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## NOTE

PSYCHOPATHY, GENES, AND THE CRIMINAL JUSTICE SYSTEM<sup>†</sup>Paula Kim<sup>\*</sup>

*This Note examines whether, and at which stages, a criminal defendant should be permitted to offer genetic evidence of a predisposition to psychopathy. Drawing on multidisciplinary sources, including the work of legal scholars, neurobiologists, psychologists, and medical researchers, the Note discusses psychopathy, its symptoms, and how it is measured, along with the proposed genetic and environmental causes of the disorder. The Note then examines current evidence rules and trends in the admissibility of genetic evidence at the guilt/innocence phase of criminal trials and at sentencing. After discussing the potential effects of admitting evidence of a genetic basis for psychopathy at both of these phases, the Note concludes that the stigmatizing nature of the disorder and the uncertainty over its causes make it inadvisable to admit this type of evidence at the guilt/innocence phase of trial. However, admitting this evidence at sentencing is not objectionable.*

## TABLE OF CONTENTS

I. Introduction.....	376
II. Genetic Causes and Bases for Psychopathy.....	378
A. What Is Psychopathy? .....	378
B. Clinical Tools For Assessing Psychopathy .....	379
1. Psychopathy Checklist, Revised .....	379

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2. Psychopathic Personality Inventory.....	380
C. Proposed Causes of Psychopathy .....	381
1. Genetic Causes.....	381
2. Environmental Causes.....	386
III. The Admissibility of Genetic Evidence.....	388
A. Admissibility of Evidence at Trial.....	388
B. The Use of Genetic Evidence in Criminal Cases .....	391
1. Guilt/Innocence Phase.....	391
2. Sentencing Phase .....	396
IV. Conclusion.....	399

## I. INTRODUCTION

Hannibal Lecter.<sup>1</sup> Patrick Bateman.<sup>2</sup> Anton Chigurh.<sup>3</sup> All three men are characters who brutally murdered multiple victims. And all three are psychopaths.<sup>4</sup> The way these three characters are

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1. Hannibal Lecter is a character in Thomas Harris's novel *Silence of the Lambs* (1988), which was later adapted into a film of the same name. He murdered seven people and ate them. See Laura Sydell, *Hannibal Lecter: A Psycho with an Unlikely Soft Spot*, NAT'L PUB. RADIO (Apr. 12, 2008), <http://www.npr.org/templates/story/story.php?storyId=89472698>.

2. Patrick Bateman is a character in Bret Easton Ellis's novel *American Psycho*, which was later adapted into a film of the same name. In the novel, Bateman kills fourteen people and several animals. See Chris Schaffer, *Examining the Personality of Patrick Bateman of American Psycho*, WALDEN UNIV., *available at* [http://www.academia.edu/349102/Examining\\_the\\_Personality\\_of\\_Patrick\\_Bateman\\_of\\_American\\_Psycho](http://www.academia.edu/349102/Examining_the_Personality_of_Patrick_Bateman_of_American_Psycho).

3. Anton Chigurh is a character in Cormac McCarthy's novel *No Country for Old Men*, which was later adapted into a film of the same name. He is a hitman who is described by another character in the novel as a "psychopathic killer." CORMAC MCCARTHY, *NO COUNTRY FOR OLD MEN* 141 (1st ed. 2005).

4. Matt DeLisi, Michael G. Vaughn, Kevin M. Beaver & John Paul Wright, *The Hannibal Lecter Myth: Psychopathy and Verbal Intelligence in the MacArthur Violence Risk Assessment Study*, 32 J. PSYCHOPATHOLOGY & BEHAV. ASSESSMENT 169, 169 (2010) ("The Hannibal Lecter character embodied psychopathic personality evidenced by his superficial charm, manipulateness, and lack of remorse . . . for the victims who he murdered and often cannibalized . . ."); Press Release, Association for Psychological Science, *Psychopathy: A Misunderstood Personality Disorder* (Dec. 7, 2011), <http://www.psychologicalscience.org/index.php/news/releases/psychopathy-a-misunderstood-personality-disorder.html> ("Psychopathic personalities are some of the most memorable characters portrayed in popular media today. These

portrayed reflects the general assumption in popular culture that all psychopaths are violent, cold-blooded killers; this is not the case.<sup>5</sup> Yet studies do suggest that psychopaths have a greater proclivity for committing crimes than non-psychopathic people: Psychopaths make up about 1% of the general population, but about 15–25% of the federal offender population.<sup>6</sup> Prisoners diagnosed with psychopathy are more likely to have committed violent crimes than non-psychopathic prisoners.<sup>7</sup> Furthermore, the violent crimes committed by psychopaths differ in nature from the violent crimes committed by non-psychopaths. Homicides committed by psychopaths are more likely to be “cold-blooded” and calculated in nature than those committed by non-psychopaths, which are more likely to be crimes of passion.<sup>8</sup> Another difference between psychopathic criminals and non-psychopathic criminals lies in recidivism rates. A study has found that psychopaths are more likely to engage in violent recidivism than are their non-psychopathic counterparts.<sup>9</sup>

It is not yet clear what causes psychopathy, but studies suggest that it is a result of the interaction between certain genetic and environmental factors.<sup>10</sup> Various theories exist as to the genetic factors that may predispose a person to this disorder. Some studies suggest that anomalies in the brain may be linked to psychopathy.<sup>11</sup> Others find that abnormal hormone levels may be

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characters, like Patrick Bateman from *American Psycho*, . . . are typically depicted as charming, intriguing, dishonest, guiltless, and in some cases, downright terrifying.”); CORMAC MCCARTHY, *NO COUNTRY FOR OLD MEN* 141 (1st ed. 2005) (“[Chigurh]’s a psychopathic killer but so what? There’s plenty of them around.”).

5. Jennifer L. Skeem, Devon L.L. Polaschek, Christopher J. Patrick & Scott O. Lilienfeld, *Psychopathic Personality: Bridging the Gap Between Scientific Evidence and Public Policy*, 12 *PSYCHOL. SCI. PUB. INT.* 95, 97 (2011) [hereinafter *Bridging the Gap*] (noting that psychopathy does not necessarily go hand in hand with criminality or with violence).

6. Michael Woodworth & Stephen Porter, *In Cold Blood: Characteristics of Criminal Homicides as a Function of Psychopathy*, 111 *J. ABNORMAL PSYCHOL.* 436, 436 (2002) [hereinafter *In Cold Blood*].

7. Stephen Porter, Angela R. Birt & Douglas P. Boer, *Investigation of the Criminal and Conditional Release Profiles of Canadian Federal Offenders as a Function of Psychopathy and Age*, 25 *LAW & HUM. BEHAV.* 647, 647-48 (2001).

8. *In Cold Blood*, *supra* note 6, at 437, 442.

9. *Id.* at 436.

10. *See Bridging the Gap*, *supra* note 5, at 110-11.

11. R.J.R. Blair, *The Amygdala and Ventromedial Prefrontal Cortex in Morality and Psychopathy*, 11 *TRENDS COGNITIVE SCI.* 387, 388-91 (2007) [hereinafter *Amygdala*]; Yu Gao, Andrea L. Glenn, Robert A. Schug, Yaling Yang & Adrian Raine, *The Neurobiology of Psychopathy: A*

a factor.<sup>12</sup> Another theory contends that there is a connection between enzyme activity, specifically low monoamine oxidase-type A (“MAO-A”) activity, and psychopathy.<sup>13</sup>

The effects of psychopathy on criminality make this disorder worth studying from a legal standpoint. However, because there is no known definitive genetic basis for psychopathy, it is difficult to determine what role, if any, genetic evidence should play in showing a predisposition for psychopathy during a criminal prosecution. Furthermore, a predisposition to psychopathy does not necessarily mean that someone will exhibit violent behavior,<sup>14</sup> which makes it more difficult to predict how certain genes will cause or contribute to certain behaviors.

