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EMPATHY FOR PSYCHOPATHS: USING FMRI BRAIN SCANS TO PLEA FOR LENIENCY IN DEATH PENALTY CASES

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Empathy for Psychopaths: Using fMRI Brain Scans to Plea for Leniency in Death Penalty Cases

By Kimberly D. Phillips*

The psychopath is unfamiliar with the primary facts or data of what might be called personal values and is altogether incapable of understanding such matters. It is impossible for him to take even a slight interest in the tragedy or joy or the striving of humanity as presented in serious literature or art. He is also indifferent to all these matters in life itself. Beauty and ugliness, except in a very superficial sense, goodness, evil, love, horror, and humor have no actual meaning [to him], no power to move him. He is furthermore, lacking in the ability to see that others are moved. It is as though he were color-blind, despite his sharp intelligence, to this aspect of human existence. It cannot be explained to him because there is nothing in his orbit of awareness that can bridge the gap with comparison. He can repeat the words and say glibly that he understands, and there is no way for him to realize that he does not understand.¹

I. INTRODUCTION

Society has an intense fascination with psychopaths. The stories of Kenneth Bianchi,² Ted Bundy,³ John Wayne Gacy,⁴ and others have spawned books and movies and have caused equal parts public outrage and peculiar interest. For many years, society’s disdain for psychopaths and their crimes left many people convinced that the proper punishment for them was death. This attitude stretches across time and cultures. For example, “[t]he Yupic-speaking

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² Robert D. Hare, PhD, Without Conscience, The Disturbing World of the Psychopaths Among Us 3-4 (The Guilford Press 1999). “Kenneth Bianchi, one of the ‘Hillside Stranglers’ who raped, tortured, and murdered a dozen women in the Los Angeles area in the late 1970s, turned in his cousin and accomplice (Angelo Buono), and fooled some experts into believing that he was a multiple personality and that the crimes had been committed by ‘Steve.’” Hare, supra note 2, at 3.
³ “Ted Bundy, the ‘All-American’ serial killer who was responsible for the murders of several dozen young women in the mid-1970s, claimed that he had read too much pornography and that a ‘malignant entity’ had taken over his consciousness . . . .” Hare, supra note 2, at 3.
⁴ “John Gacy, a Des Plains, Illinois, contractor and Junior Chamber of Commerce ‘Man of the Year’ who entertained children as ‘Pogo the Clown,’ had his picture taken with President Carter’s wife, Rosalynn, and murdered thirty-two young men in the 1970’s, burying most of the bodies in the crawl space under his house.” Hare, supra note 2, at 3.
Eskimos in Northwest Alaska” have a traditional punishment for the Eskimo they label a “kunlangeta.” Kunlangeta is a name for a man who . . . repeatedly lies and cheats and steals things and does not go hunting and, when other men are out of the village, takes sexual advantage of many women - someone who does not pay attention to reprimands and who is always being brought to the elders for punishment . . . . When asked what would have happened to such a person traditionally, an Eskimo said that probably somebody would have pushed him off the ice when nobody else was looking.

Most of the public agrees that society is safer without psychopaths. However, a new sentencing strategy for psychopaths facing the death penalty has erupted from both mental health researchers and defense lawyers - imploring juries to view a defendant’s psychopathy as a consideration of sentencing mitigation, and consequently, urging juries to impose life imprisonment instead of the death penalty.

One of the foremost experts on psychopathy, Dr. Robert D. Hare, chillingly surmises that psychopathic killers . . . are not mad, according to accepted legal and psychiatric standards. Their acts result not from a deranged mind but from a cold, calculating rationality combined with a chilling inability to treat others as thinking, feeling human beings. Such morally incomprehensible behavior, exhibited by a seemingly normal person, leaves [society] feeling bewildered and helpless.

Dr. Hare even distinguishes psychopathic killers like Ted Bundy from others whose crimes “appear to be related to serious mental problems . . . .[like] Ed Gein, a psychotic killer who

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5 David T. Lykken, PhD. Psychopathic Personality: The Scope of the Problem, in HANDBOOK OF PSYCHOPATHY 7 (Christopher J. Patrick, PhD, ed., The Guildford Press paperback ed. 2006).
6 HARE, supra note 2, at 7.
7 “Robert Hare, PhD, is Emeritus Professor of Psychology, University of British Columbia, where he has taught and conducted research for more than four decades, and President of Darkstone Research Group Ltd., a forensic research and consulting firm. He has devoted most of his academic career to the investigation of psychopathy, its nature, assessment, and implications for mental health and criminal justice,” http://www.hare.org/welcome/bio.html.
8 HARE, supra note 2, at 5.
9 “Obsessively devoted to his mother until her death in 1945, Gein never left home or dated women. After she died, he became increasingly deranged and eventually began prowling cemeteries to unearth recently buried female
skinned and ate his victims; Edmund Kemper,¹⁰ the ‘co-ed killer,’ sexual sadist, and necrophiliac who mutilated and dismembered his victims; . . . and Jeffrey Dahmer¹¹ . . . who pleaded guilty to torturing, killing, and mutilating fifteen men and boys . . . .”¹²

Accordingly, some lawyers and mental health professionals suggest that a psychopath’s “personality” neither allows him to care about others nor have empathy for his victims; therefore, juries should not punish a psychopath by imposing the death penalty.¹³ Although not contending that psychopathy is a mental illness that destroys criminal intent in the trial phase, these professionals argue that the inherent unchangeable personality traits of a psychopath mitigate “the terrifying crimes they commit.”¹⁴

This article explains the frightening nature of psychopaths, how neuroscience and neuroimaging intersects with the study of psychopathy, and specifically, whether an fMRI brain scan is appropriate mitigating evidence in death penalty sentencing hearings when the convicted defendant is a diagnosed psychopath. Thus, part II of this article introduces psychopathy, part III

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¹⁰ Kemper killed six college-age women and members of his family, including his grandparents (when he was 15) and his mother (when he was 25). He dismembered some of his victims and “reportedly engaged in sex with their corpses.” “Kemper committed his crimes in the same area and around the same time as two other serial killers, John Linley Frazier and Herbert Mullins. At the time, Santa Cruz area became known as the ‘Murder Capital of the World’ in the press . . . .” Edmund Kemper Biography, biography.com, http://www.biography.com/articles/Edmund-Kemper-403254?part=0.

¹¹ Dahmer “developed a pattern of murder that was to persist for the duration of his thirteen year killing spree: he sought out mostly African-American men at gay meeting places, lured them home to his grandmother's basement with promises of money or sex, where he would ply them with alcohol laced with drugs, strangle them, have sex with the corpse or masturbate on it, then dismember the corpses and dispose of them, usually keeping their genitals or skulls as souvenirs. He often took photos of each victim at various stages of the murder process, so he could recollect each act afterwards and relive the experience.” Jeffrey Dahmer Biography, biography.com, http://www.biography.com/articles/Jeffrey-Dahmer-9264755.

¹² HARE, supra note 2, at 5.

¹³ HARE, supra note 2, at 6. Psychopaths, whether killers or not share a “deeply disturbing inability to care about the pain and suffering experienced by others – in short, a complete lack of empathy, the prerequisite for love.” Id.

¹⁴ HARE, supra note 2, at 5.
focuses on neurology and neuroimaging, and part IV discusses neuroimaging and the law, concentrating on the use of fMRI brain scans as mitigating evidence in death penalty cases.

II. UNDERSTANDING PSYCHOPATHY

A. History of the Study of Psychopathy

Doctors first coined the term psychopath in the late 1800s; Philippe Pinel, a French psychiatrist, introduced the idea of psychopathy, “us[ing] the term insanity without delirium to describe a pattern of behavior marked by utter remorselessness and a complete lack of restraint, a pattern he considered distinct from the ordinary ‘evil that men do.’” While Pinel considered insanity without delirium a “morally neutral” condition, others endlessly debated whether psychopaths were ‘mad[,]’ . . . ‘bad[,]’ or even diabolical.” The debate deepened after World War II with the exposure of the Nazis’ plan to exterminate European Jews; a horrified world forlornly wondered “[h]ow and why could individuals - even, terrifyingly, one individual in command of a nation – operate outside the rules that most people accepted as restraints on their basic impulses and fantasies?”

As the war concluded, Dr. Hervey Cleckley published his influential book, The Mask of Sanity. Dr. Cleckley described psychopathy as a “grave” disorder “that rivals schizophrenia in depth of impairment.” His book designated psychopaths as a group “of people who are

\(^{15}\) Lykken, supra note 5, at 3. See Huges Hervé, Psychopathy Across the Ages: A History of the Hare Psychopath, in THE PSYCHOPATH: THEORY, RESEARCH, AND PRACTICE 31 (Huges Hervé et al., ed., 2007), for an in-depth narrative of “psychiatric literature in the late 18th Century to the development of the Hare Psychopathy Checklist in the late 20th century . . . .”

\(^{16}\) HARE, supra note 2, at 25.

\(^{17}\) HARE, supra note 2, at 25.

\(^{18}\) HARE, supra note 2, at 26-27.

\(^{19}\) CLECKLEY, supra note 1.

incapable of leading normal lives and whose behavior causes great distress in every community,” yet practically distinguishable “by their ability to adjust without major difficulties in the social group.” He considered the science of psychopathy as “offering a field of study in personality disorder more baffling and more fascinating than any other.”

His book presented numerous examples of psychopathy, a disorder he designated as “far less clearly understood than either the well defined psychoses or the neuroses.” He skillfully observed his patients, providing other doctors and medical students interested in psychopathy with valuable empirical evidence, which he hoped would advance the study and identification of psychopaths. His description of one of his patients, Gregory, exposes his deep fascination with the mysteries of the psychopath.

Gregory had set fires in a local cathedral and a large apartment building. Gregory’s school had expelled him for “stealing and destructiveness[,]” and a judge sentenced him to a juvenile detention center for stealing, and running away from home. A troubled child who caused his parents numerous problems, he tried to shoot his mother; she avoided death only because the gun malfunctioned. Gregory’s troubles bled into his adulthood, and he acquired a long felony record. He stayed in mental hospitals numerous times, but each time the doctors would eventually release him, stating that “nothing [was] wrong with him.”

Dr. Cleckley reported that

21 CLECKLEY, supra note 1, at 10.
22 CLECKLEY, supra note 1, at 13.
23 CLECKLEY, supra note 1, at 167. He did not cause serious damage to the cathedral but substantially damaged the apartment building. Id.
24 CLECKLEY, supra note 1, at 167.
25 CLECKLEY, supra note 1, at 168.
26 CLECKLEY, supra note 1, at 170.
[i]t would be impossible to describe adequately this young man’s career without writing hundreds of pages. His repeated antisocial acts and the triviality of his apparent motivation as well as his inability to learn by experience to make a better adjustment and avoid serious trouble that can be readily foreseen, all make me feel that he is a classic example of psychopathic personality . . . . Gregory, like all psychopaths whom I have seen, apparently knows in a verbal sense the distinctions between right and wrong, and he expresses convincingly good intentions for the future and formulates excellent plans for a wise, happy, and socially acceptable life. I do not, however, believe that this indicates at all that he will follow such plans and alter his past pattern of maladjustment . . . .[U]nlike other psychiatric patients there is no specific provision made by society for handling [him] adequately or dealing logically with the problems [he] create[s].27

Dr. Cleckley’s adept observations of Gregory and other patients memorialized in The Mask of Sanity “greatly influenced researchers in the United States and Canada and [introduced] the clinical framework for much of the scientific research on psychopathy . . . .” “[W]hat makes psychopaths tick” became the common refrain for mental health researchers studying this perplexing personality disorder.28

Dr. Robert Hare made further advancements in the study of psychopathy when he created the Psychopathy Checklist (PCL) (1980), and the revised version, the PCL-R (1991, 2003).29 With this “clinical rating scale,” Hare “set out to operationally define the interpersonal, affect, behavioral, and lifestyle characteristics of psychopathy . . . .” Dr. Hare’s PCL-R remains an important tool in identifying and measuring psychopathy, and since his introduction of the PCL-R, research into psychopathy has expanded exponentially.

