents as the law traditionally views them. Instead, they are guided almost entirely by determined and unconscious chemical cascades which exert irresistible control over an agent’s thinking and behavior.<sup>158</sup>

Still, the Supreme Court has indicated that while neuroscientific evidence “does not negate” the “responsibility for committing the underlying offense, it does bear upon an argument” that a mental illness or problem may impair the “ability to conform . . . conduct to the requirements of the law.”<sup>159</sup> Thus, one strategy that defense attorneys may choose to utilize is to affirmatively demonstrate through neuroscience that, while an individual may be guilty, she should be held less culpable for her actions than other members of our society would.<sup>160</sup> Indeed, the Court has long recognized that individualized sentencing is appropriate, even though it is not constitutionally required.<sup>161</sup> Moreover, a judge’s expansive discretion at sentencing affords her the leeway necessary to consider vast amounts of information,<sup>162</sup> including information about a defendant’s background and life choices.<sup>163</sup>

Neuroscience can provide a qualified assessment of how culpable society may want to hold a particular person, given their background and its effect on their abilities to process situations in accordance with societal norms.<sup>164</sup> Although the goal of the Sentencing Guidelines is to ensure more uniform sentences, neuroscientific evidence fits into the mold created by the Sentencing Guidelines. Even if a judge chooses not to depart from the Guidelines range for a given defendant, she may consider the weight of the

156. *Id.*

157. *See Saffle v. Parks*, 494 U.S. 484, 492–93 (1990).

158. Steven K. Erickson, *Blaming the Brain*, 11 MINN. J.L. SCI. & TECH. 27, 57 (2010).

159. *Bell v. Thompson*, 545 U.S. 794, 810 (2005); *see also Lockett v. Ohio*, 438 U.S. 586, 602 (1978) (“[T]he definition of crimes generally has not been thought automatically to dictate what should be the proper penalty.”).

160. *See Snead*, *supra* note 35, at 1319–20.

161. *See Lockett*, 438 U.S. at 602.

162. *Id.* (“[S]entencing judges traditionally have taken a wide range of factors into account.”).

163. *Id.* at 602–03 (“And where sentencing discretion is granted, it generally has been agreed that the sentencing judge’s ‘possession of the fullest information possible concerning the defendant’s life and characteristics’ is ‘[h]ighly relevant—if not essential—[to the] selection of an appropriate sentence . . . .’” (alteration in original) (emphasis omitted) (quoting *Williams v. New York*, 337 U.S. 241, 247 (1949))).

164. *See Porter v. McCollum*, 558 U.S. 30, 41 (2009) (“This is not a case in which the new evidence ‘would barely have altered the sentencing profile presented to the sentencing judge.’ The judge and jury at Porter’s original sentencing heard almost nothing that would humanize Porter or allow them to accurately gauge his moral culpability.” (citation omitted) (quoting *Strickland v. Washington*, 466 U.S. 668, 700 (1984))).

evidence in applying a sentence from the low or the high end of a given Guidelines sentencing range. In short, the ability of neuroscience to explicitly identify and explain how one's background affects culpability is supplemental information a judge may find useful at sentencing in attempting to distribute justice.

### *B. Combating Implicit Bias with Neuroscience*

Neuroscience can also be used to combat any implicit bias that may be present at sentencing. Implicit bias, or social cognition, is the process by which the brain uses "mental associations that are so well-established as to operate without awareness, or without intention, or without control."<sup>165</sup> There has been an explosion of research over the past decade about implicit bias and its relationship to decisions and actions. This research offers new avenues and opportunities to intervene and reduce the effects of bias in institutions and interactions. Evidence from hundreds of thousands of individuals shows the following:

- (1) [T]he magnitude of implicit bias toward members of outgroups or disadvantaged groups is large, (2) implicit bias often conflicts with conscious attitudes, endorsed beliefs, and intentional behavior, (3) implicit bias influences evaluations of and behavior toward those who are the subject of the bias, and (4) self, situational, or broader cultural interventions can correct systematic and consensually shared implicit bias.<sup>166</sup>

There are three important aspects regarding implicit biases that are crucial to remember. First, we all have biases; they are a way for us to process and organize the vast amounts of information that we observe every day.<sup>167</sup> Second, unconscious biases often conflict with society's egalitarian values.<sup>168</sup> Third, implicit biases often predict and determine actions and decisions more so than the values that we make sure to explicitly adopt.<sup>169</sup> Thus, implicit biases are always present, including at sentencing.