This Note argues that genetic test results should be admissible at the sentencing phase of a trial, but that the stigmatizing nature of psychopathy, in addition to the uncertainty regarding its genetic bases, makes it unwise to allow this evidence into the guilt/innocence phase of criminal trials. Part II discusses psychopathy and its symptoms, and gives an overview of the proposed genetic causes and bases for this disorder. Part III discusses the admissibility of genetic evidence in general, and the potential effects of admitting genetic evidence of psychopathy at various stages of a criminal trial.

## II. GENETIC CAUSES AND BASES FOR PSYCHOPATHY

### A. *What Is Psychopathy?*

Psychopathy is a personality disorder that is widely thought to “involve [] emotional dysfunction, characterized by reduced guilt, empathy, and attachment to significant others, and anti-social behavior including impulsivity and poor behavioral control.”<sup>15</sup> On

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*Neurodevelopmental Perspective*, 54 CANADIAN J. PSYCHIATRY 813, 814 (2009) [hereinafter *Neurobiology*]; Janice Wood, *Scans Show Psychopaths Have Brain Abnormalities*, PSYCHCENTRAL (May 11, 2011), <http://psychcentral.com/news/2012/05/11/scans-show-psychopaths-have-brain-abnormalities/38540.html>.

12. *Neurobiology*, *supra* note 11, at 818-19; Andrea L. Glenn, Adrian Raine, Robert A. Schug, Yu Gao & Douglas A. Granger, *Increased Testosterone-to-Cortisol Ratio in Psychopathy*, 120 J. ABNORMAL PSYCH. 389, 394-95 (2011).

13. Sabrina Weber, Ute Habel, Katrin Amunts & Frank Schneider, *Structural Brain Abnormalities in Psychopaths—A Review*, 26 BEHAV. SCI. LAW 7, 10-11 (2008).

14. See *Bridging the Gap*, *supra* note 5, at 97.

15. *Amygdala*, *supra* note 11, at 387.

the emotional side, it is defined by “a constellation of affective, interpersonal, and behavioral characteristics, including egocentricity; impulsivity; irresponsibility; shallow emotions; lack of empathy, guilt, or remorse; pathological lying; [and] manipulativeness . . . .”<sup>16</sup> Those with the disorder are generally superficially charming and “tend to make a good first impression on others.”<sup>17</sup> But they have also been characterized as “self-centered, dishonest, undependable . . . [and] have casual and callous interpersonal and romantic relationships.”<sup>18</sup> “In contrast to people with psychotic disorders, such as schizophrenia, who often lose contact with reality, psychopaths are almost always rational. They are well aware that their ill-advised or illegal actions are wrong in the eyes of society but shrug off these concerns with startling nonchalance.”<sup>19</sup>

On the antisocial behavioral side, those with psychopathy sometimes exhibit “persistent violation of social norms and expectations.”<sup>20</sup> “[A]t times they engage in irresponsible behavior for no apparent reason other than the sheer fun of it.”<sup>21</sup> One “core feature of the behavioral profile of [those] with psychopathy is their excessive use of instrumental (a.k.a. proactive and planned) aggression.”<sup>22</sup> Instrumental aggression is “purposeful and goal-oriented” and used “to achieve a specific desired goal such as obtaining the victim’s possessions.”<sup>23</sup> The presence of these traits can indicate psychopathic tendencies, and there are a couple of ways these traits are used to measure psychopathy.

### *B. Clinical Tools For Assessing Psychopathy*

#### 1. Psychopathy Checklist, Revised

The most widely used method of measuring psychopathy is the Psychopathy Checklist, Revised (“PCL-R”), which was created

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16. Robert D. Hare, *Psychopathy: A Clinical Construct Whose Time Has Come*, 23 *CRIM. JUST. & BEHAV.* 25, 25 (1996).

17. Scott O. Lilienfeld & Hal Arkowitz, *What “Psychopath” Means*, *SCI. AM.* (Nov. 28, 2007), <http://www.scientificamerican.com/article.cfm?id=what-psychopath-means> [hereinafter *What “Psychopath” Means*].

18. *Id.*

19. *Id.*

20. Hare, *supra* note 16.

21. *What “Psychopath” Means*, *supra* note 17.

22. R.J.R. Blair, K.S. Peschardt, S. Budhani, D.G.V. Mitchell & D.S. Pine, *The Development of Psychopathy*, 47 *J. CHILD PSYCHOL. & PSYCHIATRY* 262, 262 (2006).

23. *Id.*

by Hare “to systemize the process of assessing psychopathy in incarcerated criminal samples.”<sup>24</sup> The PCL-R is a “20-item clinical rating scale based on semistructured interviews with the patient and detailed collateral or file information.”<sup>25</sup> It consists of a checklist of 20 traits of psychopathy, and the patient is given a score of 0, 1, or 2 for each trait (0 if the item “does not apply at all to the [patient], 1 if there is a partial match or mixed information, and 2 if the item description provides a reasonably good match to the [patient]”).<sup>26</sup> A score of “30 out of a maximum of 40 is recommended as the cutoff for a diagnosis of psychopathy.”<sup>27</sup> The 20 traits are organized into four “facets” (interpersonal, affective, lifestyle, and antisocial), which are grouped into two “factors” (the interpersonal and affective facets fall under Factor I, which is the interpersonal-affective scale; lifestyle and antisocial fall under Factor II, the antisocial scale).<sup>28</sup> The PCL-R is “the most widely used and extensively validated measure of psychopathy,”<sup>29</sup> and its results are admissible in court at various stages of trial.<sup>30</sup>

## 2. Psychopathic Personality Inventory

The Psychopathic Personality Inventory (“PPI”) is a self-reported scale of psychopathy developed by Scott Lilienfeld and Scott Andrews to “comprehensively index trait dispositions” and “personality-based conceptualizations of psychopathy in nonclinical (e.g. undergraduate) samples.”<sup>31</sup> Unlike the PCL-R, the PPI does not contain “explicitly antisocial or criminal items.”<sup>32</sup> The original PPI, created in 1996, contained 187 items, but was revised in 2005 to become the PPI-R and now contains 154 items grouped into 8 subscales: social influence, fearlessness, stress immunity,

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24. *Bridging the Gap*, *supra* note 5, at 100.

25. Hare, *supra* note 16, at 30.

26. *Bridging the Gap*, *supra* note 5, at 100.

27. *Id.* at 101.

28. *Id.*

29. *Id.* at 100.

30. David DeMatteo & John F. Edens, *The Role and Relevance of the Psychopathy Checklist-Revised in Court*, 12 PSYCHOL. PUB. POL’Y & L. 214, 217-18 (2006) (finding that the PCL-R was used in 87 reported cases from 1991–2004 for various purposes: to assist in determining “whether an offender should be classified as a ‘sexually violent predator’”; to determine the future dangerousness of an offender; as “[p]art of a criminal defendant’s insanity or diminished capacity defense”; at sentencing; and to assist “in determining whether a juvenile offender should be tried in criminal court or returned to family court”).

31. *Bridging the Gap*, *supra* note 5, at 102.