Dr. Hare’s PCL-R contains specific personality traits and behavior generally acknowledge as psychopathic by the medical community.30 Using the checklist, a properly

27 CLECKLEY, supra note 1, at 174.
28 HARE, supra note 2, at 28.
30 Robert D. Hare, PhD, & Craig S. Neumann, PhD, The PCL-R Assessment of Psychopathy: Development, Structural Properties, and New Directions, in HANDBOOK OF PSYCHOPATHY 58 (Christopher J. Patrick, PhD, ed.,
trained interviewer may determine “the degree to which the [interviewee] matches the prototypical psychopath.” 31 Because of the universality of the checklist, an interviewer may measure psychopathy “in a wide variety of contexts and in different racial, ethnic, cultural, and socioeconomic groups.” 32

An interviewer rates an individual on each item in the PCL-R using a 3-point system (0, 1, 2, 3); the higher the interviewee’s total score, the more likely the individual is a psychopath. A score of 30 is the “cut score” for interviewees in North America; in other words, an individual scoring between 30 and 40 points qualifies as a psychopath.

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<th>Emotional / Interpersonal Characteristics 33</th>
<th>Behavioral Criteria</th>
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<td>Glibness/superficial charm</td>
<td>Need for stimulation/proneness to boredom</td>
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<td>Grandiose sense of self-worth</td>
<td>Parasitic lifestyle</td>
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<td>Pathological Lying</td>
<td>Poor behavioral controls</td>
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<td>Conning/manipulative</td>
<td>Promiscuous sexual behavior</td>
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<td>Lack of remorse or guilt</td>
<td>Early behavioral controls</td>
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<td>Shallow affect</td>
<td>Lack of realistic, long-term goals</td>
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<td>Callous/lack of empathy</td>
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<td>Failure to accept responsibility for own actions</td>
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<td>Many short-term marital relationships</td>
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<td>Revocation of conditional release</td>
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<td>Criminal versatility</td>
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The Guildford Press paperback ed. 2006). Researchers, including Dr. Hare, are considering whether a restructured three-factor or four-factor test would result in a more accurate psychopathy diagnostic tool. See David J. Cooke et al., Facets of Clinical Psychopathy: Toward a Clearer Measurement, in HANDBOOK OF PSYCHOPATHY 91 (Christopher J. Patrick, PhD, ed., The Guildford Press paperback ed. 2006).

31 Hare & Neumann, supra note 30, at 58.
32 Hare & Neumann, supra note 30, at 59.
33 Hare & Neumann, supra note 30, at 63. Though widely accepted, the checklist has critics. See e.g. David J. Cooke et al., supra note 30. “[A]fter almost two decades of use, it is perhaps time to stand back and consider what has been learned about the limitations of the PCL-R as a psychological test.” Id. at 92.
Research of prison populations has supported the “clinical utility of the PCL-R” as a predictor of “violent behavior and recidivism, revocations of parole, and poor participation and response to therapeutic treatment . . . .”

B. Etiology of Psychopathy

The science of psychopathy is complex and filled with researchers positing different theories regarding what recipe of biological, temperament, genetic, and environmental factors creates a psychopath. Researchers have conceptualized psychopathy “in terms of personality traits,” “behavioral tendencies,” and cognitive processes. Researchers, not always in agreement with one another, propose different causes of psychopathy: genetics, environmental influences, socio-economic factors, and neurobiological disturbances or deformities, or a combination thereof.

1. Genetic Influences

Scientific research does not yet truly understand how genes and psychopathy intersect. However, psychopathy research indicates that genetics may cause an “emotional dysfunction” in

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35 For more information on the different theories see the HANDBOOK OF PSYCHOPATHY (Christopher J. Patrick, PhD, ed., The Guildford Press paperback ed. 2006); JAMES BLAIR ET AL., THE PSYCHOPATH: EMOTION AND THE BRAIN (Blackwell Publishing 2005). One researcher notes that “it is a very challenging to prove a succinct answer to the question, ‘What is psychopathy?’ based on the diversity of approaches and views represented by leaders in the field,” Robert F. Krueger, PhD, Perspectives on the Conceptualization of Psychopathy, in HANDBOOK OF PSYCHOPATHY 193, 195 (Christopher J. Patrick, PhD, ed., The Guildford Press paperback ed. 2006). Note that based on his clinical research and experience, Dr. Hare maintained that “psychopathy is [not] the direct result of early social or environmental factors,” i.e., “poverty, emotion or physical deprivation or abuse, parental rejection, [or] inconsistent disciplinary techniques . . . .” He also admitted that his theory would attract criticism from “people who believe that virtually all adult antisocial behavior . . . stems from early maltreatment of deprivation.” HARE, supra note 2, at 179.

36 Krueger, supra note 35, at 194.

37 Krueger, supra note 35, at 193.

38 See generally HANDBOOK OF PSYCHOPATHY (Christopher J. Patrick, PhD, ed., The Guildford Press paperback ed. 2006).

39 Martyn Pickersgill, Between Soma and Society: Neuroscience and the Ontology of Psychopathy, 4(1) BIOSOCIETIES 45, 51 (Mar 2009),
some individuals, which puts them at “a great risk of developing” psychopathy. Some researchers suggest that psychopaths “fail to become socialized primarily because of a genetic peculiarity, usually a peculiarity of temperament.” In other words, a psychopath’s genetic temperament does not allow him to become socialized, “not because of a lack of socializing experiences but . . . because of some inherent psychological peculiarity[,] which makes him especially difficult to socialize”; this “innate peculiarity” of the psychopath results in an indifference “to the probability of punishment for his actions.”

Some researchers divide psychopaths into subtypes – primary and secondary psychopaths. Both share personality traits, “aggressive, hostile, and impulsive[,]” but they are different in that primary psychopathy is “genetically based” while secondary psychopathy is

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41 “Several recent twin studies provide convincing evidence that genetic factors play at least as important a role in the development of the core features of psychopathy as do environmental forces and factors.” PAUL BABIAK, PHD, & ROBERT D. HARE, PHD, SNAKES IN SUITS: WHEN PSYCHOPATHS GO TO WORK, at “Nature? Nurture? Both!” (Kindle ed., Harper Collins e-books 2006).

42 Lykken, supra note 5, at 4.

43 Lykken, supra note 5, at 11.

44 See also Huges Hervé, PhD, Psychopathic Subtypes: Historical and Contemporary Perspectives, in THE PSYCHOPATH: THEORY, RESEARCH, AND PRACTICE 431 (Huges Hervé, PhD, et al., ed., 2007).

45 “Primary psychopathy comprises constitutional deficits that are not attributable to psychological learning; such individuals display the defining personality characteristics of psychopathy (such as grandiosity, lack or guilt or remorse, and callousness) from an early age. These individuals display low levels of anxiety and lack prosocial emotions (such as guilt and love) that would otherwise prevent them from engaging in extremely callous actions.” Stephen Porter, PhD, & Michael Woodworth, PhD, Psychopathy and Aggression, in HANDBOOK OF PSYCHOPATHY 481, 489 (Christopher J. Patrick, PhD, ed., The Guildford Press paperback ed. 2006).

46 “[S]econdary psychopaths do experience social emotions, and their hostile behavior is believed to be more a product of their negative life experiences and environment. Therefore, this behavior can be thought of as an adaptation to harsh environmental contingencies (such as bad parenting) and/or could be beset explained in terms of some other pathology or syndrome (such as hysteria).” Porter & Woodworth, supra note 37, at 489. Also, secondary psychopathy may be “more dissociative than neurotic[,]” with “environmental insults” causing an
“environmentally based,” thereby challenging the theory that psychopaths are always “born that way.” In response to the growing evidence signaling that genetics may play a role in psychopathy, Dr. Hare cautions that “evidence of this sort does not mean that the pathways to adult psychopathy are fixed and immutable, but it does indicate that the social environment will have a tough time in overcoming what nature has provided,” while other researchers stress that psychopathy is not simply the result of one or more genes.49

2. The Brain: Functional Deficits and Structural Abnormalities

Dr. Clerkley’s “concept of the psychopath's functioning postulates a selective defect or elimination which prevents important components of normal experience from being integrated into the whole human reaction . . . .” Researchers are currently studying whether psychopaths manifest certain deficits: this research links “fear deficits, emotional processing deficits, cognitive deficits, language reception or production deficits, [and/] or anomalous cerebral asymmetries” with psychopathy.51

For example, one researcher theorizes that “[a]dult psychopaths have deficits in emotional processing and inhibitory control, engage in morally inappropriate behavior, and

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47 Poythress & Skeem, supra note 38, at 175. Some researchers posit that as many as “10 different subtypes of psychopathy” exist. “At the core of each subtype was a marked self-centeredness and a disregard for the rights of others; however, . . . there [are] also unique characteristics that [make] each of these subtypes different and recognizable.” Porter & Woodworth, supra note 37, at 489.

48 Babiak & Hare, supra note 41.

49 Pickersgill, supra note 39, at 53.

50 Cleckley, supra note 1, at 374.

51 Newman, supra note 20, at 200.
generally fail to distinguish moral from conventional violations . . . unlike healthy adults . . . [who] typically judge as equally forbidden transgression in which a person wears pajamas to a restaurant (conventional) and a person who gratuitously hits a waiter in a restaurant (moral).”52

The combination of “deficits in moral knowledge” “coupled with poor inhibitory control [impulsive behavior] . . . leads to morally inappropriate behavior.”53 On the other hand, other researchers theorize that psychopaths have “normal patterns of moral judgments, but they simply do not care” - they do not utilize “what they know about morally forbidden and permissible cases.”54

However, “a burgeoning body of brain imaging evidence” now links brain deficits with antisocial and violent behavior.55 Researchers hypothesize that “abnormalities to multiple brain mechanisms contribute to the behavioral, cognitive, and emotional characteristics of the psychopath.”56 Scientists suspect that abnormalities in “the prefrontal cortex, temporal cortex, the amygdala-hippocampal complex, the corpus callosum, and the angular gyrus” of the brain may predispose an individual to psychopathy.57

3. Environmental Factors

Few studies address the relationship between environmental factors and psychopathy; however, a Cambridge Study in Delinquent Development tracked 411 English boys from age 8 to age 48. “The best predictors of the most psychopathic males were having a convicted father or

53 Cima, supra note 52.
54 Cima, supra note 52.
56 Raine & Yaling, supra note 55, at 279.
57 Raine & Yaling, supra note 55, at 278.
mother, physical neglect of the boy, low involvement of the father with the boy, low family income, and coming from a disrupted family.”\(^{58}\) However, all but two of the studied males qualified as “clinical psychopaths”; the other 31 males merely qualified as having psychopathic traits at age 48, thus acquiring the label “most psychopathic.”\(^{59}\)

On the other hand, empirical evidence shows that environmental factors may have little or nothing to do with the development of a psychopath; seemingly normal family environments have produced psychopaths. Dr. Hare explains:

> [t]he parents of psychopaths can do little but stand by helplessly and watch their children tread a crooked path of self-absorbed gratification accompanied by a sense of omnipotence and entitlement. They frantically seek help from a succession of counselors and therapists, but nothing seems to work. Bewilderment and pain gradually replace the expected pleasures of parenting, and again and again they ask themselves, ‘Where did we go wrong?’\(^{60}\)

Indeed, most psychopaths’ antisocial behavior begins at an early age; studies of children showing psychopathic tendencies inform researchers that these children “made more errors in detecting fearful expressions” and were “less sensitive in detecting sad expressions.” Further, scientists have found that these children, labeled as having “callous-unemotional traits,” are “unresponsive to parenting practices that positively influence the behavior of other children” with behavioral problems.\(^{61}\)

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\(^{58}\) David R. Farrington, PhD, *Family Background and Psychopathy*, in *HANDBOOK OF PSYCHOPATHY* 229, 240 (Christopher J. Patrick, PhD, ed., The Guilford Press paperback ed. 2006).

