

The Criminal Brain: Frontal Lobe Dysfunction Evidence in Capital Proceedings

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I. Introduction

Something was wrong with the 40-year-old schoolteacher from Virginia.¹ From all outward appearances he seemed to be living a completely normal life.² What others did not know was that he had begun collecting child pornography, soliciting prostitutes, and making sexual advances toward his stepdaughter.³ Eventually his wife found out and he was ordered either to complete a Sexaholics Anonymous program or face jail time.⁴ Despite the threat of jail time, he failed the program because he could not stop himself from asking the other members for sexual favors.⁵ The night before he was scheduled for sentencing, the man went to a hospital and complained of severe headaches.⁶ During his hospitalization the man continued acting out and even propositioned nurses.⁷ Doctors performed a neurologic exam and discovered a large brain tumor displacing his orbitofrontal lobe.⁸ After the tumor was removed, the deviant urges subsided and he was allowed to return home.⁹

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1. Jeffrey M. Burns, M.D. & Russell H. Swerdlow, M.D., *Right Orbitofrontal Tumor With Pedophilia Symptom and Constructional Apraxia Sign*, 60 ARCHIVES OF NEUROL. 437, 437–38 (2003).

2. *Id.* at 437.

3. *Id.*

4. *Id.*

5. *Id.*

6. *Id.*

7. *Crimes Against Children: Pedophilia*, 2ND SIGHT MAGAZINE (July 28, 2003), at <http://secondsightresearch.tripod.com/zine/id56.html>.

8. Burns & Swerdlow, *supra* note 1, at 438.

9. *Id.*

Approximately one year later, the headaches returned and the man once again began collecting pornography.¹⁰ Brain scans revealed that the tumor had begun to regrow and surgery was once again necessary.¹¹ Just like the first time, the tumor was removed and the deviant behavior ceased.¹² Doctors concluded that the tumor was preventing the frontal lobes from functioning properly and was thereby causing the sociopathic behavior.¹³ Apparently, the tumor both stimulated the sexual urges and prevented the man from controlling his impulses to act on the urges.¹⁴

The implications of this discovery have the potential to alter much of what we know about the human brain and criminality. Albeit an extreme example, the case of the Virginia schoolteacher highlights the well documented connection between criminal behavior and brain dysfunction.¹⁵ In particular, studies show that the frontal lobes are instrumental in regulating socially appropriate behavior.¹⁶ If the frontal lobes are damaged, an individual may lose the ability to control abnormal impulses.¹⁷ Thus, a frontally damaged individual is more likely to commit “criminal” acts because his ability to judge situations and act appropriately has been compromised.

Despite the scientific evidence, the legal system has in large part failed to address the implications of frontal lobe dysfunction in the criminal process. Frontal lobe dysfunction does not fit neatly into either a diminished capacity or an insanity defense. The strongest use for evidence of frontal lobe dysfunction is in the mitigation context. As the scientific evidence regarding the effects of frontal lobe dysfunction grows, more lawyers will begin to present frontal lobe dysfunction defenses. Courts will be forced to address the effect of such evidence on the capital sentencing process. The United States Supreme Court has

10. *Id.*

11. *Id.*

12. *Crimes Against Children*, *supra* note 7.

13. Burns & Swerdlow, *supra* note 1, at 437.

14. Chris Kahn, *Doctors Home in on the Site of Evil in the Brain*, CAPE ARGUS, ¶¶ 6, 8 (July 30, 2003), <http://capeargus.co.za/index.php?fSectionId=342&fArticleId=198818> (stating that it was “possible the tumour released some pre-existing urges” causing the man to “lose[] the ability to control impulses”).

15. See Renato M.E. Sabbatini, *The Psychopath's Brain: Tormented Souls, Diseased Brains*, BRAIN & MIND, ¶ 2 (1998), at http://www.epub.org.br/cm/n07/doencas/disease_i.htm (stating that “[m]any studies have shown in the last 20 years that murderers and ultraviolent criminals have a startling evidence of brain disease”).

16. See Ned Potter, *Similar Patterns Seen in Murderers' Brains*, ¶ 7, at http://www.preventdisease.com/news/articles/unique_patterns_murders_brains.shtml (last visited Mar. 18, 2004) (discussing how the frontal lobes are responsible for controlling impulses and drives).

17. See *id.* ¶ 8 (stating that the frontal lobes of violent criminals often show signs of serious damage).

held that it is cruel and unusual punishment to execute mentally retarded individuals because their ability to reason and control urges is compromised.¹⁸ Individuals with frontal lobe dysfunction lack “the ability to control impulses or anticipate the consequences of choices.”¹⁹ Some death penalty experts believe that the natural extension of the Supreme Court’s decision would be to render people with brain dysfunction death-ineligible.²⁰

This article discusses the effect of frontal lobe dysfunction on behavior and the most effective use of such evidence in a capital murder case. Part II will examine the scientific aspects of frontal lobe dysfunction including, the symptoms and the relationship between dysfunction and criminality. Part III will explain the ways in which frontal lobe damage may be used as a valid defensive posture in a capital murder case. In particular, this Part will examine the use of frontal lobe dysfunction evidence in a diminished capacity defense, in an insanity defense, and as mitigating evidence during sentencing proceedings. Finally, Part IV will discuss how defense counsel can effectively explain frontal lobe dysfunction to the jury without offending individual notions of free will and morality.