32. *Id.*

Machiavellian egocentricity, rebellious nonconformity, blame externalization, carefree nonplanfulness, and coldheartedness.<sup>33</sup>

### *C. Proposed Causes of Psychopathy*

#### 1. Genetic Causes

Although the study of behavioral traits has been the primary way to measure psychopathy in individuals, there has been increasing interest in finding a genetic basis for these behaviors. Studies suggest that there is a link between antisocial behavior and genetics.<sup>34</sup> Twin studies show that callous-unemotional traits, which are characteristic of psychopathy, are heritable.<sup>35</sup> However, it is still not clear exactly what gene or physical anomaly causes psychopathic tendencies. There is no “psychopath gene” that definitively indicates that one will develop psychopathy. However, there are theories about certain genetic characteristics that might predispose one to the disorder.

One study suggests that psychopathy has a neurodevelopmental basis.<sup>36</sup> Brain imaging studies indicate that psychopathic traits are linked to structural differences in the brain.<sup>37</sup> Another study found a connection between antisocial personalities and reduced prefrontal gray matter volume with the use of Magnetic Resonance Imaging (“MRI”).<sup>38</sup> The results of that study showed a “significant reduction in the volume of prefrontal

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33. *Id.* at 103.

34. Grant T. Harris, Tracey A. Skilling & Marnie E. Rice, *The Construct of Psychopathy*, 28 *CRIME & JUST.* 197, 214 (2001).

35. *Amygdala*, *supra* note 11, at 389 (relaying the results of a large study of around 3,500 twin pairs, which found 67% heritability of callous-unemotional traits at ages seven and nine years of age); *see also Bridging the Gap*, *supra* note 5, at 111 (describing three different twin studies: the first used the PPI to assess psychopathy in adolescent male twins and found a 47% heritability rate of PPI scores; the second was a follow-up to the first and used a larger sample of both sexes, finding a 45% heritability rate in males and 49% heritability in females of two PPI factors (fearless dominance and impulsive antisociality); the third study had a sample size of 7,374 and found that “(a) callous-unemotional traits appeared moderately to highly (>60%) heritable, and (b) conduct problems appeared more heritable among children high in callous-unemotional traits (70–80%) than among those low in callous-unemotional traits (30–50%)”).

36. *Neurobiology*, *supra* note 11, at 813.

37. *Id.* at 814.

38. Adrian Raine, Todd Lencz, Susan Bihrlé, Lori LaCasse & Patrick Colletti, *Reduced Prefrontal Gray Matter Volume and Reduced Autonomic Activity in Antisocial Personality Disorder*, 57 *ARCHIVES GEN. PSYCHIATRY* 119 (2000).

gray matter” in subjects diagnosed with antisocial personality disorder (“APD”).<sup>39</sup>

Reduced prefrontal gray matter volume might be linked to psychopathic tendencies because the prefrontal cortex “is part of a neural circuit that plays a central role in fear conditioning and stress responsivity. Poor [fear] conditioning is theorized to be associated with poor development of the conscience.”<sup>40</sup> People with underdeveloped consciences “would be less susceptible to socializing punishments, and hence become predisposed to antisocial behavior.”<sup>41</sup> The prefrontal cortex also plays a role in risk analysis, and patients with prefrontal damage are unable to “reason and decide advantageously in risky situations,” which might lead to the “impulsivity, rule-breaking, and reckless, irresponsible behavior” that is symptomatic of psychopathy.<sup>42</sup>

A similar study compared prefrontal volumes of “unsuccessful” psychopaths (criminal psychopaths who had been caught and convicted for committing a crime) and “successful” psychopaths (criminal psychopaths who managed to avoid detection for their criminal acts).<sup>43</sup> MRI scans showed that unsuccessful psychopaths had a 22.3% reduction in prefrontal gray matter volume compared with the control group (who were not psychopathic).<sup>44</sup> Successful psychopaths also had reduced prefrontal gray volume compared to the control group, but the difference was not significant.<sup>45</sup>

The difference between the gray matter volumes of successful psychopaths and those of unsuccessful psychopaths may suggest that “prefrontal structural impairments give rise only to poor decision making that then results in capture.”<sup>46</sup> However, this difference may also suggest that “[r]elatively intact prefrontal structure[s] . . . provide successful psychopaths with both the cognitive resources to . . . manipulate others successfully, as well as sufficiently good decision-making skills in risky situations to avoid . . . detection and capture.”<sup>47</sup> Notably, the study found a negative

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39. *Id.* at 123.

40. *Id.* at 125.

41. *Id.*

42. *Id.* at 126.

43. Yaling Yang, Adrian Raine, Todd Lencz, Susan Bihle, Lori LaCasse & Patrick Colletti, *Volume Reduction in Prefrontal Gray Matter in Unsuccessful Criminal Psychopaths*, 57 *BIOLOGICAL PSYCHIATRY* 1103, 1104 (2005).

44. *Id.* at 1106.

45. *Id.*

46. *Id.* at 1107.

47. *Id.*

correlation between prefrontal gray volumes and PCL-R scores across the board.<sup>48</sup> On the whole, deficits in the prefrontal cortex have been found to “contribute to the poor decision-making, emotional dysregulation [*sic*], and impaired moral judgment in psychopathic people.”<sup>49</sup>

Brain imaging studies also indicate that “structural impairments, particularly in the amygdala, hippocampus, and corpus callosum, may contribute to the emotional deficits found in psychopathic people.”<sup>50</sup> Laakso et al. performed brain scans on 18 male violent offenders who had all been diagnosed with at least one form of APD and displayed “a high degree of psychopathy, scoring  $31.2 \pm 5.4$  (range 21–38)” on the PCL-R.<sup>51</sup> The study revealed negative correlations between volumes of the posterior half of the hippocampus and PCL-R scores.<sup>52</sup> The posterior hippocampus is involved in “index[ing] familiarity particularly to stimuli with behavioral relevance.”<sup>53</sup> Lesions in this area may “lead to impairment in conditioning to contextual fear.”<sup>54</sup> Since fear conditioning is an important part of socialization, abnormalities in the posterior hippocampus may contribute to antisocial behavior.

Abnormalities in the corpus callosum, the bundle of nerve fibers that connects the two hemispheres of the brain, may also be a contributing factor to psychopathic behavior. Another study

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48. *Id.* at 1106.

49. *Neurobiology*, *supra* note 11, at 814; *see also* Jürgen L. Müller, Susanne Gänßbauer, Monika Summer, Katrin Döhnel, Tatjana Weber, Tobias Schmidt-Wilcke & Göran Hajak, *Gray Matter Changes in Right Superior Temporal Gyrus in Criminal Psychopaths. Evidence from Voxel-Based Morphometry*, 163 *PSYCHIATRY RES.: NEUROIMAGING* 213, 213 (2008) (finding that psychopathy is associated with gray matter volume reduction in both the “frontal and temporal brain regions”); Ricardo de Oliveira-Sousa, Robert D. Hare, Ivanei E. Bramati, Griselda J. Garrido, Fátima Azevedo Ignácio, Fernanda Tovar-Moll & Jorge Moll, *Psychopathy as a Function of the Moral Brain: Fronto-Temporo-Limbic Grey Matter Reductions Demonstrated by Voxel-Based Morphometry*, 40 *NEUROIMAGE* 1202, 1202 (2008) (finding gray matter reductions in the “frontopolar, orbitofrontal and anterior temporal cortices, superior temporal sulcus region, and insula of the patient. The degree of structural abnormalities was significantly related to the interpersonal/affective dimension of psychopathy”).