\(^{59}\) However, “it must be admitted that even the ‘most psychopathic’ males in this community sample would not be classified as clinical ‘psychopaths.’” According to the PCL: SV manual [Hare’s Psychopath Checklist: Screening Version] . . . , a ‘high’ score in a community sample is 16 or above. Only two men at age 48 achieved this score, suggesting that few of the ‘most psychopathic’ men suffered from a severe personality disorder [such as psychopathy]. Nevertheless, based on the distribution of PCL:SV scores within this sample, it is correct to say that 33 males were the ‘most psychopathic’ at age 48 according to this measure of psychopathy.” Farrington, *supra* note 58, at 231.

\(^{60}\) HARE, *supra* note 2, at 156.

Typically, childhood experiences, especially those involving behavioral punishment by parents and others, shape a child’s conscience. These experiences produce “lifelong links between social taboos and feelings of anxiety. The anxiety associated with potential punishment for an act helps to suppress the act. In fact, anxiety may help to suppress even the idea of the act . . . ”, conversely, studies reveal that this paradigm is either weak or absent from a psychopath’s temperament.

4. Common Ground

Despite the many proffered theories underlying the causes of psychopathy, most researchers agree that psychopathy represents a “constellation of abnormal emotional, interpersonal, and behavioral characteristics . . . . “, moreover, psychopaths lack a developed conscience, an important check on antisocial impulses. Further, psychopathy is often viewed as distinguishable from psychosis. “Psychopaths are not disoriented or out of touch with reality, nor do they experience the delusions, hallucinations, or intense subjective distress that characterize most other mental disorders. Unlike psychotic individuals, psychopaths are rational and aware of what they are doing and why. Their behavior is a result of choice, freely exercised.”

In sum, psychopaths lack “internal codes,” maintain “unconventional attitudes about ethics and morality,” react with callousness and remorselessness, and hold an “egocentric view of the world.” They are “dominant, forceful, arrogant, [ ] deceptive[,]” and impulsive. Their

62 HARE, supra note 2, at 76.
63 Sadeh et al., supra note 40, at 604.
64 See generally supra note 32; HARE, supra note 2.
65 HARE, supra note 2, at 22.
66 HARE, supra note 2, at 86.
67 Cook et al., supra note 30, at 92.
need to take “advantage of situation that arises” combined with their lack of a conscience “creates a potent formula for crime;” psychopaths “live in the moment,” and do not contemplate the consequences of their actions.

The key sentencing argument for defense attorneys representing a psychopath is that their client is unlike other people, and not merely as a result of social circumstances such as upbringing or other environmental factors; psychopath’s behavior inherently differs from “normal” people, or even from sociopaths who researchers argue would have become “law-abiding citizens had they been reared by healthy, competent, and socialized parents.”

C. Psychopaths in Society

Psychopaths are rare, probably comprising 1% to <5% of the general population. Further, although only 15% to 30% of the prison population are psychopaths, “psychopaths commit a disproportionate amount of crimes” - 50% more than nonpsychopathic criminals. Psychopaths are both male and female, although researchers do not fully understand the potential differences “in how judgments of psychopathy are made in women v. men, as well as distinctions between female and male expressions of psychopathic traits,” among other differences. A perplexed Dr. Cleckley described one female psychopath he observed:

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68 HARE, supra note 2, at 87.
69 HARE, supra note 2, at 88.
70 Lykken, supra note 5, at 4.
71 Craig S. Neumann, PhD, & Robert D. Hare, PhD, Psychopathic Traits in a Large Community Sample: Links to Violence Alcohol Use, and Intelligence, 76(5) JOURNAL OF CONSULTING AND CLINICAL PSYCHOLOGY 893, 897 (Oct. 2008); Grant T. Harris, PhD, & Marnie E. Rice, PhD, Psychopathy Research at Oak Ridge: Skepticism Overcome,
72 Essi Viding, PhD, Annotation: Understanding the Development of Psychopathy, 45(8) JOURNAL OF CHILD PSYCHOLOGY AND PSYCHIATRY 1329 (Nov. 2004).
73 Edelyn Verona & Jennifer Vitale, Psychopathy in Women, in HANDBOOK OF PSYCHOPATHY 415 (Christopher J. Patrick, PhD, ed., 2006). Few researchers have studied psychopathy in women, however, some of the few studies indicate that psychopaths constitute between 9% - 17% of female prison populations. Id. at 418. “[T]he available evidence indicates slightly lower rates of psychopath in women . . . .” Id. at 430.
74 Verona & Vitale, supra note 73, at 416.
One of [Roberta’s] most appealing qualities is, perhaps, her friendly impulse to help others . . . She often went to sit with an ill neighbor, watched the baby of her mother’s friend, and rather patiently helped her younger sister with her studies. In none of these things was she consistent. She often promised her services and, with no explanation, failed to appear . . . She would stop to pet a puppy, take crumbs out to the birds, and comfort a stray cat. Yet, when her own dog was killed by an automobile, she showed only the most fleeting and superficial signs of concern.75

Initial research also indicates that the incidents of psychopathy may vary according to culture or ethnicity, although “historical and cultural literature” suggests that the disorder of psychopathy transcends culture.76 Many cultures report the presence of persons who lack moral or social values and “inflict[] great damage on those around him . . . .”77 Researchers’ theorize that various influences cause cultural differences in psychopathy, including “the impact of culture and ethnicity on early childhood environment and socialization . . . and the role of differing cultural perspectives on the relationship of the individual to society.”78 Researchers anticipate that future studies in this area will “lead to a greater understanding of how cultural environments contribute to the manifestation and course of psychopathic personality.”79

D. Psychopaths, Violence, and Crime

People become criminals for various reasons; “poverty, family violence, child abuse, poor parenting, economic stress, [and] alcohol and drug abuse” may cause an individual to

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75 Verona & Vitale, supra note 73, at 416.
76 Elizabeth A. Sullivan, MS, & David S. Kosson, PhD, Ethnic and Cultural Variations in Psychopathy, in HANDBOOK OF PSYCHOPATHY 437, 438 (Christopher J. Patrick, PhD, ed., 2006). One researcher argued that the “differences in psychopathy scores between North American and international prison samples may reflect a lower prevalence of psychopathy in international samples due to cultural differences.” Critics surmise “an alternative possibility is that cultural differences exist in the way criminal systems identify and respond to mental illness across countries.” Id. at 441. “Thus, differences in criminal classification policies may lead some psychopathic offenders who would be sentenced to prison in North America to instead be sent to forensic mental hospitals in other nations.” Id. at 442.
77 Sullivan & Kosson, supra note 76, at 439.
78 Sullivan & Kosson, supra note 76, at 455.
79 Sullivan & Kosson, supra note 76, at 437.
commit crime.\textsuperscript{80} However, some psychopaths callously cite their reason for committing crimes as “just for the fun of it.”\textsuperscript{81} Psychopaths are extremely selfish and “show no loyalty to groups, codes, or principles, other than to ‘look out for number one.’”\textsuperscript{82}

Research supports that psychopaths are unsympathetic, more violent and aggressive than others, and indifferent; “violence and threats are handy tools to be used when they are angered, defied, or frustrated, and they give little thought to the pain and humiliation experienced by the victims.”\textsuperscript{83} Psychopaths use violence to satisfy their needs and often react to their violent actions with “a sense of power, pleasure or smug satisfaction than regret at the damage done.”\textsuperscript{84} They “certainly” do not “lose sleep” over their actions.\textsuperscript{85} For example, one psychopath described why he killed an elderly man whose home he was burglarizing:

I was rummaging around when this old geezer comes down stairs and . . . uh . . . he starts yelling and having a fucking fit . . . so I pop him one in the, uh, head and he still doesn’t shut up. I give him a chop to the throat and he . . . like . . . staggers back and falls on the floor. He’s gurgling and making sounds like a stuck pig [laughs] and he’s really getting on my fucking nerves so I . . . uh . . . boot him a few times in the head. That shut him up . . . I’m pretty tired by now, so I grab a few beets from the fridge and turn on the TV and fall asleep. The cops woke me up [laughs].\textsuperscript{86}

A study of a large group of federal offenders (average age of 43.5 years) conducted in 2001, “found that psychopaths had been convicted of an average of 7.32 violent crimes compared to 4.52 violent crimes by nonpsychopathic offenders.”\textsuperscript{87} Researchers argue that

\begin{itemize}
\item \textsuperscript{80} HARE, supra note 2, at 84.
\item \textsuperscript{81} HARE, supra note 2, at 85.
\item \textsuperscript{82} HARE, supra note 2, at 85.
\item \textsuperscript{83} HARE, supra note 2, at 86.
\item \textsuperscript{84} HARE, supra note 2, at 89.
\item \textsuperscript{85} HARE, supra note 2, at 89.
\item \textsuperscript{86} HARE, supra note 2, at 91.
\item \textsuperscript{87} Porter & Woodworth, supra note 45, at 481.
\end{itemize}
“Psychopaths are among the most dangerous individuals in society” because they commit serious crimes at a higher rate than other offenders. Further studies indicate that psychopaths are more likely to commit “instrumental violent crime,” meaning crime “associated with premeditation, motivated by a certain goal, and not preceded by a potent emotional reaction.” Such behavior is “certainly consistent with their callousness and lack of empathy towards others”; normal human inhibitions against “killing for personal gain” would not inhibit most psychopaths from murdering someone.

Studies also sustain the belief that “thrill-seeking” drives violent psychopaths. For example, one psychopath incarcerated in Canada committed a string of sexually violent acts including “the serial rapes of adults, child sexual assaults, institutional assaults on other men, and even bestiality.” He stated his reason for “changing his preferred victim” as boredom. Other research shows a “much higher base rate of psychopathy (64%) among sexual offenders who . . . targeted both child and adult victims”; pedophiles, those who specifically targeted children, did not share this higher base rate of psychopathy.

Sadistic interests also compel psychopaths; a study found that “sadistic personality traits were more common in [violent] psychopaths . . . than in violent nonpsychopaths.” One psychopath described his “pleasure in bringing his female victims to the brink of suffocation by


89 Porter & Porter, *supra* note 88, at 290. One studied revealed that “nearly all (93.3%) of the murders perpetrated by psychopaths were instrumental in nature, as were nearly half (48.4%) of those by nonpsychopaths.” *Id.* at 290.


choking them as he raped” and verbally abused them; “after allowing them to breathe again for a few minutes, he repeated the process.”96 Although sexual homicides, a murder that “includes sexual activity before, during, and/or after” the murder, are “rare,”97 studies indicate a link between psychopathy and sexual homicides; one researcher “analyzed the biographies of 77 serial sexual murderers and found that 96% of them” scored as psychopaths on the PCL-R.98

E. Successful Psychopaths

Despite a common misperception, not all psychopaths are violent; for instance, “‘white collar’ psychopaths operating in the corporate or business world seem to rarely rely on physical aggression during their criminal behavior.”99 Researchers have studied and written on these aptly named “successful psychopaths,” who personify “the essential personality characteristics of psychopathy,” yet “manifest those traits” in non-violent ways.100

Dr. Hare, in his and Dr. Paul Babiak’s book, Snakes in Suits: When Psychopaths Go to Work,101 warns society of psychopaths in the workforce, stating that “their grandiosity, sense of entitlement, and lack of personal insight lead to conflict and rivalry with bosses and coworkers[,]” although they often perform well at job interviews and seem like qualified potential employees

96 Porter & Porter, supra note 88, at 292.
97 Porter & Porter, supra note 88, at 292. Sexual homicides “compris[e] only about 1% of all murders in the United States.” Id.
98 Porter & Porter, supra note 88, at 292. But see Jean Proulx, Sexual Murders and Sexual Aggressors: Psychopathical Considerations, in SEXUAL MURDERERS: A COMPARATIVE ANALYSIS AND NEW PERSPECTIVES 51 (Jean Proulx et al. eds., Steven Sacks trans., John Wiley & Sons, Ltd. 2007) “[T]he few studies that suggest sexual murderers are psychopaths all suffer from methodological limitations . . . .” Id. at 55.
100 Jason R. Hall, BA, & Stephen D. Benning, MA, The “Successful Psychopath”: Adaptive and Subclinical Manifestations of Psychopathy in the General Population, in THE HANDBOOK OF PSYCHOPATHY 459 (Christopher J. Patrick, PhD, ed., 2007). Because most psychopath research focuses “on samples of incarcerated male offenders[,] . . . the wealth of findings regarding incarcerated criminal psychopaths may not generalize to psychopaths (either criminal or noncriminal) residing in the community.” Id. Common questions researchers ask about successful psychopaths are whether these individuals “represent[ ] less extreme examples of psychopathy”; whether they “merely express their extreme personality tendencies in more adaptive ways?”; and, “to what extent does the etiology of noncriminal psychopathy overlap with its criminal expression?” Id. at 460.
101 Babiak & Hare, supra note 41.
because of their “charm and charisma.” Employers also often credit leadership qualities to people who are actually displaying psychopathic behaviors. For example, “coercion, domination, and manipulation” may be mistaken for “taking charge, making decisions, and getting others to do what [they] want.”