II. Scientific Analysis

A. The Frontal Lobes: Anatomy and Functions

Before successfully developing a defense based on frontal lobe dysfunction, a lawyer must first know what the frontal lobes are and how they function. The frontal lobes make up approximately “one-third of the surface of each hemisphere including the motor cortex.”²¹ They are generally considered to consist of three overlapping regions known as the cingulate gyrus, the dorsolateral region, and the orbital frontal lobe.²² The frontal lobes are located at the anterior of the skull behind the forehead.²³ Although the areas overlap, they are clearly distinct anatomical regions responsible for controlling separate functions.²⁴ One

18. See *Atkins v. Virginia*, 536 U.S. 304, 321 (2002) (holding that the execution of a mentally retarded person violates the Eighth Amendment ban on cruel and unusual punishment).

19. See Kahn, *supra* note 14, ¶ 8.

20. *Id.* ¶ 13.

21. Andrew Kertesz, *Language and the Frontal Lobes*, in *THE HUMAN FRONTAL LOBES: FUNCTIONS AND DISORDERS* 261, 261 (Bruce L. Miller & Jeffrey L. Cummings eds., 1999).

22. JONATHAN H. PINCUS, M.D., *BASE INSTINCTS: WHAT MAKES KILLERS KILL?* 238 n.1 (2001) [hereinafter PINCUS, *Base Instincts*]. The cingulate gyrus is shaped like a “C” and extends from the front of the brain, along the middle, to the back of the brain. *Id.* The dorsolateral region is near the temples, and the orbital frontal lobe lays at the front of the brain above the eyes. *Id.*

23. *Id.*

24. See Daniel I. Kaufer & David A. Lewis, *Frontal Lobe Anatomy and Cortical Connectivity*, in *THE HUMAN FRONTAL LOBES: FUNCTIONS AND DISORDERS*, *supra* note 21, at 27, 27 (discussing the multiple regions and circuits comprising the frontal lobes of the brain).

way to conceptualize how the frontal lobes work is by looking at their relationship to the rest of the brain. One scholar has discussed this relationship by stating that if the brain were an aircraft then the frontal lobes would be the pilot.²⁵ Like a plane, the brain is a complex “machine” that needs the guidance and control of the frontal lobes in order to function properly.²⁶ The primary role of the frontal lobes is to mediate what are commonly referred to as our “executive functions.”²⁷ These functions include the ability to plan, make judgments, and behave accordingly.²⁸ The frontal lobes control these higher level cognitive functions. The prefrontal, or orbitofrontal, cortex “mediates empathic, civil, and socially appropriate behavior; personality change is the hallmark of orbitofrontal dysfunction.”²⁹ It is this area of the frontal lobes which is most frequently the subject of studies examining the relationship between frontal lobe dysfunction and criminal activity.³⁰

B. Dysfunction

1. Causes

In order to recognize a possible defense based on frontal lobe dysfunction, lawyers must be aware of the various types of disorders which affect brain functioning. Frontal lobe dysfunction is most commonly caused by some sort of trauma to the head. Because the frontal lobes are located at the front of the skull, they are particularly susceptible to closed head trauma.³¹ One cause of closed head trauma is the “sudden forces of acceleration/deceleration exerted upon [the] skull” during automobile accidents.³² It is not uncommon for accident victims to suffer “mild frontal lobe dysfunction” from this type of injury.³³ In addition, many people involved in car accidents do not realize that they may

25. GOOD SAMARITAN CENTER FOR CONTINUING REHABILITATION, FRONTAL LOBE INJURY 1, at <http://www.biawa.org/pax/generic/Frontal%20Lobe%20Injury.doc> (last visited Jan. 28, 2004).

26. *Id.*

27. PINCUS, *Base Instincts*, *supra* note 22, at 233 n.6.

28. *Id.*

29. Tiffany W. Chow & Jeffrey L. Cummings, *Frontal-Subcortical Circuits*, in THE HUMAN FRONTAL LOBES: FUNCTIONS AND DISORDERS, *supra* note 21, at 3, 6.

30. See generally Leonard Abel, *PET Study: Looking Inside The Minds of Murderers*, 1 CRIME TIMES 1 (1995), at <http://216.117.159.91/crimetimes/95a/w95ap1.htm> (relating the results of a study linking prefrontal lobe dysfunction to criminal behavior).

31. See Bruce Peterson, *Mild Frontal Lobe Dysfunction: The Solicitors Contribution to Medico-Legal Assessments*, 20 QUEENSL. L. SOC'Y J. 53, 55 (1990) (addressing the role lawyers should play in identifying frontal lobe dysfunction).

32. *Id.* at 54.

33. *Id.* at 53–54.

have suffered frontal lobe damage. Accident victims may notice abnormal behavior but mistakenly attribute such behavior to “emotional instability or inability to cope” with the accident.³⁴ It is important for lawyers to examine their clients’ history to uncover car accidents or other possible causes of trauma to the brain. Periods of unconsciousness or amnesia are good indicators that an accident may have been severe enough to have caused frontal lobe damage.³⁵

Frontal lobe dysfunction can also result from disease. Cerebrovascular disease, a condition affecting blood vessels in the brain, can cause strokes or hemorrhages that damage the frontal lobes.³⁶ Frontotemporal dementias, commonly seen in aging adults, are characterized by a degeneration of the frontal lobes.³⁷ Acquired diseases, like Creutzfeldt-Jakob disease, herpes-related encephalitis, Human Immunodeficiency Virus, and Lyme Disease also may affect frontal lobe functioning.³⁸ As discussed in the case of the Virginia schoolteacher, brain tumors can cause frontal lobe dysfunction.³⁹ By reviewing a client’s medical history, defense counsel may uncover a possible cause of frontal lobe dysfunction resulting from these conditions or other similar diseases.