50. *Neurobiology*, *supra* note 11, at 814.

51. Mikko P. Laakso, Olli Vaurio, Essi Koivisto, Liisa Savolainen, Markku Eronen, Hannu J. Aronen, Panu Hakola, Eila Repo, Hilka Soininen & Jari Tiihonen, *Psychopathy and the Posterior Hippocampus*, 118 *BEHAV. BRAIN RES.* 187, 188-89 (2001).

52. *Id.*

53. *Id.* at 191.

54. *Id.*

performed by Raine et al. took brain scans of men, who were either part of the control group, or the psychopathic antisocial group (which was comprised of participants who had a PCL-R score of 23 or higher).<sup>55</sup> The researchers found that “increased callosal volume was significantly associated with blunted affect, lack of remorse, no close friends, lack of social closeness, . . . increased psychopathy, . . . reduced autonomic activity, increased interpersonal deficits, reduced autonomic activity, and low spatial IQ.”<sup>56</sup> The participants in the psychopathic antisocial group showed a 22.6% increase in callosal volume compared with the control group.<sup>57</sup> The psychopathic antisocial group compared with the control group also had “increased callosal length” and “reduced callosal thickness.”<sup>58</sup>

Another study performed by Yang et al. revealed a link between abnormalities in the amygdala, a “part of the brain associated with processing emotion,”<sup>59</sup> and psychopathy.<sup>60</sup> MRIs were performed on 27 people with psychopathy (defined by a score between 23 and 40 on the PCL-R) and 32 controls (people whose PCL-R scores were between 5 and 14).<sup>61</sup> The “[p]sychopathic individuals showed a significant volume reduction in the amygdala compared with controls.”<sup>62</sup> The amygdala plays a vital role in fear conditioning, and “is an important component of the neural systems subserving reward learning, social interaction, and moral emotion and reasoning, where the ability to recognize the emotions signaled by facial expressions is crucial for making advantageous decisions in a complex social environment.”<sup>63</sup> Thus, it has long been “hypothesized that disturbances in amygdala structure or function may contribute to the social dysfunction and

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55. See Adrian Raine, Todd Lencz, Kristen Taylor, Joseph B. Hellige, Susan Bihrlé, Lori Lacasse, Mimi Lee, Sharon Ishikawa & Patrick Colletti, *Corpus Callosum Abnormalities in Psychopathic Antisocial Individuals*, 60 ARCHIVES GEN. PSYCHIATRY 1134, 1135 (2003).

56. *Id.* at 1138.

57. *Id.* at 1134.

58. *Id.* at 1137.

59. Christopher Bergland, *The Size and Connectivity of the Amygdala Predicts Anxiety, The Athlete's Way*, PSYCHOL. TODAY (Nov. 20, 2013), <http://www.psychologytoday.com/blog/the-athletes-way/201311/the-size-and-connectivity-the-amygdala-predicts-anxiety>.

60. Yaling Yang, Adrian Raine, Katherine L. Narr, Patrick Colletti & Arthur W. Toga, *Localization of Deformations Within the Amygdala in Individuals with Psychopathy*, 66 ARCHIVES GEN. PSYCHIATRY 986, 986 (2009).

61. *Id.* at 987.

62. *Id.* at 989.

63. *Id.* at 986-87.

impaired moral decision making in individuals with psychopathy.”<sup>64</sup>

In addition to structural impairments, other factors may affect amygdala responsiveness to emotion and facial expressions, such as the form of one’s genes. A gene can take on different forms in different individuals. These variants, often referred to as polymorphisms, can affect behavior. For example, studies have shown that “individuals who are II homozygotes for the 5-hydroxytryptamine transporter (“5-HTTLPR”) gene show a significantly reduced amygdala response to emotional expressions relative to those who have the short-form polymorphism of the gene.”<sup>65</sup> There may also be other genes “whose polymorphisms increase or decrease emotional and amygdala responsiveness.”<sup>66</sup> An individual who has enough of the polymorphisms that decrease amygdala responsiveness may be genetically predisposed to psychopathy.<sup>67</sup>

Another such gene polymorphism that may affect brain functionality is MAOA-L, which is the low expression variant of monoaminoxidase-A (“MAO-A”). A recent brain imaging study suggests that this polymorphism is “linked with a significant reduction in the gray matter volume that encompasses the cingulate gyrus and the amygdala bilaterally, with a maximum volume reduction in the anterior cingulate cortex.”<sup>68</sup> This is significant because the cingulate cortex is “involved in the regulation of emotions and social behavior.”<sup>69</sup> However, the MAO-A gene and MAOA-L may not be closely linked with psychopathy because the two are associated with impulsive aggression, which is different from the “instrumental goal-directed aggression predominantly shown by psychopaths.”<sup>70</sup>

While many studies focus on looking for a neurological basis for psychopathy, there are some more recent examples that have looked at the role hormones may play. One study looked for a link between two hormone systems—the hypothalamus-pituitary-adrenal (“HPA”) axis and the hypothalamus-pituitary-gonadal (“HPG”) axis—and psychopathy.<sup>71</sup> These two systems produce

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64. *Id.* at 987.

65. *Amygdala*, *supra* note 11, at 389.

66. *Id.*

67. *Id.*

68. Weber et al., *supra* note 13, at 11.

69. *Id.*

70. *Id.*

71. Glenn et al., *supra* note 12, at 389.

cortisol and testosterone.<sup>72</sup> The researchers hypothesized that the HPA system, whose end product is cortisol, may be hypoactive in psychopaths because this axis “is involved in potentiating the state of fear, generating sensitivity to punishment and inducing withdrawal behavior.”<sup>73</sup> The HPG axis was also thought by researchers to be connected to psychopathy because this system’s “end product, testosterone, has been associated with approach-related behaviors, including reward seeking, dominance, and aggression.”<sup>74</sup> Furthermore, testosterone has been linked to various “antisocial behaviors including difficulties on the job, law breaking, marriage failures, drug use, alcohol abuse, and violent behavior, which are commonly observed in psychopathy.”<sup>75</sup>

The study, which analyzed saliva samples collected from participants, found a significant association between PCL-R scores and the ratio of baseline testosterone to cortisol reactivity.<sup>76</sup> Participants “scoring higher in psychopathy had a higher ratio of baseline testosterone to cortisol reactivity,” but this effect “was only true for individuals with high baseline levels of testosterone.”<sup>77</sup> The ratio between testosterone levels and cortisol reactivity can be seen as a general index of the imbalance between the HPA and HPG axes within that individual.<sup>78</sup> Because the two systems act in opposite directions (“cortisol facilitates withdrawal and fearfulness, whereas testosterone facilitates approach and reward seeking”), “the activity of these two systems relative to each other seems to have a significant effect on brain systems that are relevant to psychopathy,” such as the amygdala.<sup>79</sup> Thus, this study suggests that “the HPA and HPG axes may work in concert to predispose toward psychopathic traits.”<sup>80</sup>

## 2. Environmental Causes

While the studies discussed above focus on purely genetic causes of psychopathy, there are other studies that suggest that psychopathy is a function not only of genetics but also of the

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72. *Id.*

73. *Id.*

74. *Id.* at 390 (internal citations omitted).

75. *Id.*

76. *Id.* at 394.

77. *Id.* at 396.

78. *Id.* at 397.