However, some psychopaths “function reasonably well – as lawyers, doctors, psychiatrists, academics, mercenaries, police officers, cult leaders, military personnel, business people, writers, artists, entertainers, and so forth . . . .” That a psychopath could work and possibly succeed at the highest levels of employment seems incomprehensible, yet Dr. Hare explains the reasons for their success.

[P]sychopaths do work in modern organizations; they often are successful by most standard measures of career success; and their destructive personality characteristics are invisible to most of the people with whom they interact. They are able to circumvent and sometimes hijack succession planning and performance management systems in order to give legitimacy to their behaviors. They take advantage of communication weaknesses, organization systems and processes, interpersonal conflicts, and general stress the plague all companies. They abuse coworkers and, by lowering morale and stirring up conflict, the company itself.

Dr. Hare argues that successful psychopaths are so only because “their intelligence, family background, social skills, and circumstances permit them to construct a façade of

102 Babiak & Hare, supra note 41, at Preface.
103 Babiak & Hare, supra note 41, at Preface.
104 Babiak & Hare, supra note 41, at Preface.
105 Babiak & Hare, supra note 41, at Preface. Some noncriminal psychopaths “found among the fictional villains (and heroes) of literature, film, and television include . . . Gordon Gekko in Oliver Stone’s film Wall Street”; Gekko is “a cynical and callous, yet highly charismatic, leader of a Wall Street brokerage firm” whose greed comes “at the expense of morality.” Others include J.R. Ewing, in Dallas, an “arrogant, remorseless, and cunning individual who casually exploit[ed] both family and business associates in order to advance his own career” and Alan Shore, from Boston Legal, who was a “charming, glib, yet, quintessentially amoral individual who conn[ed] and manipulate[ed] his way into positions of power. Hall & Benning, supra note 79, at 461.
normalcy and to get what they want with relative impunity.”

However, he insists that an accomplished psychopath’s success is “often illusory and always at someone else’s expense.”

F. Treatment of Psychopaths

The medical community has long believed that psychopaths are either not treatable or less treatable than nonpsychopaths. Likewise, psychopaths involved in treatment programs “engage less well in treatment and are more likely to drop out of treatment.” In fact, some studies indicate that after treatment, psychopaths’ reoffend and violate prison rules more than they did before participating in treatment.

The medical community argues the traits inherent to psychopaths negatively affect treatment that would otherwise help nonpsychopaths; these traits include “affective traits,” such as shallow effect and lack of empathy; “interpersonal traits,” such as lying, grandiosity, and conning; and “lifestyle traits” such as boredom and disregard for rules. In other words, treatment programs for psychopaths are not viable because “psychopaths are fundamentally different from others and that there is nothing ‘wrong’ with them in the manner of a deficit or...
impairment that therapy can ‘fix.’ Instead, they exhibit an evolutionary viable life strategy that involves lying, cheating and manipulating others.”111

However, some researchers assert that certain treatment programs may help some psychopaths.112 Because a score of 30 or above on the 20-item PCL-R may result in “over 14 million combinations” of traits, the medical community recommends targeted psychological therapy, which requires tailoring the “management and treatment” of psychopaths “to their individual pattern of psychopathic traits.”113 Other researchers advocate the “institutional incapacitation” of psychopaths “where practicable” and participation in “tightly controlled behavioral programs with contingencies that remain in effect both inside and outside” correctional institutions.114

Researchers also hypothesize that early intervention with children showing psychopathic traits, including “explicitly teaching about psychopathy in school and in public education campaigns,” might protect potential victims of psychopaths.115 Other researchers call for changes in the “social environment,” such as “increasing school supervision, boosting police patrols, installing surveillance, cameras, using metal detectors, and promoting neighborhood watch and citizen patrols, restricting access to firearms, increasing access to abortion, restricting citizens’ freedom to move to relocate, and so on [,] . . .” thereby hopefully reducing the negative impact of psychopaths on society.116

112 Willmot & Tetley, supra note 108, at 43.
113 Willmot & Tetley, supra note 108, at 44.
114 Rice & Rice, supra note 111, at 568.
115 Rice & Rice, supra note 111, at 567.
116 Rice & Rice, supra note 111, at 567 (acknowledging that “large social costs” of some approaches to protect potential victims would outweigh any potential benefits). Id.
At first glance, the treatment of and protection from psychopaths may seem trivial because they comprise such a small percentage of society. However, researchers agree, “the failure to distinguish between offenders [and members of society] who are psychopaths and those who are not has dire consequences for society.”\textsuperscript{117} Dr. Hare ominously warns society:

it is very likely that at some time in your life you will come into painful contact with a psychopath. For your own physical, psychological, and financial well-being it is crucial that you know how to identify a psychopath, how to protect yourself, and how to minimize the harm done to you.

Reading this introductory material on psychopaths’ emotional and behavior traits reveals why juries might find as most unpersuasive any mitigating evidence entered on their behalf at a death penalty sentencing hearing. Psychopaths are ruthless, detached, violent, and frighteningly puzzling; an average human being can neither relate to nor understand a Ted Bundy or John Wayne Gacy. However, neuroscience may convince juries to act more leniently, if ever so slightly, in the sentencing phase of a psychopath’s trial; and when a psychopath faces the death penalty, “slight lenience” is better than no lenience.

III. NEUROLOGY AND PSYCHOPATHY

Neuroscience is the study of the brain and its genetic, structural, functional, and chemical components.\textsuperscript{118} Cognitive neuroscientists “seek to understand how human sensory systems, motor systems, attention, memory, language, higher cognitive functions, emotions, and even consciousness arise from the structure and function of the brain.”\textsuperscript{119}

\textsuperscript{117} HARE, supra note 2, at xii.
\textsuperscript{118} Pickersgill, supra note 39, at 51.
A. History of Neurology: Brain Abnormalities and Injuries

Cesare Lombroso, the father of criminology, studied the autopsies of criminals and theorized that identifiable brain irregularities could “evidence the predisposition to commit crime.” These physical abnormalities included “a deviation in head size and shape from the types common to ethnic groups, eye defects and peculiarities, pouches in the cheeks like those of some animals, [and] the abundance, variety, and precocity of wrinkles.” His theories, although eventually discredited, encouraged the scientific study of a criminal’s mind rather than an examination of the criminal’s particular crime.

The development of brain abnormality science continued with the case of Phineas Gage, a well-known case among mental health professionals. Mr. Gage suffered a traumatic brain injury in 1848, which resulted in major changes in his personality; thereby, providing the scientific community with additional evidence of a possible link between brain abnormalities and personality.

Gage managed a railroad construction crew that removed boulders from the railroad’s path. Gage and his workers removed the boulders by drilling a hole in the rock, stuffing the hole with explosives, padding the hole with sand using a 13 pound, 3’ 7” long and 1.25 inch in diameter pole called a tamping iron, and igniting the explosives in the hole. When Gage

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120 Giuseppe Carrà, MD, & Francesco Barale, MD, Cesare Lombroso, M.D., 1835-1909, 4 AM J PSYCHIATRY 4 (April 2004), ajp.psychiatryonline.org/cgi/reprint/161/4/624.pdf. Dr. Lombroso was born, studied, and practiced in Italy. He also proffered a controversial theory that “genius was closely linked to madness and were two faces of the same psychobiological reality . . . [theorizing] that a man of genius was essentially a degenerate whose ‘madness’ was a form of evolutionary compensation for excessive intellectual development.” Id.

121 Carrà & Barale, supra note 120.

122 Carrà & Barale, supra note 120.

123 Andrew W. Grieve, Phineas P. Gage, ‘the man with the iron bar’, 12 TRAUMA 171 (July 2010); http://tra.sagepub.com.ezproxy.cul.columbia.edu/content/12/3/171. “Gage’s recuperation was protracted and he suffered many setbacks including infection, confusion and coma. By approximately April 1849, he, amazingly, had made an almost complete physical recovery. He had, however, lost vision and developed ptosis of the left eye. Sadly, initially, his neuropsychiatric sequelae rendered him unable to continue his job with the railway. He then
forgot to pad one of the drilled holes with sand, his tamping iron formed a spark that prematurely ignited the explosives in the rock he was working on.\textsuperscript{124} The blast sent the tamping iron through his cheek and out the top of his skull, where it landed 25 meters behind him.\textsuperscript{125}

His co-workers rolled a conscious Gage to a doctor in an oxcart; Dr. J.M. Harlow treated his injuries. Despite losing an eye and enduring a frontal lobotomy, Gage made “almost a complete physical recovery,” however, the injury to his brain caused severe personality changes.\textsuperscript{126} Once a valued employee, described as “hardworking, responsible, and a ‘firm-favourite’ with the men in his charge,” Gage’s personality and reason skills changed radically.

His friends and family described him as

fitful, irreverent, indulging at times in the grossest profanity, manifesting but little difference for his fellows, impatient of restraint or advice when it conflicts with his desire, at time pertinaciously obstinate, yet capricious and vacillating, devising many plans for future operation, which are no sooner arrange than they are abandoned in turn for others appearing more feasible . . . \[He was a\] child in his intellectual capacity and manifestations . . . \textsuperscript{127}

Gage’s accident, brain injury, and subsequent changes in personality and intellect had an immense influence on the “field of neuropsychiatry and traumatic brain injury,” exciting researchers and advancing the science of brain injury; his case was “one of the first pieces of

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\textsuperscript{124} Grieve, \textit{supra} note 123, at 171.
\textsuperscript{125} Grieve, \textit{supra} note 123, at 171. “Taking a direction upward and backward toward the median line, it penetrated the integuments, the masseter and temporal muscles, passed under the zygomatic arch, and (probably) fracturing the temporal portion of the sphenoid bone, and the floor of the orbit of the left eye, entered the cranium, passing through the anterior left lobe of the cerebrum, and made its exit in the median line, at the junction of the coronal and sagittal sutures, lacerating the longitudinal sinus, fracturing the parietal and frontal bones extensively, breaking up considerable portions of brain, and protruding the globe of the left eye from its socket, by nearly one half its diameter.” \textit{Id.} at 172.
\textsuperscript{126} Grieve, \textit{supra} note 123, at 172-73.
\textsuperscript{127} Grieve, \textit{supra} note 123, at 173. “Evidence suggests that the seriously maladapted Gage described by Harlow may have existed only for a limited time post-accident. There is evidence of a ‘social recovery’ of Gage. This may have occurred in the context of him working in the highly hierarchical and organised environment of coach driving in Chile. Furthermore, \[a later picture of him\] show[ed] a ‘handsome, well dressed, confident and even proud’ Gage holding his tamping iron, though with scars and one eye closed.” \textit{Id.} at 173.
\end{flushleft}
evidence that damage to the prefrontal cortex . . . could alter aspects of personality and impair socially appropriate behavior.”128 Present-day researchers are using the lessons learned from Dr. Lombroso, Gage’s case, and contemporary brain research to suggest that hereditable organic brain abnormalities may result in psychopathy.