2. Symptoms

Frontal lobe dysfunction is characterized by both cognitive and behavioral deficits. Depending on which regions of the frontal lobe are damaged, different symptoms can occur.⁴⁰ Damage to the prefrontal cortex is generally associated with behavioral changes; damage to the dorsolateral region results in cognitive dysfunction.⁴¹ Common cognitive disturbances include problems with memory, motor skills, spatial processing, attention, verbal fluency, and concentration.⁴²

34. *Id.* at 54.

35. *Id.*

36. Helena Chui & Lee Willis, *Vascular Disease of the Frontal Lobes*, in *THE HUMAN FRONTAL LOBES: FUNCTIONS AND DISORDERS*, *supra* note 21, at 370, 378–79.

37. Arne Brun & Lars Gustafson, *Clinical and Pathological Aspects of Frontotemporal Dementia*, in *THE HUMAN FRONTAL LOBES: FUNCTIONS AND DISORDERS*, *supra* note 21, at 346, 350.

38. Douglas W. Scharre, *Infectious, Inflammatory, and Demyelinating Disorders of the Frontal Lobes*, in *THE HUMAN FRONTAL LOBES: FUNCTIONS AND DISORDERS*, *supra* note 21, at 461, 461–62.

39. *See* Burns & Swerdlow, *supra* note 1, at 438 (stating that the patient’s tumor “displac[ed] the right orbitofrontal cortex and distort[ed] the dorsolateral prefrontal cortex”); Tomoko Y. Nakawatase, *Frontal Lobe Tumors*, in *THE HUMAN FRONTAL LOBES: FUNCTIONS AND DISORDERS*, *supra* note 21, at 436, 436 (discussing the types of frontal lobe tumors, their manifestations, and diagnosis techniques).

40. Scharre, *supra* note 38, at 461.

41. *See* Ellen Perelman, *Consciousness and the Meta-Functions of the Frontal Lobes: Setting the Stage*, in *THE HUMAN FRONTAL LOBES REVISITED* 1, 1 (Ellen Perelman ed. 1987) (explaining the role the frontal lobes play in cognitive, intellectual, and behavioral functions).

42. *Id.*; *see* Susan E. McPherson & Jeffrey L. Cummings, *The Neuropsychology of the Frontal Lobes*,

Many behavioral deficits resulting from damage to the prefrontal region are associated with a disruption of the “executive functions.”⁴³ “Executive functions are comprised of four principal neuropsychological components: (1) goal formulation, (2) planning, (3) carrying out goal-directed behaviour, and (4) the ability to monitor effective performance.”⁴⁴ Perhaps the most notable behavioral effect of frontal lobe dysfunction is personality change.⁴⁵ Frontally damaged individuals often display marked apathy, tactlessness, impulsivity, irritability, and the inability to “empathize with the feelings of others.”⁴⁶ Some researchers refer to “emotional blunting” to describe the apathetic attitude associated with frontal lobe dysfunction.⁴⁷ On the other end of the spectrum, damage to the frontal lobes can cause disinhibited or pseudopsychopathic behavior.⁴⁸ Because the frontal lobes regulate the abilities to control impulses, to reason, and to make socially responsible judgments, damage to the frontal lobes is a significant cause of violent and aggressive behavior.⁴⁹ If those areas fail to function properly, a person may act impulsively and inappropriately. The associated inability to act in a “civilized” manner often results in increased criminality.⁵⁰

Characteristics such as failure in school, unemployment, and poverty are frequently associated with prefrontal abnormalities.⁵¹ Some studies “suggest that prefrontal cortex dysfunction may interact with environmental, social, and psychological influences, leading to criminal behavior.”⁵² In addition, the manifestation of these types of indicators may be helpful in determining the point at which the frontal lobe disorder developed. An adult who exhibits “recurrent impulsive, aggressive, and antisocial behaviour” may have suffered

in DISORDERS OF BRAIN AND MIND 11, 13, 19 (Maria A. Ron & Anthony S. David eds. 1998) (listing the tests used to assess cognitive and behavioral ability).

43. McPherson & Cummings, *supra* note 42, at 16.

44. *Id.*

45. *Id.* at 19.

46. See Chow & Cummings, *supra* note 29, at 6–7 (describing the behavioral changes associated with orbitofrontal dysfunction).

47. Michael H. Thimble, *Psychopathology of Frontal Lobe Syndromes*, ¶ 7, at <http://www.ect.org/effects/lobe.html> (1990).

48. Chow & Cummings, *supra* note 29, at 6–7.

49. See Jonathan H. Pincus, *Aggression, Criminality, and the Frontal Lobes*, in THE HUMAN FRONTAL LOBES: FUNCTIONS AND DISORDERS, *supra* note 21, at 547, 547–49 [hereinafter Pincus, *Aggression*] (discussing a study involving murderers and the link between frontal lobe damage and criminality).

50. See Abel, *supra* note 30, at 1 (discussing the possibility that the frontal lobes “may function very differently in murderers than in the rest of us”).

51. *Id.*

52. *Id.*

from organic brain disorder since early childhood.⁵³ If, however, the behavioral and cognitive indicators cannot be traced throughout the patient's history, then it is more likely that the brain dysfunction resulted from trauma or disease.