79. *Id.*

80. *Id.* at 398.

interaction between genes and environment.<sup>81</sup> One study on the genetics of crime divided Swedish male adoptees into four groups “depending on the presence or absence of (a) a congenital predisposition (i.e., whether biological parents were criminal) and (b) a postnatal predisposition (how the children were raised by their adoptive parents).”<sup>82</sup> When only genetic factors were present, 12.1% of adoptees were criminal.<sup>83</sup> When only environmental factors were present, 6.7% of adoptees were criminal.<sup>84</sup> But when both genetic and environmental factors were present, 40% of the adoptees were criminal.<sup>85</sup> This indicates that criminality may be a result of the interaction of genetics and environment.

However, other studies suggest that the environment is less of a factor in psychopathy than it is in other disorders. While family environment is a crucial factor of the “age of onset of criminality” for non-psychopathic offenders, it has little impact on psychopathic offenders.<sup>86</sup> Inadequate parenting, “a known environmental marker for antisocial behavior in children, appears to have less of an impact in children with psychopathic tendencies. Children with psychopathic tendencies show high levels of conduct problems irrespective of the quality of parenting they receive.”<sup>87</sup> This may suggest that environmental factors are not as significant when it comes to psychopathy, or that the environmental factors that do affect the development of psychopathy are different from those that play a significant role in the development of other disorders.

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81. Blair et al., *supra* note 22, at 264 (“[A]buse/exposure to . . . extreme traumas potentiates specific neural systems involved in the individual’s response to threat and by doing so increases the risk of reactive aggression and through this, increases the probability of a diagnosis of [conduct disorder].”); *Bridging the Gap*, *supra* note 5, at 98 (arguing that it is unlikely that “any psychiatric condition, including psychopathy, is entirely ‘born’ or ‘made’” and that psychopathy is likely the result of the interplay between genes and environment); Adrian Raine, *Biosocial Studies of Antisocial and Violent Behavior in Children and Adults: A Review*, 30 J. ABNORMAL CHILD PSYCHOL. 311, 312 [hereinafter *Biosocial*] (“[I]t is a truism that genetic processes need an environment in which to become expressed. As such, environmental changes will turn these genetic influences on and off across the life-span.”).

82. *Biosocial*, *supra* note 81, at 312.

83. *Id.*

84. *Id.*

85. *Id.*

86. Essi Viding, *Annotation: Understanding the Development of Psychopathy*, 45 J. CHILD PSYCHOL. & PSYCHIATRY 1329, 1331 (2008).

87. *Id.*

Either way, the exact causes of psychopathy are still unknown. As discussed above, there are numerous theories regarding the basis for the development of psychopathy, and many studies whose results suggest that there is a genetic basis for the disorder. However, these studies and tests are still relatively new and not exactly conclusive. Furthermore, these studies tend to show a correlation between a physical abnormality with only a certain symptom or characteristic of psychopathy: reduced prefrontal gray matter volume contributes to emotional dysfunction and poor fear conditioning; structural impairments in the amygdala predispose people to a shallow affect and lack of empathy; callosal abnormalities lead to interpersonal deficits.

Thus, while these studies may bring us closer to understanding the root cause of psychopathy, they do not definitively point to a genetic basis of the disorder, and the tests involved (brain imaging, saliva samples) reveal only a correlation between psychopathy and genetics. They do not say for sure whether a certain physical abnormality causes psychopathy, or whether psychopathy necessarily causes particular behaviors. So even if a test revealed that an offender had reduced callosal volume, it could not be said for certain that the offender was psychopathic, or that his behavior arose from a genetic abnormality. Furthermore, there are disagreements over the extent to which environmental factors affect psychopathy, which makes it even more difficult to say which types of tests should be admissible in court to support an allegation that a defendant is psychopathic.

### III. THE ADMISSIBILITY OF GENETIC EVIDENCE

#### *A. Admissibility of Evidence at Trial*

In general, for any piece of evidence to be admissible at trial, it must conform to the particular evidence rules of that jurisdiction. Because most, if not all, states have adopted some version of the Federal Rules of Evidence, it is helpful to look at them to determine the basic status of the law across jurisdictions.<sup>88</sup> The federal rules “begin with the premise, presented in Rule 402, that all relevant evidence is admissible.”<sup>89</sup> Evidence is relevant if it

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88. Dora W. Klein, *Rehabilitating Mental Disorder Evidence After Clark v. Arizona: Of Burdens, Presumptions, and the Right to Raise Reasonable Doubt*, 60 CASE W. RES. L. REV. 645, 649 (2010).

89. *Id.* at 657 (citing FED. R. EVID. 402: “[a]ll relevant evidence is admissible, except as otherwise provided by the Constitution of the United

has “any tendency to make a fact more or less probable than it would be without the evidence and [if] th[at] fact is of consequence in determining the action.”<sup>90</sup>

However, there are exceptions to the relevance rule, some of which are presented in Rule 403, which states: “[t]he court may exclude relevant evidence if its probative value is substantially outweighed by a danger of one or more of the following: unfair prejudice, confusing the issues, misleading the jury, undue delay, wasting time, or needlessly presenting cumulative evidence.”<sup>91</sup> The trial judge has “broad discretion to admit relevant evidence,” but his “discretion to exclude evidence under Rule 403 is narrowly circumscribed.”<sup>92</sup>

In addition to these general relevance rules, Rule 702 is also applicable to the admissibility of genetic evidence at trial. This rule governs testimony by expert witnesses and states:

a witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if:

- (a) the expert's scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;
- (b) the testimony is based on sufficient facts or data;
- (c) the testimony is the product of reliable principles and methods; and
- (d) the expert has reliably applied the principles and methods to the facts of the case.<sup>93</sup>

Thus, for genetic evidence suggesting that a defendant may have psychopathy to be admissible, it must be relevant to the issues of the case; its probative value must not be substantially outweighed by the potential prejudice, confusion, or delay it may

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States, by Act of Congress, by these rules, or by other rules prescribed by the Supreme Court pursuant to statutory authority”).

90. FED. R. EVID. 401.

91. FED. R. EVID. 403.

92. *United States v. Gonzalez*, 718 F. Supp. 2d 1341, 1347 (2010) (citing *United States v. Simpson*, 910 F.2d 154, 157 (4th Cir. 1990); *United States v. Norton*, 867 F.2d 1354, 1361 (11th Cir. 1989)).

93. FED. R. EVID. 702.

cause; and, should the evidence be presented or explained by an expert, it must meet the requirements set out in Rule 702.

The Supreme Court examined Rule 702 in the 1993 case *Daubert v. Merrell Dow Pharmaceuticals*,<sup>94</sup> holding that Rule 702 displaced the “general acceptance test” expounded in *Frye v. United States*,<sup>95</sup> and that *Frye* was no longer the standard for determining admissibility of scientific evidence.<sup>96</sup> *Daubert* established a “gate-keeping” role for the trial court so that judges, and not the scientific community, determine whether “novel scientific evidence” should be admitted in federal courts.<sup>97</sup> To provide the new “gate-keepers” with some guidance, the *Daubert* court laid out factors the trial judge should consider when determining whether to admit new scientific evidence.<sup>98</sup> The judge is to make a “preliminary assessment of whether the testimony's underlying reasoning or methodology is scientifically valid and properly can be applied to the facts at issue.”<sup>99</sup> The judge may consider several factors when making this assessment, including

whether the theory or technique in question can be (and has been) tested, whether it has been subjected to peer review and publication, its known or potential error rate and the existence and maintenance of standards controlling its operation, and whether it has attracted widespread acceptance within a relevant scientific community.<sup>100</sup>

The *Daubert* test “is a flexible one, and its focus must be solely on principles and methodology, not on the conclusions that they generate.”<sup>101</sup>

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94. 509 U.S. 579 (1993).