B. *Brain Abnormalities and Psychopathy*

Neuroscientific research into the causes of psychopathy is a “diverse field,” involving a “relatively small number of high-profile researchers”; these researchers do not always agree on what brain abnormalities and/or deficits cause psychopathy.129 Neuroscientists studying the link between the brain and psychopathy suspect that abnormalities in the brain’s “prefrontal cortex, temporal cortex, the amygdala-hippocampal complex, the corpus callosum, and the angular gyrus” may predispose an individual to psychopathy.130 These studies implicate both functional and structural impairments in different areas of the brain as predisposing an individual to antisocial, violent, and/or psychopathic behavior.131 Some of the suspect brain regions are listed in the following table:

<table>
<thead>
<tr>
<th>Brain Region</th>
<th>Impairment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ventromedial Prefrontal Cortex</td>
<td>Impaired impulse control and emotional learning, impaired adaptation of behavior to changes in reinforcement contingencies, impaired decision-making and planning</td>
</tr>
<tr>
<td>Corpus Callosum</td>
<td>Increased functional inter-hemispheric, connectivity reduced inter-hemispheric, asymmetries of function</td>
</tr>
<tr>
<td>Superior Temporal Gyrus</td>
<td>Impaired processing of abstract material, lack of perspective awareness and empathy</td>
</tr>
<tr>
<td>Hippocampus</td>
<td>Impaired retrieval of emotional memories and contextual fear conditioning, impaired associative learning</td>
</tr>
<tr>
<td>Amygdala</td>
<td>Impaired processing of emotional material</td>
</tr>
</tbody>
</table>

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129 Pickersgill, *supra* note 39, at 50.

130 Raine and Yang, *supra* note 55, at 278.

131 Raine and Yang, *supra* note 55, at 278.

1. Functional Brain Deficiencies

Studies associating psychopathy with functional brain deficiencies focus on brain activity; neuroimaging technology tests measure blood flow, electrical activity, and metabolic activity in the brain in order to correlate brain mechanisms with psychopathy. The studies indicate that some psychopaths, when compared to nonpsychopathic individuals, evidence “normal or increased (not decreased) patterns of brain activation” in certain parts of their brain.

For example, studies indicate that psychopaths “show increased bilateral blood flow in frontotemporal regions during the processing of emotional words, which correlates with aggressive and violent behavior.” Other studies indicate that psychopaths show decreased activity in parts of their brain; for example, one study found that “abnormal ‘connectivity’ in the amygdala-orbitofrontal cortex may contribute to . . . the impulsive, antisocial behavior[,] and emotional detachment associated with psychopathy.”

2. Structural Brain Abnormalities

Studies associating psychopathy with structural brain abnormalities focus on the structural integrity of different parts of the brain. For example, one study focusing on structural abnormalities to the prefrontal cortex addressed the relationship between “prefrontal volume and psychopathy.” The study found a correlation between psychopathic individuals and “low prefrontal gray volume,” with successful psychopaths showing less of a reduction in gray matter

133 Raine & Yang, supra note 55, at 280-81.
134 Raine & Yang, supra note 55, at 283.
135 Raine & Yang, supra note 55, at 281.
136 M.C. Craig et al., Altered Connections on the Road to Psychopathy, 14 MOLECULAR PSYCHIATRY 946, 950 (2009).
than unsuccessful psychopaths. The researchers stressed that the significance of differences in volume of gray matter between successful and unsuccessful psychopaths matters.

Relatively intact prefrontal structure may provide successful psychopaths with both the cognitive resources to manipulate and con others successfully, as well as sufficiently good decision-making skills in risky situations to avoid legal detection and capture. In contrast, prefrontal structural deficits may render unsuccessful psychopaths particularly susceptible to poor decision making; interpersonally inappropriate, impulsive, disinhibited, unregulated, reward-driven antisocial behavior; and reduced sensitivity to environmental cues signaling danger and capture – factors placing them more prone to legal detection and conviction.

These researchers, however, ended with an important caveat, “prefrontal structural impairments, in and of themselves, [do not] cause psychopathic behavior.”

Indeed, studies in this area reach inconsistent conclusions. For example, another study found no “significant correlations between” gray or white matter volume and the “degree of psychopathy” in participants when “data were controlled for education and duration of alcohol abuse . . .”


A survey of these functional and structural brain studies reveals that researchers are progressing in determining the neurological underpinnings associated with psychopathy. While these studies also have implications for the use of forensic science in the criminal justice

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137 Yaling Yang et al., Volume Reduction in Prefrontal Gray Matter in Unsuccessful Criminal Psychopaths, 57 BIOLOGICAL PSYCHIATRY 1103, 1106 (2005) (the study did not correlate deficits in white matter volume and psychopathy).

138 Yang et al., supra note 137, at 1107.

139 Yang et al., supra note 137, at 1107. Psychopathic behavior is “more likely” . . . “a complex disruption to neural circuitry involving the prefrontal cortex.” Id.

140 Weber et al., supra note 128, at 18.

141 Snead, supra note 119, at 36.
system, “drawing inferences from neuroimaging data about the brain, the mind, and behavior” is complex; showing a “conclusive relationship . . . between a particular brain region’s function and any associated cognitive process” remains difficult.

For example, James Fallon, a psychopathy researcher, studied his own brain after his mother told him that his lineage contained many “very violent people.” For example, his “direct great grandfather, Thomas Cornell, was hanged in 1667 for murdering his mother.” Moreover, seven other “alleged murders belonged to the Cornell family, including [Lizzie] Borden.” Lizzie, “accused of killing her father and stepmother with an ax in Fall River, Massachusetts, in 1882,” was controversially acquitted on the murder charges. Curious about his brain structure and function, Fallon PET scanned his brain. The PET scan mirrored psychopaths PET scans; both Fallon and psychopaths’ scans showed “dark patches in the orbital cortex,” which controls “ethical behavior, moral decision-making, and impulse control.”

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142 Snead, supra note 119, at 38.
143 Snead, supra note 119, at 38.

144 Dr. James Fallon, PhD, is a Professor Emeritus of Anatomy & Neurobiology and a Professor of Psychiatry & Human Behavior at the University of California Irvine’s School of Medicine, http://www.faculty.uci.edu/profile.cfm?faculty_id=2303.


146 Hagerty, supra note 145.

147 Hagerty, supra note 145.

148 Hagerty, supra note 145. “The Lizzie Borden case has mystified and fascinated those interested in crime for over one hundred years. Very few cases in American history have attracted as much attention as the hatchet murders of Andrew J. Borden and his wife, Abby Borden. The bloodiness of the acts in an otherwise respectable late nineteenth century domestic setting is startling. Along with the gruesome nature of the crimes is the unexpected character of the accused, not a hatchet-wielding maniac, but a church-going, Sunday-school-teaching, respectable, spinster-daughter, charged with parricide, the murder of parents, a crime worthy of Classical Greek tragedy.” Russell Aiuto, Lizzie Borden, trutv.com, http://www.trutv.com/library/crime/notorious_murders/famous/borden/index_1.html.

149 See infra, part III.(C.).

150 Hagerty, supra note 145.
other words, his scan looked “just like one of those killers,” reminding Fallon that a psychopath does not emerge from every “psychopathic brain.”

C. *Neuroimaging*

Neuroimaging techniques involve either structural or anatomical neuroimaging or functional neuroimaging. Researchers use structural neuroimaging techniques to observe “the brain’s architecture.” Similarly, researchers use the computerized images resulting from neuroimaging techniques to “measure the brain’s activity (and sometimes its structure).” Throughout the years researchers have studied the brain using computed tomography (CT), scanning, magnetic resonance imaging (MRI), electroencephalography (EEG),

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151 Hagerty, *supra* note 145.

152 Fallon also tested positive for a gene related to aggression and violence. Although Fallon “once believed that genes and brain function could determine everything about us,” he now thinks that environment plays a role as well. Hagerty, *supra* note 145.

153 Snead, *supra* note 119, at 37.


155 “CT or CAT scans are special x-ray tests that produce cross-sectional images of the body using x-rays and a computer. These images allow the radiologist . . . to look at the inside of the body just as you would look at the inside of a loaf of bread by slicing it. This type of special x-ray, in a sense, takes ‘pictures’ of slices of the body so doctors can look right at the area of interest. CT scans are frequently used to evaluate the brain, neck, spine, chest, abdomen, pelvis, and sinuses. A head or brain CT examines the various structures of the brain to look for a mass, stroke, area of bleeding, or blood vessel abnormality. It is also sometimes used to look at the skull.” Lawrence M. Davis, MD, & Lisa Davis, MA, *CT Scan*, eMedicineHealth.com, http://www.emedicinehealth.com/ct_scan/article_em.htm#CT%20Scan%20Introduction.

156 “An MRI is similar to a . . . CT scanner in that it produces cross-sectional images of the body. Looking at images of the body in cross section can be compared to looking at the inside of a loaf of bread by slicing it. Unlike a CT scan, MRI does not use x-rays. Instead, it uses a strong magnetic field and radio waves to produce very clear and detailed computerized images of the inside of the body. A special kind of MRI exam, called magnetic resonance angiography (MRA), examines the blood vessels. The blood vessels in the neck (carotid and vertebral arteries) and brain are frequently studied by MRA to look for areas of constriction (narrowing) or dilatation (widening).” Davis & Davis, *supra* note 155, at *Magnetic Resonance Imaging* (MRI), http://www.emedicinehealth.com/ct_scan/article_em.htm#CT%20Scan%20Introduction. “MRI technology also produces visual images of the brain that distinguish gray from white matter and depict individuals’ brain structures.” Jane Campbell Moriarty, JD, *Neuroimaging Evidence in U.S. Courts, 26 BEHAV. SCI. LAW* 29, 31 (2008).

157 “An EEG is a test that records the electrical impulses in your brain through metal discs placed on your scalp. The test results show brain wave patterns in different parts of your brain and if the patterns are normal or abnormal. The EEG test helps to detect or rule out conditions such as epilepsy, stroke, brain tumors, trauma, coma, or brain death.” University of Pittsburgh Medical Center, *Information for Patients,*
magnetoencephalography (MEG),\textsuperscript{158} positron emission tomography (SPECT),\textsuperscript{159} and functional magnetic resonance imaging (fMRI). This article focuses on fMRI scans.

1. Neuroimaging Techniques: fMRI

Neuroscientists using fMRI technology may “examine the brain with ‘higher sensitivity and accuracy . . . and view the brain ‘in action.’”\textsuperscript{160}

While MRI visualizes anatomical details in living things by considering magnetic charges, fMRI records “the differences between oxygenated and nonoxygenated blood cells due to their magnetic charges, so more active neurons can be distinguished from less active ones.” Distinct from MRI, fMRI is correlated with brain function rather than brain structure . . . Although based on the same technology as MRI, fMRI apparently presents improvements in that it can measure localized changes in the brain as an individual is performing a selected task. Unlike some other forms of neuroimaging, such as CAT scans and MRI, which appear in shades of gray, fMRI creates vivid and colorful images in three-dimensional computer-generated images of the surface of the brain.\textsuperscript{161}

\textsuperscript{158} “MEG is a new technology that measures the very faint magnetic fields that emanate from the head as a result of brain activity. In MEG, magnetic detection coils bathed in liquid helium are poised over the subject’s head. The brain’s magnetic field induces a current in the coils, which in turn induces a magnetic field in a special, incredibly sensitive instrument called a superconducting quantum interference device, or SQUID . . . Of all the brain scanning methods, MEG provides the most accurate resolution of the timing of nerve cell activity -- down to the millisecond.” \textit{MEG}, pbs.org, http://www.pbs.org/wnet/brain/scanning/meg.html. “MEG is a direct measure of brain function, unlike functional measures such as fMRI, PET and SPECT that are secondary measures of brain function reflecting brain metabolism . . . and is adaptable to mapping many functions – sensory, motor, language, [and] memory cortex,” \textit{MEG}, www.mit.edu, http://web.mit.edu/kitmitmeg/whatis.html.