3. Testing

There are various techniques available that enable doctors to determine if someone is suffering from brain tumors or other forms of frontal lobe dysfunction. Initially, brain abnormalities are indicated by a patient's particular symptoms and prior medical history. A general neurological exam that evaluates a patient's eye movement, hearing, reflexes, sensation, balance, and coordination is useful in detecting brain tumors.⁵⁴ After performing a preliminary neurological exam, doctors will turn to more advanced imaging techniques. A computed tomography ("CT") scan uses x-rays and sometimes iodine dye to produce an image of the patient's brain.⁵⁵ Magnetic resonance imaging ("MRI") takes pictures at different angles so doctors can see three dimensional images.⁵⁶ MRIs are the preferred test for distinguishing between healthy and diseased tissue and are useful in detecting increases or decreases in "overall prefrontal grey matter volume."⁵⁷ Positron emission tomography ("PET") scans are different from CT scans or MRIs in that they show metabolic activity rather than brain structure.⁵⁸ To perform a PET scan, doctors inject either sugar or an amino acid that contains a radioactive tracer, and the scan measures the levels of the injected agents in the brain.⁵⁹ PET scans are better than other tests at detecting recurrent tumors and distinguishing between benign and malignant tumors.⁶⁰ If the test detects a tumor, surgeons perform a biopsy in order to examine the cells and make a precise diagnosis.⁶¹ PET scans can also detect non-tumor related frontal

53. See M.C. Brower & B.H. Price, *Neuropsychiatry of Frontal Lobe Dysfunction in Violent and Criminal Behaviour: A Critical Review*, 71 J. NEUROL. NEUROSURG. & PSYCHIATRY 720, 721 (2001) (discussing the relationship between criminal behavior and frontal lobe dysfunction), <http://jnnp.bmjournals.com/cgi/reprint/71/6/720.pdf>.

54. See THE BRAIN TUMOR SOC'Y, HOW ARE BRAIN TUMORS DIAGNOSED, ¶ 2, at http://www.tbts.org/virtual_html/diagnose.htm (last visited Mar. 18, 2004) (discussing the various methods used to diagnose brain tumors).

55. *Id.* ¶ 5.

56. *Id.* Unlike a CT scan, MRIs do not use radiation and take better pictures of tumors on or near bone. *Id.* ¶ 6.

57. See Brower & Price, *supra* note 53, at 723 (discussing the ability of an MRI to detect "frontal grey matter reductions").

58. THE BRAIN TUMOR SOC'Y, *supra* note 54, ¶ 7.

59. *Id.*

60. *Id.*

61. *Id.* ¶ 8.

lobe dysfunction by measuring blood flow and metabolic changes.⁶² An electroencephalogram (“EEG”) uses electrodes to measure electrical impulses in the brain.⁶³ EEGs are an important tool in detecting structural brain abnormalities by measuring brain activity levels.⁶⁴

Other types of diagnostic tools can be used to detect more specific frontal lobe dysfunction. Both the Stroop Interference Test and the Wisconsin Card Sorting Test can be used to assess an individual’s frontal lobe functioning.⁶⁵ Neuropsychological testing can be particularly helpful at indicating specific orbitofrontal dysfunction.⁶⁶ The Iowa Gambling Task tests a subject’s ability to make safe and ultimately profitable decisions by delaying reward for the ultimate good.⁶⁷ Frontally damaged individuals fare poorly on this test due to their propensity to seek instant gratification.⁶⁸

Frontal lobe dysfunction often goes undiagnosed because the symptomatology is similar to personality disorders.⁶⁹ It is common for frontally damaged individuals to be diagnosed with Attention Deficit Hyperactivity Disorder (“ADHD”), Antisocial Personality Disorder (“APD”), and Obsessive Compulsive Disorder (“OCD”).⁷⁰ Lawyers often accept a diagnosis of personality disorder after a psychological examination and fail to pursue further testing.⁷¹

62. See Brower & Price, *supra* note 53, at 723–24 (describing a study that used PET scans to show decreased “cortical blood flow or metabolism” corresponding to violent behavior).

63. See generally *Medline Plus Medical Encyclopedia: EEG*, Medline Plus, at <http://www.nlm.nih.gov/medlineplus/ency/article/003931.htm> (Nov. 14, 2002) (explaining the use of EEGs).

64. *Id.*; see Brower & Price, *supra* note 53, at 722 (discussing clinical findings regarding the occurrence of abnormal EEGs in individuals who exhibit violent or criminal behavior).

65. Burns & Swerdlow, *supra* note 1, at 440.

66. *Id.*

67. *Id.*

68. *Id.* The test involves four decks of cards containing cards that offer either a financial gain or loss. *Id.* Two decks contain a few cards that result in substantial payoffs, but overall leave a player in debt. *Id.* The other two decks provide more modest gains or losses, but if a player chooses from these decks he will incur a net financial gain. *Id.* “This paradigm can distinguish individuals with orbitofrontal dysfunction from control individuals because it is difficult for orbitofrontal-damaged subjects to restrain their exploration of the riskier, disadvantageous decks.” *Id.*

69. See PINCUS, *Base Instincts*, *supra* note 22, at 78 (stating that “[a]lmost all of the symptoms associated with antisocial personality disorder can also be manifestations of frontal damage (impulsiveness, poor work history, aggressiveness, recklessness, little ability to foresee consequences, limited insight, limited remorse, indifference, lack of empathy, irresponsibility)”).

70. *Id.*; see Brower & Price, *supra* note 53, at 721 (discussing the association between ADHD and prefrontal dysfunction); ELKHONON GOLDBERG, *THE EXECUTIVE BRAIN: FRONTAL LOBES AND THE CIVILIZED MIND* 130 (2001) (discussing the implication of frontal lobe dysfunction in OCD).

71. For a more complete discussion of the problems incurred by labeling defendants as

This problem is compounded by the fact that frontally damaged individuals regularly display no change on I.Q. tests.⁷² Thus, an examiner may not suspect brain damage or dysfunction because the subject's cognitive abilities appear to be intact.⁷³ The danger with such diagnoses is that they ignore a possible *cause* for the antisocial behavior. A thorough assessment is necessary to reveal whether antisocial behavior is a result of frontal lobe dysfunction or simply indicative of APD.