Researchers have analyzed the effect of a trial court judge's implicit biases on defendants in the judge's courtroom. One study found that, according to the Implicit Association Test, consistent with other Americans, judges held implicit associations concerning African Americans.<sup>170</sup>

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165. *FAQs*, PROJECT IMPLICIT, <https://implicit.harvard.edu/implicit/demo/background/faqs.html> (last visited Oct. 16, 2016) [<https://perma.cc/YSR3-BER7>].

166. Jerry Kang & Mahzarin R. Banaji, *Fair Measures: A Behavioral Realist Revision of "Affirmative Action,"* 94 CALIF. L. REV. 1063, 1064 (2006).

167. See Jeffrey J. Rachlinski et al., *Does Unconscious Racial Bias Affect Trial Judges?*, 84 NOTRE DAME L. REV. 1195, 1210 (2009).

168. See *id.* at 1222.

169. See *id.*

170. See *id.*; see also Jerry Kang et al., *Implicit Bias in the Courtroom*, 59 UCLA L. REV. 1124, 1143 (2012) ("Put another way, data show that when the race of the defendant is explicitly identified to judges in the context of a psychology study . . . judges are strongly motivated to be fair, which prompts a different response from White judges (who may think to themselves 'whatever else, make sure not to treat the Black defendants worse') than Black judges (who may think 'give the benefit of the doubt to Black defendants'). However, when

However, these associations were only influential when the race of the defendant was manipulated through subliminal techniques.<sup>171</sup> When the race of the defendant was explicitly identified, implicit associations had no influence on judgment.<sup>172</sup> These results suggest that judges are able to control the influence of unconscious racial bias but only when they are focused on doing so.<sup>173</sup>

Because implicit biases play a role in the courtroom and at sentencing, the question then becomes what should we do about it? Neuroscience offers insight into practical ways to reduce bias by offering mitigating evidence that may help the sentencing judge identify these biases. When a neurological test can demonstrate that a defendant's thought process does not operate as one a judge would normally encounter—whether that is due to diminished culpability or a brain injury—a judge could consider that information, counteracting any implicit biases she may be holding about the defendant's obvious characteristics.<sup>174</sup> After all, reliance on physical evidence that can be brought forth to affirmatively show that someone thinks differently is immensely more convincing than the mere acknowledgment that an individual experienced childhood trauma or had a brain injury.<sup>175</sup>

Neuroscience also contributes to one of the main ways to combat implicit biases: individuation.<sup>176</sup> Individuation requires the person attempting to combat her implicit biases to gather specific information about an individual before her.<sup>177</sup> Thus, instead of making judgments on the basis of the defendant's group characteristics, a judge armed with neurological information and data can make judgments based on the defendant's personal characteristics.<sup>178</sup> In other words, the judge would be able to explicitly recognize that a group characteristic that may result in a bias is merely one of that individual's many, many attributes.<sup>179</sup>

Individuation walks hand in hand with another common way to combat implicit bias: “perspective-taking.” Perspective-taking constitutes “imagining oneself in the shoes of someone from a different social or ethnic

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race is not explicitly identified but implicitly primed . . . perhaps the judges' motivation to be accurate and fair is not on full alert.”)

171. See Rachlinski, *supra* note 167, at 1223.

172. *Id.*

173. See generally Kang et al., *supra* note 170.

174. Kang & Banaji, *supra* note 166, at 1064 (indicating that implicit biases can be counteracted through self, situational, and broader cultural interventions).