\textsuperscript{159} A single-photon emission computerized tomography (SPECT) scan lets your doctor analyze the function of some of your internal organs. A SPECT scan is a type of nuclear imaging test, which means it uses a radioactive substance and a special camera to create 3-D pictures. While imaging tests such as X-rays can show what the structures inside your body look like, a SPECT scan produces images that show how your organs work. For instance, a SPECT scan can show how blood flows to your heart or what areas of your brain are more active or less active. SPECT can be helpful in determining which parts of the brain are being affected by dementia, clogged blood vessels, seizures, encephalitis, [and] head injuries,” \textit{SPECT Scan}, www.mayoclinic.com, http://www.mayoclinic.com/health/spect-scan/MY00233.

\textsuperscript{160} Moriarty, supra note 156, at 32.

\textsuperscript{161} Moriarty, supra note 156, at 32.
2. fMRI and Psychopathy Research

Researchers investigating psychopathy are also using fMRI technology. One of the better-known researchers is Dr. Kent Kiehl, a pupil of Dr. Hare’s, who has stated during interviews that he “is frustrated by the lack of respect shown to psychopathy by the mental-health establishment.” For the past several years, Dr. Kiehl has scanned New Mexican prison inmates with an fMRI machine, attempting to “unravel the neural basis of psychopathy.”

Dr. Kiehl takes fMRI images of identified psychopaths as they perform tests; for example, a word-based test or an image-based test. During the word-based test, inmates are scanned as they are “shown a series of words and phrases”; the inmate rates each word or image as he considers whether it depicts morally offensive behavior. The phrases fall into three categories: “some [are] intended as obvious moral violations, like ‘having sex with your mother’; some [are] ambiguous, like ‘abortion’; and some [are] morally neutral, like ‘listening to others.’ The computer software capture[s] not only the inmate’s response but also the speed with which he [makes] his judgment. The imaging technology record[s] which part of the brain [is] involved in making the decision and how active the neurons there [are].” The scans become a part of the data analyzed by Kiehl in his work with psychopaths.

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162 Dr. Kent A. Kiehl, PhD, is an Associate Professor in the Department of Psychology at the University of New Mexico, http://www.unm.edu/~psych/faculty/lg_kiehl.html.
165 Seabrook, supra note 163, at 2.
166 Seabrook, supra note 163, at 2.
167 Seabrook, supra note 163, at 2.
Netherlands research psychologist, Harma Meffert, also uses fMRI scans in her research on empathy. Using the scans along with additional information, she compares psychopaths, who lack empathy, with “‘normally’ empathic people.” She wants to know if psychopaths “do terrible things to other people because, unlike most of us, they do not share the pain they inflict.”

Meffert and her team show psychopaths pictures of “hands interacting in ways that convey different emotional messages.” For example, one picture depicts “one hand stroking the other . . . – a positive, pleasurable gesture,” while another picture depicts one hand painfully twisting the other hand’s finger. The subjects rate the pictures on a scale of one to five, depending “on how positively or negatively he perceives the gestures.” Because “interacting hands activate many parts of the brain,” Meffert and her team hope to identify brain activity differences between “normal” people and psychopaths.

3. fMRI Limitations

However, researchers’ use of fMRI scans is not without controversy.

fMRI is not and will never be a mind reader, as some of the proponents of decoding-based methods suggest, nor is it a worthless and non-informative ‘neophrenology’ that is condemned to fail, as has been occasionally argued . . . . The beautiful graphics . . . the fMRI produce, and the excitement about what they

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170 Abbott, supra note 169, at 942.
171 Abbott, supra note 169, at 942.
172 Abbott, supra note 169, at 944.
173 Abbott, supra note 169, at 944.
174 Abbott, supra note 169, at 944.
175 Abbott, supra note 169, at 944.
176 Nikos K. Logothetis, What We Can Do and Cannot Do with fMRI, 453 NATURE 869 (June 2008).
177 Logothetis, supra note 176, at 869.
imply, often mask the immense complexity of the physical, biophysical[,] and engineering procedures generating them.178

During an fMRI scan, as the participant views images and thinks and feels in response to those images, colors appear on the scan, allegedly revealing the parts of the brain involved with the participant’s thoughts and emotions.179 However, the colors seen on the scan do not “directly measure brain cell activity,” but instead “reflect . . . the flow of blood in the brain and the amount of oxygen the blood is carrying.”180 In truth, the colors indicating brain activity simply do not directly correlate with the idea that the “lit up” parts of the brain are the “ones involved in that emotion or task.”181

While an fMRI scan shows where “brain activity occurs as people think and experience emotion,” whether that brain activity is “actually causing the associated thoughts and feelings” is yet undetermined.182 Historically, researchers aligned themselves with the localization theory; the idea that “memories, emotions, and beliefs” were “localized in a single site in the brain.”183 However, “current evidence . . . now suggests that most complex psychological or behavioral concepts do not map into a single center in the brain”; in other word, brain processes are too multifaceted and intricate to support the “localized site theory.”184 Accordingly, critics claim that “fMRI scans can be misleading” and that neuroscientists should concentrate their research on “how the brain produces thoughts and feelings instead of searching for their locations.”185

178 Logothetis, supra note 176, at 870.
180 BERNSTEIN, supra note 179, at 58.
181 BERNSTEIN, supra note 179, at 58.
182 BERNSTEIN, supra note 179, at 58.
184 Crawford, supra note 183, at 71.
185 BERNSTEIN, supra note 179, at 58.
For instance, a group of researchers used fMRI scans to study compulsive gamblers.\textsuperscript{186} When the gamblers won, the fMRI scan showed “an unusually small amount of activity in a brain area that is normally activated by the experience of rewards, or pleasure.”\textsuperscript{187} Because of the low activity in that part of the brain, the researchers posited that a brain abnormality in this pleasure area of the brain might cause gambling addiction.\textsuperscript{188} However, other studies revealed that “compulsive gambling appears in people taking a prescription drug that increases activity” in the pleasure area of the brain; when the gambler stops taking the drug, the gambler stops his compulsive gambling.\textsuperscript{189} As a result of these conflicting results, researchers cannot definitively associate “lower-than-normal” activity or “higher-than-normal” activity in the pleasure area of the brain with compulsive gambling.\textsuperscript{190}

Correspondingly, as related to the study of psychopathy, fMRI limitations include problems proving that brain abnormalities identified by the scan actually correlate with psychopathic traits and behavior. Indeed, some researchers wonder whether brain abnormalities cause psychopathy or psychopathy causes the brain abnormalities that scans detect.\textsuperscript{191} Critics also argue that fMRI scan results are easily manipulated, “depend[ing] too much on how experimenters choose to interpret them.”\textsuperscript{192}

Empirical evidence informs the controversial use of fMRI scans in researching psychopathy. One scientist used a dead salmon as his fMRI test subject to “work out some new

\textsuperscript{186} BERNSTEIN, supra note 179, at 60. \\
\textsuperscript{187} BERNSTEIN, supra note 179, at 60. \\
\textsuperscript{188} BERNSTEIN, supra note 179, at 60. \\
\textsuperscript{189} BERNSTEIN, supra note 179, at 60. \\
\textsuperscript{190} BERNSTEIN, supra note 179, at 60. \\
\textsuperscript{191} Miller, supra note 164, at 1286. \\
\textsuperscript{192} BERNSTEIN, supra note 179, at 59.
methods.”193 The researcher placed the fish in the scanner and “showed it ‘a series of photographs depicting human individuals in social situations.’”194 As required by test protocol, the researcher even asked the salmon, as he would a human test subject, “to determine what emotion the individual in the photo must have been experiencing.”195 The salmon’s fMRI scan indicated a fascinating result; the scan showed that “the dead salmon was actually thinking about the pictures” the researcher had shown him.196

This result exposes some of the problems associated with fMRI data and brain disorders such as psychopathy; the data, while certainly not useless, is also fallible and tricky.

The limitations of fMRI are not related to physics or poor engineering, and are unlikely to be resolved by increasing the sophistication and power of the scanners; they are instead due to the circuitry and functional organization of the brain, as well as to inappropriate experimental protocols that ignore this organization . . . . Claims . . . that neuroimaging should be sufficient to understand brain dysfunctions and disorders are . . . naïve and utterly incorrect.197

IV. PSYCHOPATHS AND DEATH PENALTY SENTENCING

“‘Psychopath is a term that is becoming pervasive in the law.’”198 Legislators use the term in legislation and statutes ranging from civil commitment and indeterminate sentencing to sexual offender and capital punishment laws.199 Mental health and legal professionals debate whether

194 Madrigal, supra note 193.
195 Madrigal, supra note 193.
196 Madrigal, supra note 193.
197 Logothetis, supra note 176, at 877 (arguing that “a multimodal approach is more necessary than ever for the study of the brain’s function and dysfunction”).
198 John F. Edens, PhD, & John Petrila, PhD, Legal and Ethical Issues in the Assessment and Treatment of Psychopathy, in HANDBOOK OF PSYCHOPATHY 573 (Christopher J. Patrick, PhD, ed., The Guildford Press paperback ed. 2006)
199 Edens & Petrila, supra note 198, at 574.
the term psychopathy is “primarily a legal or diagnostic categor[y], or neither.” Undeniably, the term psychopath has different meanings with the definition depending on which professional, i.e., mental health doctors and researchers, attorneys, judges, or legislators, uses the word and in what context.201 The word is loaded and “profound[ly] impacts” how the legal system regards and handles criminal defendants diagnosed as psychopaths.202 Likewise, professionals often use antisocial personality disorder, psychopathy, sociopathy, and dissocial personality disorder “interchangeably, despite different criteria for each label,” causing additional confusion.203

Despite these concerns, “psychometric” test data and assessments, including data on psychopathy, may potentially assist the ‘trier of fact’.204 However, “many forensic examiners inappropriately administer various psychometric measures, misinterpret their results, or both, and then attempt to introduce this flawed information into judicial proceedings, either through reports or direct testimony. Moreover, even well-intentioned mental health experts can have their data misrepresented by resourceful prosecutors and defense attorneys.”205

A. The Beginning: Using the PCL-R in the Courtroom

A recent survey revealed that “from 1991 through 2004, the PCL-R checklist was used in 87 reported cases: 76 state cases and 11 federal cases” and showed that the prosecution offers this evidence much more often than the defense.206

200 Edens & Petrila, supra note 198, at 575.
201 Edens & Petrila, supra note 198, at 575.
202 Edens & Petrila, supra note 198, at 585.
203 Edens & Petrila, supra note 198, at 575.
204 Jonathan Edens, PhD, Misuses of the Hare PCL-R in Court: Two Case Examples, 16 J. INTERPERS. VIOLENCE 1082, 1083 (2001).
205 Edens, supra note 204, at 1083.
206 David DeMatteo, JD, PhD, & John F. Edens, PhD, The Role and Relevance of the Psychopathy Checklist Revised in Court: A Case Law Survey of U.S. Courts (1991-2004), 12(2) PSYCHOLOGY, PUBLIC POLICY, AND LAW 214, 217-18 (2006). “Among the 76 state cases, the PCL–R was introduced by the prosecution (or state) in 49 cases (64%).
Sexually violent predator  To assist in determining whether an offender should be classified as a “sexually violent predator” and subjected to post criminal-sentence involuntary commitment.  60 2

Future dangerousness  To assist in determining whether an offender poses a risk for future danger, typically for purposes of determining the appropriateness of probation or parole.  11 3

Mental state at time of the offense  Part of a criminal defendant’s insanity or diminished capacity defense.  3 0

Sentencing  Used in the punishment phase of a trial to assist in determining the appropriate disposition of a convicted offender.  2 1

Capital sentencing  To assist in determining the presence of aggravating factors (e.g., future violence risk), which are required to impose a death sentence.  0 4

Juvenile transfer  To assist in determining whether a juvenile offender should be tried in criminal court or returned to family court.  0 1a

aThe prosecution sought to transfer a defendant, who was between 15 and 17 years old when he was alleged to have committed several serious criminal offenses, to criminal court. At the time of the juvenile transfer, evaluation involving the PCL-R, the defendant was an adult.