Frontal lobe disorder can also resemble the symptoms of schizophrenia.⁷⁴ Research indicates that schizophrenics exhibit abnormal frontal lobe functioning.⁷⁵ Both frontally damaged individuals and schizophrenics display "affective changes, impaired motivation, [and] poor insight."⁷⁶ Numerous diagnostic tests reveal that the frontal lobes of schizophrenic patients have marked abnormalities.⁷⁷ "These findings emphasize the importance of neurologic and neuropsychologic investigation of patients with schizophrenia, using methods that may uncover underlying frontal lobe disturbances, and the important role that frontal lobe dysfunction may play in the development of schizophrenic symptoms."⁷⁸

Thorough testing is necessary to determine whether a defendant is suffering from frontal lobe dysfunction. An examination of the defendant's history is essential to a proper diagnosis. In addition, disorders with similar manifestations, such as personality disorders and schizophrenia, must be ruled out with proper neurological testing. Lawyers should pay particular attention to diagnoses of personality disorder and consider additional testing in such cases.⁷⁹

having personality disorders *see*, Terrence T. Eglund, Case Note, 16 CAP. DEF. J. 487 (2004) (analyzing Tucker v. Ozmint, 350 F.3d 433 (4th Cir. 2003)).

72. PINCUS, *Base Instincts*, *supra* note 22, at 78.

73. *See id.* (discussing the misdiagnosis of a defendant with frontal lobe dysfunction).

74. *See* Thimble, *supra* note 47, ¶ 14.

75. *Id.*

76. *Id.*

77. *Id.* These abnormalities have been documented "in neuropathologic studies, in EEG studies, in radiologic studies using CT measure, with MRI, and in cerebral blood flow (CBF) studies . . . [and] in several studies using positron emission tomography (PET)." (internal citations omitted). *Id.*

78. *Id.*

79. Lawyers should be aware that a diagnosis of personality disorder is dependent upon whether or not the individual exhibited symptoms during childhood through adulthood. *See* AM. PSYCHIATRIC ASS'N, DIAGNOSTIC AND STATISTICAL MANUAL OF MENTAL DISORDERS, 645 (4th ed. 1994) [hereinafter APA] (stating that APD is characterized by a "pervasive pattern of disregard . . . that begins in childhood or early adolescence and continues into adulthood"). Thus, if a defendant only recently developed antisocial behaviors, lawyers should attempt to isolate the cause and reject a diagnosis of APD.

C. Case Studies

The 19th century case of Phineas Gage (“Gage”) exemplifies the unique effect frontal lobe damage has on personality and morality.⁸⁰ Gage was the foreman of a crew hired to lay railroad tracks in Maine and was responsible for handling the gunpowder used to blast rock.⁸¹ While setting up the blasting powder, a premature explosion drove an iron bar through his head.⁸² Although the rod shot directly through Gage’s frontal lobes, he survived.⁸³ However, Gage’s injuries went well beyond the observable physical damage. Most notably, the injury caused extreme changes in Gage’s personality and judgment while leaving his cognitive abilities intact; although Gage could “walk, talk, read, write, calculate, and remember . . . [h]e had become immoral and unethical.”⁸⁴ He “changed from a smart and energetic worker and a well-balanced man to a fitful, irreverent man who was unemployable and indulged in gross profanity publicly.”⁸⁵ Gage’s case is a striking example of the interconnection between frontal lobe dysfunction and severe behavioral deficits. In and of themselves, Gage’s symptoms resemble what would today be labeled as APD.⁸⁶ However, the fact that these extreme personality changes were caused by isolated trauma to the frontal lobes signified to researchers that apparent personality disorders may in fact have an organic component. Gage’s case is important because it suggests that a person who acts immorally may in fact be suffering from brain dysfunction.

Personality changes are also heavily documented in soldiers who have sustained frontal lobe injuries.⁸⁷ Studies of war veterans reveal a strong correlation between head injury and aggressive, antisocial behavior.⁸⁸ Data collected by German researchers following the first and second World Wars shows a significant connection between “orbitofrontal lesions and subsequent antisocial behav-

80. See Cheryl L. Grady, *Neuroimaging and Activation of the Frontal Lobes*, in THE HUMAN FRONTAL LOBES: FUNCTIONS AND DISORDERS, *supra* note 21, at 196, 197 (discussing the famous case of Phineas Gage); PINCUS, *Base Instincts*, *supra* note 22, at 75 (recounting the story of Phineas Gage).

81. PINCUS, *Base Instincts*, *supra* note 22, at 75.

82. *Id.*; Seth M. Weingarten, *Psychosurgery*, in THE HUMAN FRONTAL LOBES: FUNCTIONS AND DISORDERS, *supra* note 21, at 446.

83. PINCUS, *Base Instincts*, *supra* note 22, at 75.

84. *Id.*

85. Weingarten, *supra* note 82, at 446.

86. PINCUS, *Base Instincts*, *supra* note 22, at 75.

87. Weingarten, *supra* note 82, at 446; see Brower & Price, *supra* note 53, at 721 (describing the connection between antisocial behavior and frontal lobe injuries in veterans of the first and second World Wars).