95. *Frye v. United States*, 293 F. 1013, 1014 (D.C. Cir. 1923) (holding that expert opinion based on a scientific technique was inadmissible unless that technique was generally accepted as reliable by the relevant scientific community).

96. *Daubert*, 509 U.S. at 579.

97. *Id.* at 597.

98. Alice B. Lustre, *Post-Daubert Standards for Admissibility of Scientific and Other Expert Evidence in State Courts*, 90 A.L.R. 5th 453 (2001).

99. *Daubert*, 509 U.S. at 580.

100. *Id.*

101. *Id.*

*B. The Use of Genetic Evidence in Criminal Cases*

## 1. Guilt/Innocence Phase

Currently, genetic tests for identification purposes, namely DNA tests, are widely permitted at the guilt/innocence phase of trial.<sup>102</sup> Parties have also “introduced evidence of genetic predisposition, apparently based on family history, in a handful of criminal cases.”<sup>103</sup> However, courts are less likely to admit second generation genetic test results. For example, in the 1970s, after a study was published about increased violence in men who carried an extra Y chromosome, many defendants attempted to introduce evidence that they had XYY syndrome in “an effort to negate their culpability.”<sup>104</sup> Courts rejected this defense for various reasons.

In *Millard v. State*,<sup>105</sup> the defendant attempted to use evidence of XYY syndrome to support his insanity defense. The court affirmed the trial judge’s refusal to submit the issue of the defendant’s sanity to the jury, because although expert testimony

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102. See *United States v. Chischilly*, 30 F.3d 1144, 1144 (9th Cir. 1994) (holding that “DNA evidence of match between defendant's blood sample and semen found on victim's clothing, and testimony regarding probability of coincidental match were admissible”); *Vann v. State*, 229 P.3d 197 (Ala. App. 2010) (holding that testimony by a laboratory technician about the results of a DNA test was admissible); *United States v. Gaines*, 979 F. Supp. 1429 (S.D. Flo. Oct. 3, 1997) (holding that expert testimony regarding DNA test results was admissible at trial).

103. *Id.* n.33 (citing *Hill v. Ozmint*, 339 F.3d 187, 201-02 (4th Cir. 2003) (Defendant introduced evidence that he “suffered from a genetically based serotonin deficiency, which resulted in aggressive impulses”); *People v. Bobo*, 3 Cal. Rptr. 2d 747, 753 (Cal. Ct. App. 1990) (psychiatrist testified that defendant's paranoid schizophrenia resulted from “[g]enetic factors, biochemical elements, and developmental experiences”); *Crook v. State*, 813 So. 2d 68, 70-72 (Fla. 2002) (per curiam) (defendant introduced expert testimony that defendant's violent rages were at least partially caused by genetic factors); *State v. Johnson*, 549 N.E.2d 565, 566 (Ohio Ct. App. 1989) (per curiam) (reversing trial court's decision to admit expert testimony that defendant committed crimes because of “primary functional disautonomia . . . brought about by bad nutrition acting upon a genetically predisposed person”); *State v. Davis*, No. M1999-02496-CCA-R3-CD, 2001 Tenn. Crim. App. LEXIS 341, \*12, \*18 (Tenn. Crim. App. May 8, 2001) (defendant used expert's assertion that he had a “genetic predisposition’ for depression and mental illness” to argue that his mental condition prevented him from forming “the requisite intent to commit first-degree murder” and other crimes).

104. Paul S. Appelbaum, *Behavioral Genetics and the Punishment of Crime*, 56 *PSYCHIATRIC SERVICES* 25, 26 (2005).

105. 261 A.2d 227 (Md. Ct. Spec. App. 1970).

“clearly established that [the defendant] possessed an extra Y chromosome (XYY) and that he was therefore genetically abnormal,” this abnormality alone was not sufficient to establish insanity under the relevant state statute.<sup>106</sup> Furthermore, the court found that the expert’s testimony as to the defendant’s sanity was “not based on reasonable medical certainty.”<sup>107</sup>

Similarly in *People v. Tanner*,<sup>108</sup> the court upheld the trial court’s refusal to grant the defendant’s motion to replace his guilty plea with a plea of insanity. The court of appeals gave several reasons for its decision: first, the court felt that the evidence did not sufficiently link XYY syndrome to violent behavior because it suggested “only that aggressive behavior may be one manifestation of the XYY Syndrome” and did not establish “that all XYY individuals [we]re by nature involuntarily aggressive.”<sup>109</sup> Second, the experts could not determine whether the defendant’s criminal act was a result of his chromosomal abnormality.<sup>110</sup> Third, the expert witnesses did not testify that XYY syndrome resulted in “mental disease which constitute[d] legal insanity under the” state statute.<sup>111</sup>

Recently courts have been more willing to admit scientific test results suggesting some genetic abnormality.<sup>112</sup> However, it is not certain that this evidence will benefit the defendant. In *Brant v. State*,<sup>113</sup> the defense expert testified that PET scans of the defendant “showed four areas of suppressed glucose uptake that could indicate underactivity in those parts of the brain. [The expert] identified those portions of the brain as being important to impulse control and good judgment.”<sup>114</sup> Based on these scans, the expert opined that the defendant “had, as a result of mental disease, defect, a substantial impairment and limitation in his ability to conform his behavior to the requirements of the law.”<sup>115</sup>

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106. *Id.* at 231.

107. *Id.* at 232.

108. 91 Cal. Rptr. 656 (Ct. App. 1970).

109. *Id.* at 600.

110. *Id.* at 600-01.

111. *Id.* at 601.

112. Deborah W. Denno, *Courts’ Increasing Consideration of Behavioral Genetics Evidence in Criminal Cases: Results of a Longitudinal Study*, 2011 MICH. ST. L. REV. 967, 974 (2011) (“Overall, courts today appear far less skeptical about accepting behavioral genetics evidence, and they do so in the majority of cases in which defense attorneys attempt to offer it.”).

113. 21 So. 3d 1276 (Fla. 2009).

114. *Id.* at 1281.

115. *Id.* at 1281-82.

Despite this testimony, the trial court found the defendant guilty of murder and sentenced him to death, and the Florida Supreme Court affirmed the conviction and sentence.<sup>116</sup>

Nevertheless, genetic evidence can affect the outcome of a case. In *State v. Waldroup*,<sup>117</sup> the defense expert was permitted to testify that the defendant had a particular variant of the MAO-A gene, which made him more prone to violence.<sup>118</sup> The expert made it clear it was not certain that the gene caused the defendant's extreme aggression, but that the defendant's "genetic makeup, combined with his history of child abuse together . . . constituted a risk factor or vulnerability."<sup>119</sup> This evidence helped convince a jury that the defendant's actions were not premeditated, and he was convicted of voluntary manslaughter instead of murder.<sup>120</sup>

To date there are no known instances where a defendant attempted to introduce genetic evidence suggesting a predisposition to psychopathy in order to negate culpability during the guilt/innocence phase of a trial. But because "scientific advances and rising acceptance of genetics research have [recently] fueled a focus on the use of behavioral genetics evidence in criminal trials and death penalty cases," there is a good chance that in the near future a defendant might try to introduce such evidence with regards to psychopathy.<sup>121</sup> At the guilt/innocence phase, a defendant could potentially introduce this evidence either to establish an insanity defense, or to negate the mens rea element of a crime. However, he is likely to run into some problems.