As the table indicates, prosecutors have used the PCL-R checklist in death penalty sentencing hearings as evidence in aggravation. When an offender rates a higher score on the PCL-R, prosecutors “argue that an offender represents ‘a continuing threat to society,’ thereby warranting imposition of the death penalty.” Some commentators criticize this use of the PCL-R because the art of determining future dangerousness is a perilous one; mental health professionals have endlessly debated whether they can reliably predict future dangerousness of a

the defense in 13 cases (17%), both sides in 4 cases (5%), a court-appointed clinician in 9 cases (12%), and the prosecution (or state) and a court-appointed clinician in 1 case (1%). In each of the 10 cases involving court-appointed clinicians, the expert witness was called to testify for the prosecution. In all 11 federal cases involving the PCL-R, it was introduced by the prosecution (or government). As such, in over 85% (74 of 87) of the cases that we identified, PCL-R evidence was introduced by a witness called by the prosecution. In sharp contrast, it was introduced by an expert witness called by the defense in slightly less than 20% (17 of 87) of the cases reviewed.” Id. at 218.

DeMatteo & Edens, supra note 206, at 219.


Edens et al., supra note 208, at 434.
criminal defendant,\textsuperscript{210} and studies indicate that they cannot reliably do so.\textsuperscript{211} Generally, however, researchers have approved mental health professionals’ “use of the PCL-R to inform a number of referral questions in legal contexts.”\textsuperscript{212}

B. Neuroimaging in Courts

Neuroscience affects “core constructs of the law, such as competency, free will, and the genesis of violent behavior.”\textsuperscript{213} Because of neuroscience’s contribution to the study of the brain and mental processes, lawyers have turned to neuroscience and neuroimaging in their quest to seek justice, both for the community and criminal defendants. The legal community’s interest in using neuroscience in criminal cases partly flows from the \textit{mens rea} requirement; “many legal issues have turned on the question: ‘what was he thinking?’”\textsuperscript{214}

In a groundbreaking neuroimaging case, lawyers representing John Hinkley, Jr., who was accused of attempting to assassinate President Ronald Reagan in 1981, offered into evidence a CT scan of Hinkley’s brain; a defense radiologist testified that the scan showed “his brain to be ‘shrunken’ to an unusual degree for a person his age.”\textsuperscript{215} While projecting the images on a screen in the courtroom, the radiologist suggested that this shrinkage showed “‘organic brain disease’ because the shrinkage seemed permanent.”\textsuperscript{216} The radiologist testified that the CT scan

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\item \textsuperscript{210} DeMatteo & Edens, \textit{supra} note 206, at 215.
\item \textsuperscript{211} See Mark D. Cunningham, \textit{Dangerousness and Death: A Nexus in Search of Science and Reason}, 61(8) AMER. PSYCHOLOGIST 828 (Nov. 2006).
\item \textsuperscript{212} DeMatteo & Edens, \textit{supra} note 206, at 222.
\item \textsuperscript{214} Joshua Greene, PhD, and Jonathan Cohen, PhD, \textit{For the Law, Neuroscience Changes Nothing and Everything}, 359 PHIL. TRANS. R. SOC. LONDON B 359 (2004).
\item \textsuperscript{216} Taylor, \textit{supra} note 215.
\end{itemize}
revealed that Hinckley suffered from “schizophrenia and was insane when he shot President Reagan.” The jury found Hinckley not guilty by reason of insanity.

For criminal sentencing purposes, neuroscience evidence is sometimes presented by the defense as mitigation evidence at sentencing. Defendants may present mitigating evidence of “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.” Defense lawyers call neuroscientists to establish “a biological disposition to criminal violence”; during the hearing, neuroscientists testify about the defendant’s mental illness or brain abnormality. Defense attorneys rely on this evidence, arguing that the defendant’s mental illness or brain abnormality makes him “less than fully culpable” for his violent acts while urging the jury to impose life imprisonment rather than the death penalty.

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217 Taylor, supra note 215.


220 Kansas v. Marsh, 548 U.S. 163, 174 (2006) (citing Lockett v. Ohio, 438 U.S. 586, 604 (1978) (plurality opinion). See e.g. 18 U.S.C § 1592 (mitigating factors in federal death penalty sentencing cases include “[t]he defendant's capacity to appreciate the wrongfulness of the defendant's conduct or to conform conduct to the requirements of law was significantly impaired, regardless of whether the capacity was so impaired as to constitute a defense to the charge”).

Neuroscientist Michael Gazzaniga has noted that those who represent criminal defendants “are looking for that one pixel in their client’s brain scan that shows . . . a malfunction in the normal inhibitory networks,” which would allow them to demand leniency on the grounds that their client could not control his actions.

This theory fits well with what some researchers posit about psychopaths. Psychopath’s brains abnormalities predispose them to committing criminal acts of violence; in other words, a psychopath “just cannot help it” because their lack of conscience prevents the normal inhibition against antisocial, violent, and immoral behavior. However, neuroscientists have not, on average, convincingly utilized neuroimaging evidence and testimony; more often than not, jurors in these cases have “imposed or recommended a sentence of death.”

222 “Michael Gazzaniga, [PhD.] is a Professor of Psychology and the Director for the SAGE Center for the Study of Mind at the University of California Santa Barbara. He oversees an extensive and broad research program investigating how the brain enables the mind,” UCSB.edu, http://www.psych.ucsb.edu/~gazzaniga/.

223 Snead, supra note 221, at 1306-07.

224 Snead, supra note 221, at 1308 (citing Jackson v. Calderon, No. CV 91-4249-R, 1997 WL 855516, at *1, *6 (C.D. Cal. Nov. 14, 1997) (EEG used to show results of chronic drug use, jury sentenced death); People v. Smith, 107 P.3d 229, 233-34 (Cal. 2005) (PET showing defendant's “brain damage” introduced by Monte Buchsbaum at sentencing, jury sentenced death); People v. Gutierrez, 52 P.3d 572, 585, 589 (Cal. 2002) (“brain scans” presented at trial to show lesions on defendant's frontal lobes, jury sentenced death); People v. Kraft, 5 P.3d 68, 81, 98 (Cal. 2000) (PET scan introduced at sentencing, jury sentenced death); People v. Holt, 937 P.2d 213, 226, 231 (Cal. 1997) (PET and EEG showing abnormalities in frontal and temporal lobes as well as damage to cingulate gyrus region of brain presented at penalty phase, jury sentenced death); People v. Gutierrez, 52 P.3d 572, 585, 589 (Cal. 2002) (“brain scans” presented at trial to show lesions on defendant's frontal lobes, jury sentenced death); People v. Smith, 107 P.3d 229, 233-34 (Cal. 2005) (PET showing defendant's “brain damage” introduced by Monte Buchsbaum at sentencing, jury sentenced death); People v. Gutierrez, 52 P.3d 572, 585, 589 (Cal. 2002) (“brain scans” presented at trial to show lesions on defendant's frontal lobes, jury sentenced death); People v. Kraft, 5 P.3d 68, 81, 98 (Cal. 2000) (PET scan introduced at sentencing, jury sentenced death); People v. Holt, 937 P.2d 213, 226, 231 (Cal. 1997) (PET and EEG showing abnormalities in frontal and temporal lobes as well as damage to cingulate gyrus region of brain presented at penalty phase, jury sentenced death); Johnston v. State, 841 So. 2d 349, 353-55 (Fla. 2002) (expert testimony based on MRI, EEG, and PET presented at sentencing showing that defendant's “frontal lobe area had substantially less activity than was normal (below the first percentile),” trial court followed jury recommendation of death sentence); Smithers v. State, 826 So. 2d 916, 921-22 (Fla. 2002) (expert testified at sentencing that “PET scan of [defendant's] head was abnormal and was consistent with brain damage due to head trauma,” trial judge accepted jury recommendation of death sentence); Sexton v. State, 775 So. 2d 923, 929, 936 (Fla. 2000) (expert testimony based on MRI and PET scans presented to show defendant's “dysfunctional limbic system in the lower half of the brain” and “structural injury on the top half of his brain,” trial judge accepted jury recommendation of death sentence); State v. Timmendequas, 737 A.2d 55, 65, 71 (N.J. 1999) (expert testimony based on SPECT results presented at penalty phase describing “possible serious problem with defendant's brain,” court sentenced defendant to death following jury finding that aggravating factors outweighed mitigating factors); State v. Reid, No. M2003-00539-CCA-R3-DD, 2005 WL 1315689, at *1, *15 (Tenn. Crim. App. Dec. 27, 2005) (MRI and PET used to show shrinkage to left temporal lobe, jury sentenced death); Ex parte Simpson, 136 S.W.3d 660, 661, 665 (Tex. Crim. App. 2004) (experts testified regarding MRI and EEG results, court sentenced death).
C. Using the fMRI Scan as Evidence in Mitigation

Neuroscientists have used PET and SPECT scans, EEGs, and other neuroimaging methods during death penalty sentencing hearings. Currently, neuroscientists are attempting to integrate fMRI scans into their testimony in mitigation; fMRI scans are impressive images that many attorneys hope will carry much weight with the jury. The first known case of a lawyer utilizing a neuroscientist who based his testimony on an offender’s fMRI scans was in the case of Brian Dugan. Notably, however, the judge did not admit the actual fMRI scan, but only allowed the expert to present a diagram depicting the scan’s results.

In 1983, Brian Dugan raped and murdered Jeanine Nicarico, a 10-year old girl living in the Chicago area; he confessed to the crime in 1985 and pled guilty to rape and murder charges in 2009. In a videotaped interview, Dugan asserted that he had only intended to rob the Nicaricos’ home, but when Jeanine met him at the door, he “‘clicked’” and “‘turned into Mr. Hyde from Dr. Jekyll.’” At his death penalty sentencing hearing, Dugan’s lawyers asked Dr. Kent Kiehl, an fMRI expert, to testify about Dugan’s psychopathy, hoping that the jury would impose life-imprisonment instead of death.

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225 PET and/or SPECT scans have “been used in approximately 130 reported court cases.” Yaling Yang, B.S., et al., Brain Abnormalities in Antisocial Individuals: Implications for the Law, 26 BEHAV. SCI. LAW 65 (2008).

226 Snead, supra note 221, at 1301.

227 Infra note 233.


229 Hagerty, supra note 228.

230 See supra part III.(C.)(2.).

231 Dugan scored a 38.5 out of 40 in the PCL-R checklist, which placed him in the 99th percentile for psychopathy. Hagerty, supra note 228.
Dr. Kiehl, as part of his research agenda, argues that the legal system should treat psychopaths like “people with very low IQs who are not fully responsible for their actions”\footnote{In Atkins v. Virginia, 536 U.S. 304 (2002), the Supreme Court held that imposing the death penalty on the mentally retarded is an excessive punishment in violation of the Eighth Amendment. \textit{Id.} at 321.} because psychopaths’ have low emotional IQs."\footnote{Hagerty, \textit{supra} note 228. Kiehl, when talking to Hagerty, asked her, “What if I told you that a psychopath has an emotional I.Q. that’s like a 5-year old? . . . Well, if that was the case, we’d make the same argument for individuals with low emotional IQ – that maybe they’re not as deserving of punishment, not as deserving of culpability, etc.” \textit{Id.}} Accordingly, at Dugan’s sentencing hearing, Kiehl informed the jurors that psychopaths make choices “not necessarily informed by emotion in the same way ours are.”\footnote{Michael Haederle, \textit{supra} note 228.} He urged the jurors to view Dugan’s brain as different and to consider those differences during their sentencing deliberations. Using a diagram based on an fMRI scan\footnote{The Judge ruled that Kiehl could not show the actual fMRI images; the prosecution had argued that the “color-coded images, which showed the distinctive pattern of Dugan’s neural activation, would confuse or mislead jurors.” Haederle, \textit{supra} note 228.} of Dugan’s brain, Kiehl described Dugan’s brain abnormality to the jury as “abnormally low grey matter density,”\footnote{Haederle, \textit{supra} note 228.} a structural brain abnormality that some researchers have preliminarily linked to psychopathy.\footnote{See \textit{supra} part III.(B.).}