88. Brower & Price, *supra* note 53, at 721.

ious.”⁸⁹ Similarly, the Vietnam Head Injury Study found that frontally damaged individuals exhibited higher rates of aggressive, violent, and antisocial behavior than subjects without frontal lobe injuries.⁹⁰ Soldiers who suffered frontal lobe trauma were more likely to steal, get involved in physical altercations, and make inappropriate sexual advances or comments.⁹¹

Other studies have revealed how trauma or disease can cause “acquired sociopathy” in adult subjects.⁹² In the case of the Virginia schoolteacher, a tumor was responsible for causing the man to develop pedophilia.⁹³ Adult onset frontal lobe damage often leaves “previously established moral development” intact while destroying impulse control and judgment.⁹⁴ Thus, the individual remains acutely aware of the immorality of his behavior, yet is unable to control the sociopathic impulses. In addition, studies show that these types of frontally damaged individuals may also “display marked deficits in real life tasks demanding judgment, awareness of socially appropriate conduct, and the capacity to assess future consequences” while only showing “minimal impairments on standard neuropsychological tests of intelligence.”⁹⁵ Thus, frontal lobe damage may cause behavioral changes without disrupting a person’s intellectual capacity.

One of the most famous studies concerning the connection between brain functioning and criminal behavior was conducted in the 1990's by Adrian Raine (“Raine”).⁹⁶ Raine examined the PET scans of 41 individuals convicted of either murder or manslaughter.⁹⁷ When compared with the brain scans of control groups, the scans of the “murderers” showed significant metabolic decreases in the frontal lobes.⁹⁸ Unlike the high levels of frontal lobe activity in the control group, the killers’ frontal lobes were noticeably inactive.⁹⁹ Raine further separated the “murderers” into two groups depending on the nature of the killing.¹⁰⁰ The first group, labeled “predatory” killers, was comprised of subjects who acted

89. *Id.*

90. *Id.*

91. *Id.*

92. *Id.*

93. *See* Burns & Swerdlow, *supra* note 1, at 437 (describing the patient’s “acquired sociopathy”).

94. *Id.* at 438–39.

95. Brower & Price, *supra* note 53, at 721.

96. Potter, *supra* note 16, ¶ 2 (citing Adrian Raine et al., *Brain Abnormalities in Murderers Indicated by Positron Emission Tomography*, 42 *BIOLOGY & PSYCHIATRY* 495 (1997)).

97. Brower & Price, *supra* note 53, at 724, 726 n.59.

98. *Id.*

99. Potter, *supra* note 16, ¶¶ 4–5.

100. Brower & Price, *supra* note 53, at 724.

with “controlled, purposeful aggression to achieve a desired goal.”¹⁰¹ The second group, labeled “affective” killers, was comprised of individuals whose crimes were characterized by “impulsive, emotionally charged aggression.”¹⁰² Tests revealed that the “affective” group exhibited low prefrontal activity, while the “predatory” group’s activity level was similar to the control group.¹⁰³ Thus, the study shows “a strong association between increased aggression and reduced prefrontal cortical size or activity.”¹⁰⁴ These brain scans are positive evidence that frontal lobe deficits are associated with impulsive, rather than purposeful, violent crimes. Raine’s studies suggest that “murderers” who act in an impulsive, uncontrolled manner, may in fact be suffering from significant frontal lobe dysfunction.¹⁰⁵

III. *Building a Defense*

There are three ways in which evidence of frontal lobe dysfunction can be used in a capital proceeding. During the guilt/innocence phase, evidence of frontal lobe disorder may establish diminished capacity or form the basis for an insanity defense. If frontal lobe evidence is rejected as a defense, or if it is accepted but the defendant is found guilty nonetheless, it can be useful as mitigation evidence at the penalty phase. Using Virginia law as an example, this section addresses the potential obstacles to admission of frontal lobe evidence and the best ways to surmount those obstacles.

A. *Diminished Capacity*

Evidence of diminished capacity is used to establish that the defendant’s mental condition prevented him from forming the mens rea necessary to commit the crime charged.¹⁰⁶ In order to convict a defendant of capital murder, the Commonwealth must establish that the killing was “willful, deliberate, and

101. *Id.*

102. *Id.*

103. *Id.*

104. *Id.*

105. *See id.* (stating that “clinically significant frontal lobe dysfunction is associated with aggressive dyscontrol”).

106. *See* ROGER D. GROOT, CRIMINAL OFFENSES AND DEFENSES IN VIRGINIA 467–68 (West 2004 Virginia Practice Series) (quoting *Dejarnette v. Commonwealth*, 75 Va. 867, 880–81 (Va. 1881)). In *Dejarnette*, the court stated:

[T]here are, doubtless, cases in which, whilst the prisoner may not be insane, in the sense which exempts from punishment, yet he may be in that condition from partial aberration or infebblement of intellect which renders him incapable of sedate, deliberate and specific intent necessary to constitute murder in the first degree.

Dejarnette, 75 Va. at 880–81.

premeditated” and must additionally prove at least one elevating fact.¹⁰⁷ In capital cases, diminished capacity evidence functions by negating the existence of premeditation and deliberation.¹⁰⁸ A successful diminished capacity defense can reduce capital murder to second-degree non-premeditated murder.¹⁰⁹

In *Stamper v. Commonwealth*¹¹⁰ the Supreme Court of Virginia explicitly rejected the use of any mental state evidence, short of insanity, to establish a diminished capacity defense.¹¹¹ The court stated that the “fundamental reason for the exclusion of such evidence” was that:

The state of knowledge in the fields of medicine and psychiatry is subject to constant advance and change. The classifications and gradations applied to mental illnesses, disorders, and defects are frequently revised. The courts cannot, and should not, become dependent upon these subtle and shifting gradations for the resolution of each specific case.¹¹²

The court firmly set the dividing line for criminal responsibility at the legal standard for sanity and held that “[t]he shifting and subtle gradations of mental illness known to psychiatry are useful only in determining whether the borderline of insanity has been crossed.”¹¹³

Five years later, the Supreme Court of Virginia confirmed its holding in *Stamper* when it decided *Smith v. Commonwealth*.¹¹⁴ In *Smith*, the defendant sought to admit expert testimony that he suffered from “alcohol dependence and from a borderline personality disorder.”¹¹⁵ Smith’s expert contended that the defendant’s personality disorder had prevented him from “hav[ing] the capacity to follow through on his intentions.”¹¹⁶ Smith argued that the trial court should have admitted the expert’s testimony because it was relevant to premeditation.¹¹⁷ In addition, Smith contended that *Stamper* was inapplicable because it involved

107. See VA. CODE ANN. § 18.2-31 (Michie Supp. 2003) (listing the offenses that constitute capital murder).

108. GROOT, *supra* note 106, at 468.

109. *Id.*

110. 324 S.E.2d 682 (Va. 1985).