First, the nature of psychopathy is such that any evidence tending to prove a genetic predisposition to this disorder is likely far more prejudicial than probative. Psychopathy is an unusually stigmatizing disorder, which may partly be due to the fact that psychopaths are generally portrayed as cruel, manipulative, and violent in popular culture and the media. Presenting evidence that

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116. *Id.* at 1277.

117. No. E2010-01906-CCA-R3-CD, 2011 WL 5051677 (Tenn. Crim. App. Mar. 29, 2011) (appeal granted Apr. 2, 2012).

118. Barbara Bradley Hagerty, *Can Your Genes Make You Murder?*, NAT'L PUB. RADIO (Jul. 1, 2010), <http://www.npr.org/templates/story/story.php?storyId=128043329> (reporting that "over the fierce opposition of prosecutors, the judge allowed" a forensic psychiatrist to testify that defendant's genetics, along with the fact that he was abused as a child, "created a vulnerability that he would be a violent adult").

119. *Id.* (internal quotations omitted).

120. *Id.*

121. Denno, *supra* note 112, at 970.

indicates a genetic predisposition to psychopathy may unfairly prejudice a jury against a defendant. Thus, a court may not even admit this evidence under Rule 403. In addition, the evidence should not get past Rule 702. The genetic bases of psychopathy are not sufficiently understood to be “the product of reliable principles and methods.”<sup>122</sup> The studies that have been conducted on the matter reveal merely a link between a genetic abnormality and a behavioral characteristic of psychopathy. Furthermore, there is no method of showing that the genetic abnormality caused the criminal behavior. Thus it may be difficult for an expert to “reliably appl[y] the principles and methods to the facts of the case” without misleading or confusing the jury into thinking that evidence of an abnormality is proof of psychopathy, and that psychopathy was the principal cause of the defendant’s criminal behavior.<sup>123</sup> In sum, admitting genetic evidence of psychopathy would likely hurt the defendant and mislead the jury.

Second, should a defendant get his evidence admitted and use it to support a plea of insanity, he would probably be unsuccessful. In the federal system, in order to invoke the insanity defense, a defendant must show by clear and convincing evidence that “at the time of the commission of the acts constituting the offense, the defendant, as a result of a severe mental disease or defect, was unable to appreciate the nature and quality or the wrongfulness of his acts. Mental disease or defect does not otherwise constitute a defense.”<sup>124</sup> This provision is modeled after the American Law Institute Model Penal Code insanity standard which states: “[a] person is not responsible for criminal conduct if at the time of such conduct as a result of mental disease or defect he lacks substantial capacity either to appreciate the criminality [wrongfulness] of his conduct or to conform his conduct to the requirements of the law.”<sup>125</sup> Subsection two clarifies the meaning of “mental disease or defect,” stating that these terms “do not include an abnormality manifested only by repeated criminal or otherwise antisocial conduct.”<sup>126</sup> A number of state courts have adopted this standard as well.<sup>127</sup>

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122. FED. R. EVID. 702.

123. *Id.*

124. 18 U.S.C. § 17 (1984).

125. ALI Model Penal Code § 4.01 (1962).

126. *Id.*

127. Allen P. Wilkinson & Arthur C. Roberts, *Insanity Defense*, 41 AM. JUR. PROOF OF FACTS 2d 615, § 7 (published in 1985, updated Feb. 2013) (citing *State v. Perez*, 438 A.2d 1149 (1981); *State v. Nuetzel*, 606 P.2d 920 (1980); *People v. Clark*, 429 N.E.2d 1255 (1981); *Gardner v. State*, 419 N.E.2d 749

Using evidence of psychopathy to establish an insanity defense is likely to prove fruitless for several reasons. First, some legal scholars interpret subsection two of the ALI Model Penal Code insanity standard to exclude psychopathy “as a legally sufficient mental abnormality.”<sup>128</sup> However, the comments to the insanity standard do not explicitly exclude psychopathy. And as stated in Part I, psychopathy does not necessarily lead to criminal behavior. There are characteristics of the disorder that are separable from criminal or antisocial behavior. Thus, one could argue that psychopathy should qualify, or has the potential to qualify, as a mental disease or defect under the insanity standard. However, a psychopathic defendant’s insanity defense is still likely to fail because, as stated in Part I, psychopaths “are well aware that their ill-advised or illegal actions are wrong in the eyes of society but shrug off these concerns with startling nonchalance,”<sup>129</sup> most likely due to poor fear conditioning.<sup>130</sup> Thus, a psychopathic offender could not show that severe psychopathy made him unable to appreciate the wrongfulness of his crime.

This also poses a problem for negation of a mens rea element of a crime. Almost all criminal statutes have some sort of mens rea, or “guilty mind,” element that addresses the mental state the offender possessed when committing the crime. Thus, if the mental element of a crime is intent, a defendant could argue that a mental disorder prevented him from forming the requisite intent. However, if psychopathic individuals act rationally and are aware of the wrongfulness of their actions, it would be difficult, if not impossible, to claim that psychopathy negated the intent or knowledge requirement of a crime.

In sum, admitting evidence of a genetic predisposition to psychopathy would not be beneficial to the defendant, nor to the legal justice system, due to the stigmatizing nature of the disorder and the insufficient understanding of its genetic basis. However, it seems unfair to completely disregard a disorder that might make one more prone to aggression, even if that aggression is used rationally and strategically. Thus, genetic evidence of psychopathy should be admitted at sentencing.

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(1981) (“The ALI test is used in federal courts and in a number of state courts.”)).

128. Stephen J. Morse, *Psychopathy and Criminal Responsibility*, 1 *NEUROETHICS* 205, 207 (2008).

129. *What “Psychopath” Means*, *supra* note 17.

130. Laakso et al., *supra* note 51 at 191.

## 2. Sentencing Phase

At this phase of the trial, many of the concerns regarding admitting the evidence during the guilt/innocence phase of the trial no longer exist. There is no need to worry about confusing a jury over the issues of a case, because the issues have already been decided at this point. Furthermore, in many jurisdictions, the presiding judge ultimately chooses the sentence<sup>131</sup> so there is even less of a concern that a jury may be prejudiced or confused at this stage. And finally, the “admissibility standards for mitigating evidence during sentencing are fairly generous,” and in capital cases, “any relevant evidence is admissible in mitigation.”<sup>132</sup> Thus, genetic evidence of psychopathy should be admitted at this stage.

It is less clear whether the evidence would have an effect on the defendant’s sentence. In practice, genetic evidence of psychopathy has not often been introduced as a mitigating factor at sentencing. But when it has, the evidence either has not significantly affected the outcome, or has been considered a potentially aggravating factor. In *Creech v. Hardison*,<sup>133</sup> the defendant was convicted of first-degree murder in a capital case. At the penalty phase of the trial, the defendant offered a variety of mitigating evidence, including testimony from a psychologist who found that the defendant “had an antisocial personality and scored in the 96th percentile of the prison population for psychopathy,” and was likely biologically or genetically predisposed to violence.<sup>134</sup> The court found that the mitigating factors did not

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131. In the federal system, the Federal Sentencing Guidelines are no longer mandatory, but a judge must:

consider the Guidelines “sentencing range established for . . . the applicable category of offense committed by the applicable category of defendant,” pertinent Sentencing Commission policy statements, and the need to avoid unwarranted sentencing disparities and to retribute victims, §§ 3553(a)(1), (3)-(7); and . . . impose sentences that reflect the seriousness of the offense, promote respect for the law, provide just punishment, afford adequate deterrence, protect the public, and effectively provide the defendant with needed training and medical care, § 3553(a)(2).