175. See Snead, *supra* note 35, at 1313 (“It is one thing to deny that human decision-making is purely mechanical when your opponent offers only a general, philosophical argument. It is quite another to hold your ground when your opponent can make detailed predictions about how these mechanical processes work, complete with images of the brain structures involved and equations that describe their function.” (quoting Joshua Greene & Jonathan Cohen, *supra* note 18, at 1781)).

176. See Patricia G. Devine, Patrick S. Forscher, Anthony J. Austin & William T.L. Cox, *Long-Term Reduction in Implicit Race Bias: A Prejudice Habit-Breaking Intervention*, 48 J. EXPERIMENTAL SOC. PSYCHOL. 1267 (2013).

177. See *id.* at 1270.

178. *Id.*

179. *Id.*

group.”<sup>180</sup> When individuals take part in perspective-taking viewpoints, studies show that it “weakens the automatic expression of racial biases.”<sup>181</sup> In fact, various “perspective-taking activities substantially decrease[] implicit bias as measured by the IAT and behavioral changes.”<sup>182</sup> Neuroscience, and especially its subfield of study, neuropsychology, with its in-depth reviews of a person’s background and past experiences, can help a judge engage in perspective-taking. Further, it exposes judges to a defendant’s background, as discussed by a relevant expert, as opposed to the defendant herself or the defendant’s attorney. Establishing a connection with the defendant’s background and attempting to further understand it “may help a judge take, rather than evade, responsibility for the consequences of her decisions.”<sup>183</sup>

There is no shortage of ways that neuroscience can facilitate the sentencing process. As the science continues to develop, criminal justice system actors should continue to look for ways in which it can provide even more insight and clarity into a defendant’s life, providing a fuller picture for sentencing purposes.

#### CONCLUSION

Since the seventeenth century, the criminal justice system has concerned itself with mental states of the accused.<sup>184</sup> Even though the concept of neuroscience has only been around since the 1960s,<sup>185</sup> recent expansions and developments in the field have opened a window, shedding light on the vast darkness that encompasses what little we know about the brain. It indicates that an offender’s criminal intent or mental state may be the product of her past experiences, especially those during childhood. Using this vital information during the sentencing phase of a convicted offender could more thoroughly help a judge apply an appropriate sentence and avoid biases, thereby providing more principled justice.

Courts have the tools necessary to handle the newest forms of technology, even those in their infancy.<sup>186</sup> It will be up to the lawyers appearing before the court to learn and utilize the many offerings of neuroscience in both criminal and civil trials and at sentencing hearings as a form of mitigating evidence. It will be up to judges to contemplate the information offered to them and employ and utilize it appropriately, both in sentencing and to counteract their own implicit biases. And it will be up to state and federal legislators to take advantage of the information and data discovered by these studies and form more thoughtful and responsive

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180. Nicole E. Negowetti, *Judicial Decisionmaking, Empathy, and the Limits of Perception*, 47 AKRON L. REV. 693, 729 (2014).

181. *Id.*

182. *Id.*

183. *Id.* at 738.

184. Denno, *supra* note 10, at 495–96.

185. *Id.*

186. *See id.* at 505.

policies and statutes that address the systemic problems leading to mass incarceration.

Defendants exposed to childhood trauma are one of the most prominent examples of those who can benefit from utilizing neuroscientific evidence in a courtroom. Individualized assessments of a defendant's background can expand on why she may have behaved a particular way, such as if it was the result of repeated exposure to traumatic situations during childhood. This particularly applies to, for example, those who grow up in dangerous inner-city neighborhoods and those who end up in the foster care and welfare systems. Not only does neuroscience offer judges insight into individuals such as these, but it can also facilitate judges' attempts to counteract implicit biases.

In sum, participants in the criminal justice system—from judges and defense attorneys to prosecutors and legislators—should keep abreast of the developments in neuroscience and consider whether the use of neuroscience and neuropsychology would be beneficial given the particular circumstances of the case, either in dealing with a particular individual or a societal issue. As the technology continues to flourish, we should embrace it in our communal efforts to continue bending the arc of the moral universe toward justice.<sup>187</sup>

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187. *See* THEODORE PARKER, TEN SERMONS OF RELIGION 84–85 (1853).