111. See *Stamper v. Commonwealth*, 324 S.E.2d 682, 688 (Va. 1985) (declining to adopt a diminished capacity defense).

112. *Id.*

113. *Id.* The court stated that “[f]or the purposes of determining criminal responsibility a perpetrator is either legally insane or sane; there is no sliding scale of insanity.” *Id.*

114. *Smith v. Commonwealth*, 389 S.E.2d 871, 879–80 (Va. 1990).

115. *Id.* at 879.

116. *Id.*

117. *Id.* The expert stated that Smith “had the ability to form intentions and to premeditate” despite his inability to follow through with such intentions. *Id.*

a drug offense as opposed to a capital murder charge.¹¹⁸ “Under Virginia law, Smith says, it is clear that ‘there exists a defense available only to capital or first degree murder cases and not to any other offense.’”¹¹⁹ The defense argued that if evidence of voluntary intoxication is admissible to negate premeditation, evidence of Smith’s inability to premeditate should likewise be admissible.¹²⁰ Despite Smith’s assertion, the Supreme Court of Virginia adhered to its decision in *Stamper* and held that the mental functioning evidence was inadmissible.¹²¹

In 1999, the Supreme Court of Virginia again applied the rationale of *Stamper* to uphold the trial court’s exclusion of mental state evidence.¹²² In *Peeples v. Commonwealth*,¹²³ the defendant sought to admit expert testimony “that he was likely to interpret social situations differently than most people, that he had problems with impulse control, and that he was likely to jump to conclusions.”¹²⁴ Both the trial court and the Supreme Court of Virginia rejected the defendant’s arguments that his mental disability proved he acted in the heat of passion or, alternatively, in self defense.¹²⁵ Relying on *Stamper*, the court stated that “[a]n opinion that the defendant suffered a mental disability that rendered him vulnerable to misunderstanding a social situation is the type of gradation or classification of the defendant’s mental state too subtle and shifting to form the basis for excusing his use of deadly force.”¹²⁶

The holdings in *Stamper*, *Smith*, and *Peeples* appear to prohibit the use of frontal lobe dysfunction evidence to establish a diminished capacity defense in Virginia. However, Smith’s voluntary intoxication argument reveals a possible avenue through which frontal lobe dysfunction evidence might be admissible to establish diminished capacity. The Supreme Court of Virginia has allowed the admission of voluntary intoxication evidence in murder cases to negate premeditation and deliberation.¹²⁷ Despite the Supreme Court of Virginia’s apparent ban on mental state evidence for non-insanity defenses, voluntary intoxication is

118. *Id.* at 880.

119. *Id.*

120. *Smith*, 389 S.E.2d at 880.

121. *Id.* at 879–80.

122. *See Peeples v. Commonwealth*, 519 S.E.2d 382, 384–85 (Va. 1999) (upholding the trial court’s exclusion of expert testimony concerning the defendant’s lack of impulse control).

123. 519 S.E.2d 382 (Va. 1999).

124. *Peeples*, 519 S.E.2d at 385.

125. *Id.* at 383, 385.

126. *Id.*

127. *See* GROOT, *supra* note 106, at 497 n.4 (citing *Chittum v. Commonwealth*, 174 S.E.2d 779 (Va. 1970)). In *Chittum*, the Supreme Court of Virginia stated that “[v]oluntary drunkenness, where it has not produced permanent insanity, is *never* an excuse for crime; *except*, where a party is charged with murder, if it appear that the accused was too drunk to be capable of deliberating and premeditating [sic], then he can be convicted only of murder in the second degree.” *Chittum*, 174 S.E.2d at 783 (alterations in original) (quoting *Gills v. Commonwealth*, 126 S.E. 51, 53 (Va. 1925)).

admissible to negate the existence of a mental state.¹²⁸ The underlying reasoning is that a defendant who is incapable of premeditating because he is intoxicated could not have formed the requisite mental state, i.e. premeditation.¹²⁹ Likewise, a frontally damaged defendant's ability to premeditate is impaired due to deficits in planning, judgment, and impulse control. If voluntary intoxication evidence is admissible to negate premeditation, then evidence of frontal lobe dysfunction should also be admissible for that purpose.

In order to establish a successful diminished capacity defense, attorneys must argue that frontal lobe dysfunction is the scientific equivalent of voluntary intoxication. Frontal lobe dysfunction is analogous to voluntary intoxication in that both are conditions which affect an individual's ability to premeditate. Unlike insanity, in which the defendant must establish the existence of a mental *disease*, diminished capacity may be proven by evidence of a mental *condition*.¹³⁰ "The frontal lobes of the brain are sensitive to low concentrations of alcohol, resulting in alteration of thought and mood."¹³¹ Alcohol significantly affects frontal lobe functioning, particularly a person's "awareness and self-control."¹³² Similarly to frontal lobe dysfunction, intoxication may cause an individual to "become more aggressive and even violent . . . or express abnormal desires and drives normally kept under control."¹³³ In addition, both conditions weaken a person's judgment, sense of morality, and sense of inhibition.¹³⁴ The physical and behavioral similarities between frontal lobe dysfunction and voluntary intoxication support the argument that the conditions operate in the same way to affect a person's capacity to act deliberately and with premeditation.