United States v. Booker, 543 U.S. 220, 224 (2005).

132. Erica Beecher-Monas, *Circumventing Daubert in the Gene Pool*, 43 TULSA L. REV. 241, 251 (2007).

133. No. CV 99-0224-S-BLW, 2010 WL 1338126 (D. Idaho Mar. 31, 2010).

134. *Id.* at \*10.

outweigh the aggravating factors, namely that the defendant had the intent to kill, and once the murder commenced, it was an “intentional, rational act.”<sup>135</sup>

In *Gilson v. Sirmons*,<sup>136</sup> the court referred to genetic evidence of the defendant’s mental condition as a “two-edged sword,” pointing to the fact that although the evidence of the disorder “and his inability to control his ‘explosive behavior’ may have [] some mitigating effect” on the defendant’s sentence it also had the “potential of proving [Defendant] was a threat to society, including prison society, and could indicate a propensity for future violence. Such evidence would [be] contradictory to [the other] mitigating evidence” presented by the defense.<sup>137</sup>

However, a study conducted by Aspinwall, Brown, and Tabery<sup>138</sup> suggests that evidence of a genetic predisposition to psychopathy would result in reduced sentences. Participants, 181 state trial court judges, were given a hypothetical situation involving a defendant who was predisposed to psychopathy.<sup>139</sup> Judges in different groups were given different types of evidence pointing to psychopathy (one group was given only testimony from a psychiatrist saying that defendant was a diagnosed psychopath, and another group was given that testimony plus testimony from a neurobiologist explaining the biomechanics that contribute to the development of psychopathy).<sup>140</sup> While psychopathy was seen as an aggravating factor overall, the biomechanical evidence “significantly reduced the extent to which psychopathy was rated as aggravating and significantly reduced sentencing (from 13.93 years to 12.83 years).”<sup>141</sup>

But it is also unclear whether genetic evidence of psychopathy *should* have an effect on sentencing. There are four theories as to why we punish: retribution (the offender is punished because he deserves it); rehabilitation (the punishment should contribute to the reformation of the offender); deterrence (punishment is justifiable if it is expected to result in reduction of

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135. *Id.* at \*9.

136. 520 F.3d 1196, 1248 (10th Cir. 2008).

137. *Id.*

138. See Lisa G. Aspinwall, Teneille R. Brown & James Tabery, *The Double-Edged Sword: Does Biomechanism Increase or Decrease Judges’ Sentencing of Psychopaths?*, 337 *SCI.* 846 (2012).

139. See *id.* at 846, for the full hypothetical.

140. *Id.*

141. *Id.*

crime); and incapacitation (incarcerating offenders keeps criminals off the streets).<sup>142</sup>

From a retributive point of view, genetic evidence of psychopathy should perhaps result in a reduction in sentencing. If an offender commits a violent act because he is predisposed to violence, there is less of a sense that he deserves to be punished. If a person is born with structural impairments in the brain that make him more likely to engage in antisocial and criminal behavior, perhaps he should not be punished as severely as someone without brain anomalies. However, a retributive perspective should also take the interest of the victim and the victim's family into account. It seems unfair to the victim to punish less severely his or her attacker simply because mitigating genetic evidence was presented at sentencing. If punishment partly serves the purpose of honoring the victim, a reduction in sentencing for psychopaths would cut against this purpose.

A reduction in sentencing might be consistent with the rehabilitative purpose of punishment. If an offender is biologically predisposed to psychopathy, and there is no known "cure" for psychopathy, lengthy incarceration will not do more to "reform" the offender's behavior than would a shorter period of incarceration. Conversely, one could argue for a longer incarceration period because if psychopaths cannot be rehabilitated, they should be incarcerated for a longer period of time to keep them off of the streets (which is consistent with the incapacitation theory of punishment). Studies have shown that "psychopathy is an important risk factor for recidivism" and that "psychopaths [are] about five times more likely than nonpsychopaths to engage in violent recidivism within 5 years of release."<sup>143</sup> Thus, according to the incapacitation theory, it would be safer for society to keep psychopathic individuals in prison for a longer period of time. However, perhaps rather than a change in the severity of sentencing, evidence of psychopathy could lead to a change in the type of punishment psychopathic defendants receive, so that their sentences involve therapy or some other form of rehabilitative treatment rather than merely time in prison.<sup>144</sup>

Increased sentences for psychopathic individuals could serve deterrence purposes. Studies show that psychopaths are more

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142. JOHN KAPLAN, ROBERT WEISBERG & GUYORA BINDER, *CRIMINAL LAW: CASES AND MATERIALS* 29-53 (Vicki Been et al. eds., 6th ed. 2008).

143. *In Cold Blood*, *supra* note 6, at 436.

144. *See Bridging the Gap*, *supra* note 5, at 131-34, for more information about studies on treating psychopathic individuals.

likely to use calculated, instrumental aggression<sup>145</sup> and so perhaps they would rationally take into consideration the consequences of their actions (more severe punishments) before committing a crime. On the other hand, if psychopathic individuals are predisposed to engaging in violent or antisocial behavior, it is possible that even the threat of increased sentences would not be enough to deter them.

No matter the outcome, genetic evidence of psychopathy should be admissible at sentencing as a mitigating factor. It would then be up to the presiding judge to consider all of the facts and determine a just punishment.

#### IV. CONCLUSION

Psychopathy is a tricky disorder. It is extremely stigmatizing, and though it is often studied, its causes are still unknown. Modern research reveals a link between genetics and psychopathy, but the utility of genetic evidence in relation to psychopathy is questionable because of the nature of the tests. Genetic tests for psychopathy are new and not perfectly conclusive. Additionally, the tests have tended to reveal a correlation between a physical abnormality and a corresponding characteristic of psychopathy. There is no proof yet that there is one definitive genetic root cause of psychopathy. Thus, genetic evidence may not tell the whole story and may be unwarrantably prejudicial, either in or against the defendant's favor.

The nature of psychopathy itself also calls into question the utility and reliability of genetic evidence regarding this disorder. Psychopathy is a difficult disorder to define and a predisposition to psychopathy does not necessarily lead to violent or criminal behavior. Furthermore, psychopathy is a disorder characterized by cold rationality, which makes it difficult to be used in an insanity defense or as a negation of a required mental state.

Also, we must ask why genetic and biological evidence seems more persuasive than social or environmental evidence, as demonstrated by the study performed by Aspinwall et al.<sup>146</sup> The notion of biological determinism seems to resonate strongly with people because the concept is embedded with elements of inevitability and lack of free will. If genes make a person violent, he cannot control that and should therefore not be punished as severely for doing something out of his control. Yet we also have

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145. See, e.g., Blair et al., *supra* note 22.

146. See Aspinwall et al., *supra* note 138.

little control over the environment we are born into, the type of parenting we are exposed to, and the socioeconomic status of our families. It seems unfair to place more weight on biology than on social factors that are equally impossible to control.

Overall, advanced methods of genetic testing are socially beneficial because they lead us closer to understanding the development of psychopathy. Because psychopaths make up a disproportionately large number of offenders, it is useful to understand the disorder more fully so that we can adopt better prevention, detection, and rehabilitation measures to deal with psychopathic offenders. In addition, genetic tests in general for better-understood disorders may be very effective at trial. However, it is dangerous to put too much weight on genetic tests for psychopathy in a trial setting. It seems these tests are here to stay at the sentencing phase, yet we should be wary of introducing genetic evidence of psychopathy at other phases of trial until the disorder is better understood.