The defense lawyers, searching for mitigating evidence of an “emotional disturbance,” asked Kiehl, among other things, whether Dugan’s brain “was normal.”\footnote{Haederle, \textit{supra} note 228.} Kiehl replied, “No, sir,” explained that Dugan had suffered from psychopathy since the early 1980s, and emphasized that “Dugan suffered from reduced mental capacity that amounted to ‘an emotional disturbance.’”\footnote{Haederle, \textit{supra} note 228.} The jury subsequently and unanimously sentenced Dugan to death,\footnote{Haederle, \textit{supra} note 228.} although

\footnote{Haederle, \textit{supra} note 228. The jurors initially voted 10-2 in favor of death, but they returned a unanimous verdict after deliberating for one more night. \textit{Id.}}
they deliberated for 10 hours and reread all the neuroscience testimony, indicating that the scientific testimony had made an impression.\textsuperscript{241}

After the hearing, Kiehl reflected on the case, confidently predicting that the legal community will eventually “embrace neuroscientific evidence in weighing when and how to punish people whose brains don’t function normally.”\textsuperscript{242} Noting that Dugan’s legal bills for his sentencing defense “had already approached $1 million,” Kiehl criticized the legal system’s use of the death penalty in cases involving psychopaths.\textsuperscript{243} “I think it is a terrible waste of money,’ Kiehl mused, ‘Maybe as a society we shouldn’t be executing you because you have this [brain] difference.’”\textsuperscript{244}

In post hearing comments, the prosecutor vehemently disagreed, stating, “I don’t think you’ll see [this type of testimony], and when you do, I think it’ll be impeached substantially.”\textsuperscript{245} Indeed, the prosecutor had his own expert, New York psychiatrist Jonathan D. Brodie, testify that Dugan’s brain scan, taken in 2009, could not possibly “show Dugan’s state of mind at the time of the Nicarica killing”\textsuperscript{246} and that “the brain does not dictate behavior . . . . ‘There may be many, many people who also have psychopathic tendencies and have similar scans, who don’t do antisocial behavior, who don’t rape and kill.”\textsuperscript{247} The prosecutor questioned Kiehl’s assertions that psychopaths’ brain abnormalities affect their weighing of the “consequences of their behavior,” calling Kiehl’s testimony “a crock” and arguing that psychopaths “do in fact make choices” and

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\textsuperscript{241} Hagerty, supra note 228. \\
\textsuperscript{242} Haederle, supra note 228. \\
\textsuperscript{243} Haederle, supra note 228. \\
\textsuperscript{244} Haederle, supra note 228. \\
\textsuperscript{245} Haederle, supra note 228. \\
\textsuperscript{246} Haederle, supra note 228. \\
\textsuperscript{247} Hagerty, supra note 228.
\end{flushleft}
Ironically, in 2011 the Governor of Illinois, Pat Quinn, commuted Dugan’s death sentence and signed legislation banning the death penalty in Illinois.249

D. Critiques of fMRI Scans Offered as Mitigating Evidence

The use of neuroimaging in the courtroom, including fMRI scans, obviously has its proponents and detractors. Critics argue that the science of linking brain images to brain abnormalities and criminal behavior is too young and simply not yet “reliable” enough.250 Some scientists argue that neuroscientists cannot, “with scientific integrity . . . convincingly correlate” brain abnormalities with behavior, which is problematic.251 The scientific disagreement about what specific area of the brain causes violence or aggression, or even, whether behavior is “reducible to a unitary function in the brain” is not likely to inspire confidence within the legal system.252

Another complication is that scientists and lawyers have different goals.253 Scientists conduct research, the results of which often conflict, but these necessary conflicts “fuel[s] scientific process.”254 Lawyers, however, support their arguments with the science that best fits their theory; only if the other side, either the defense or the prosecution, points out the conflicts in the science will the “truth . . . emerge.”255

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248 Haederle, supra note 228.
250 Moriaty, supra note 156, at 48.
252 Baskin et al., supra note 251, at 239.
253 Baskin et al., supra note 251, at 240.
254 Baskin et al., supra note 251, at 240.
255 Baskin et al., supra note 251, at 240.
Further, fMRI standards and procedures vary from lab to lab, with each lab having “independently developed the methods and analysis procedures required to acquire and process [that lab’s] functional data.” Without standardized procedures and methods, “expert testimony on [fMRI] scans could differ greatly, with no baseline available to provide clarity to the testimony. One commentator argues that “the evaluation” of neurobiology research “demands conceptual clarity, along with careful analysis of methods and data to prevent misunderstanding and possible abuse of results.”

There are limits to the “objectivity” of neuroimaging. Brain imaging is the product of a complex set of techniques, subjective decisions, technical choices, and informed interpretations. Scientists, technicians, and clinicians decide the level of detail they will use to scan the brain. They must determine what types of imaging should be ordered, how thick or thin the slices should be, the degree of clarity, the difference in contrast between types of tissue, and how the signal should be filtered from background noise . . . . To draw valid conclusions about brain imaging, one must determine whether the imaging technique is sensitive, accurate, reliable, valid, and reproducible. These conclusions also depend on what is being measured and what the measurements mean. A structural MRI scan is unable to accurately predict even the age or gender of a patient. None of these tests (either structural or functional neuroimages) has independent predictive value.

He also expresses concern that “while the brain mediates behavior, it is not clear whether there is or ever will be a linear, identifiable relationship between” the brain and violent behavior. In regards to specific neuroimaging studies done on psychopaths, while acknowledging that the research data is revealing some “consistent anomalies,” the “data from

257 Baskin et al., supra note 251, at 240.
258 Baskin et al., supra note 251, at 239-40.
259 Baskin et al., supra note 251, at 249. “Ultimately, we encounter the same moral and methodological problems predicting violence with neuroimaging as we do trying to predict violence with other clinical instruments.” Id. at
260 Baskin et al., supra note 251, at 240.
the various studies are not uniform and methodological problems exist including recruitment of subject, use of controls, and the social, economical, and biological complexities of violence.”

fMRI scanners also have “inherent [hardware] limitations.” The scanner might not detect less intense brain activity or “scanner noise” might “interfere with brain function” and affect the scanner image. Also, certain types of distortion, including head movement, may affect fMRI images. Further problems include the impact that “changes in other bodily systems” may have on the image, including the use of medications or drugs and potential “anatomical abnormalities among tested individuals,” and “unexplained variability of the signal within brain regions among individuals tested,” which may affect study results.

Others worry that fMRI scans and other neuroimages could unfairly sway a jury; “an interesting neuroimage may be far more impressive to a jury than a neuroscientist’s testimony about frontal lobe deficits.” An fMRI image, along with other neuroimages, “has strong persuasive power;” because of the power of the images, people, including jurors, view the image as a “visual truth” and “perceive[] [the image] as factually correct.”

In fact, researchers at Yale have discovered that “[n]onexperts judge [psychological] explanations with neuroscience information as more satisfying than [psychological] explanations without neuroscience, especially bad [psychological] explanations.”

261 Baskin et al., supra note 251, at 265.
263 Tancredi & Brodie, supra note 262, at 278.
264 Tancredi & Brodie, supra note 262, at 279.
265 Tancredi & Brodie, supra note 262, at 280.
266 Moriatry, supra note 156, at 48.
267 Tancredi & Brodie, supra note 262, at 287.
among other things, that “the powerful visual imagery” produced by brain scans “renders scientific claims more convincing.” They further explain that “the pictures of blobs on brains seduce one into thinking that we can now directly observe psychological processes” and neuroimaging technology has the power to “sway” jurors’ opinions “beyond what the evidence can support.”

Even physicians are seduced by the technology. Physicians, who “are well aware of the complexity of the human body,” often read an fMRI image as “conveyers of objective, authoritative knowledge” and give the image a reverence that it has not yet earned, “in large part because the representation of MRI data in graphic form” is much more impressive and authoritative than data viewed “in numerical form.” If some physicians revere fMRI images in this distorted way, then jurors and others without significant medical knowledge will likely give fMRI images even more respect, a respect that is not hitherto warranted. “[T]he nature of the feedback from neuroimaging - colorful images that can be presented in real time, or moving 3D representations that appear like holograms - is likely to create overconfidence in the technology and the interpretation of its output.”

Commentators have also questioned whether jurors would fully understand the semantics issues involved when an expert compares a “normal” fMRI scan to a “abnormal” scan, e.g., a scan of a psychopath’s brain. In neuroimaging studies, a “normal” image is usually an

269 Weisberg et al., supra note 268, at 476.
270 Weisberg et al., supra note 268, at 476.
271 Weisberg et al., supra note 268, at 477.
273 Marks, supra note 272, at 493.
274 Marks, supra note 272, at 486.
275 Tancredi & Brodie, supra note 262, at 287.
“average or composite image” of “healthy individuals.”  Although the jurors probably will not consciously realize it, the “normal” image is never going to look like the “abnormal” image because the “normal” image will depict someone without the particular brain abnormality depicted in the “abnormal” image. In other words, the significance of the differences in the compared scans is not really as significant as it might seem. Further misconceptions may result because the “healthy” scan may depict the brain of an individual who is “a different age, sex, or racial makeup” than the individual in the “abnormal” scan. No study has conclusively proven that an abnormal fMRI image “relates to a specific set of behaviors”; “just as an abnormal image may not necessarily relate to a brain deficit, a normal image may not necessarily mean there are no deficits in that area of the brain.”

Finally, attorneys should seriously consider whether fMRI scans presented in mitigation would lead a jury down the path of “aggravation.” The personality and behavior of and violence committed by some psychopaths is chilling. Convincing a jury that a defendant’s psychopathy is a mitigating factor might prove difficult. In a telephone survey, interviewers asked community residents to “name someone they believed to be a psychopath;” over 60% of the residents named Ted Bundy, Jeffrey Dahmer, or Charles Manson. Jurors associating these men with a psychopathic defendant would probably not qualify as a mitigating factor in the jurors’ minds.

Other studies have shown that mock jurors view psychopaths “more negatively” and treat them “more severely” than “offenders identified as not mentally ill or identified as having a different type of [mental] disorder (e.g., schizophrenia).” In addition, the studies indicate that

276 Tancredi & Brodie, supra note 262, at 287.
277 Tancredi & Brodie, supra note 262, at 287.
278 Tancredi & Brodie, supra note 262, at 287.
279 Tancredi & Brodie, supra note 262, at 288.
280 Edens & Patrila, supra note 198, at 582.
mock jurors are more likely to support a sentence of death when they associate the defendant as “exhibiting psychopathic traits,” and that they are not dissuaded by other “testimony” or “case information.”

Some courts have even branded brain damage evidence as a “double-edged sword”; while this evidence may “diminish [a defendant’s] blameworthiness for his crime,” it may also indicate “a probability that he will be dangerous in the future,” which is often presented as a factor in aggravation in death penalty sentencing cases. Attorneys presenting fMRI evidence for mitigating purposes should consider whether the prosecution could offer the same evidence for aggravating purposes. Such strategic decisions may expose attorneys to “ineffective assistance of counsel” claims.

V. CONCLUSION

The deck is largely stacked against attorneys representing psychopathic offenders at death penalty sentencing hearings. Psychopaths possess few likeable personality traits, are commonly perceived as disturbed and extremely dangerous, and usually lack the personal relationships that might produce some mitigating testimony. Therefore, despite the problems associated with neuroscience and neuroimaging, the positive impact that a neuroscientist’s testimony coupled with a colorful fMRI scan might have on a death penalty jury is a defense strategy worth pursuing. Prosecutors, however, must prepare for a detailed cross-examination of the expert; doing so will help explain, correct, and dilute a neuroscientist’s fMRI based testimony. Finally, judges, who legally must allow great latitude to the defendant to present


282 Barth, supra note 281, at 511. However, Barth also cites Callins v. Collins, 998 F.2d 269, 278 (5th Cir. 1993), noting that “the Fifth Circuit rejected defendant’s claim of ineffective assistance of counsel based on counsel’s failure to investigate mitigating evidence because it ‘cut[] both ways,’ and thus did not establish prejudice.” Id. at 512.
mitigating evidence, should nevertheless, ensure that neuroscience testimony based on fMRI images does not confuse or mislead jurors.