The Virginia courts require a significant showing of intoxication in order to get an intoxication jury instruction.¹³⁵ The defense has the burden of producing evidence of substantial intoxication.¹³⁶ Despite the fact that the defense bears this burden of production, the prosecution retains the ultimate burden of

128. GROOT, *supra* note 106, at 497.

129. *Id.*; see *Wright v. Commonwealth*, 363 S.E.2d 711, 712 (Va. 1988) (stating that "when a person voluntarily becomes so intoxicated that he is incapable of deliberation or premeditation, he cannot commit a class of murder that requires proof of a deliberate and premeditated killing").

130. See *infra* Part III.B (discussing the "disease of mind" requirement for an insanity defense).

131. David L. Faigman et al., *Testing for Alcohol: Forensic Issues*, in MODERN SCIENTIFIC EVIDENCE: THE LAW AND SCIENCE OF EXPERT TESTIMONY Part IV § 33-2.0 (2d ed. 2002), WL 4 MODSCIEVID 33-2.2.

132. *Id.*

133. *Id.*

134. Fred Lane & Scott Lane, LANE GOLDSTEIN TRIAL TECHNIQUE § 11:174 (3d ed. 2003), WL GOLDTRTECH 11:174.

135. GROOT, *supra* note 106, at 498 (citing *Lilly v. Commonwealth*, 499 S.E.2d 522 (Va. 1998); *Jenkins v. Commonwealth* 423 S.E.2d 360, 368-69 (Va. 1992)).

136. *Id.* at 497-98.

persuasion with regard to premeditation.¹³⁷ Expert testimony concerning the extent of the defendant's impairment may prove invaluable to securing a jury instruction.¹³⁸ Such evidence of extreme intoxication is necessary to establish that the defendant lacked the ability to pre-form an intent to kill. In the case of frontal lobe dysfunction, the defense should rely on expert testimony to establish that frontal lobe damage can limit the defendant's capacity for premeditation. Once the defense meets its burden of production, by establishing the existence of significant frontal lobe dysfunction, the prosecution bears the burden of proving premeditation.¹³⁹

Frontal lobe dysfunction impairs premeditation in two ways. First, frontally damaged individuals lack the ability to plan ahead and "to understand the consequences of actions."¹⁴⁰ Numerous studies conclusively state that "damage to the frontal lobes causes the impairment of insight, impulse control, and foresight."¹⁴¹ Diagnostic testing in case studies has revealed "marked deficits in real life tasks demanding judgment, awareness of socially appropriate conduct, and the capacity to assess future consequences."¹⁴² Second, frontal lobe dysfunction results in poor impulse control "which often leads to socially unacceptable behavior."¹⁴³ Thus, a frontally damaged individual has a reduced capacity to make appropriate decisions and physically control his impulses. It is both illogical and arbitrary that a diminished capacity defense would be available to a person who chooses to drink alcohol, but not to an individual stricken with a physical disability:

The law is not the creation of such barbarous and insensible animal nature as to extend a more lenient legal rule to the case of a drunkard, whose mental faculties are disturbed by his own will and conduct, than to the case of a poor demented creature afflicted by the hand of God.¹⁴⁴

137. *Id.*

138. *See* Fitzgerald v. Commonwealth, 292 S.E.2d 798, 807 (Va. 1982) (allowing a jury instruction in cases in which the defendant's "condition was an issue of fact to be resolved by the jury" in light of various expert testimony).

139. It is important to note that unlike an insanity claim, in which the defense bears the burden of persuasion, the defense burden here is only one of production.

140. *See* JONATHAN H. PINCUS & GARY TUCKER, BEHAVIORAL NEUROLOGY 103 (1974) (discussing the emotional effects of frontal lobe syndrome); Martin Winkler, *ADHD and Frontal Lobe Dysfunction*, at <http://web4health.info/en/answers/adhd-cause-frontal.htm> (Sept. 4, 2003) (stating that the frontal lobes control "intention, planning and goal direct behaviour").

141. *See* GOLDBERG, *supra* note 70, at 146 (discussing the connection between frontal lobe damage and criminal behavior).

142. Brower & Price, *supra* note 53, at 721.

143. GOLDBERG, *supra* note 70, at 146.

144. State v. Noel, 133 A. 274, 285 (N.J. 1926).

Defense counsel should argue that by allowing a voluntary intoxication defense, the Supreme Court of Virginia opened the door to a diminished capacity defense based on frontal lobe dysfunction because both conditions affect the defendant's ability to premeditate.

B. Insanity

1. *M'Naghten Test*

The second way in which frontal lobe dysfunction may be used in a capital proceeding is as insanity evidence. An insanity defense, like a diminished capacity defense, "bear[s] directly on the defendant's criminal culpability."¹⁴⁵ Virginia's test for insanity, first set forth in 1871 in *Boswell v. Commonwealth*,¹⁴⁶ states that a defendant is legally insane if he "was laboring under such a defect of reason from disease of the mind . . . as not to know the nature and possible consequences of his act, or if he did know, then that he did not know he was doing what was wrong."¹⁴⁷ This test mirrors the *M'Naghten* test, or the right/wrong test, which has been adopted by federal statute and most state courts.¹⁴⁸ Virginia has conclusively stated that its insanity test is to be read disjunctively such that the first part of the test concerns the defendant's cognitive ability, and the second

145. GROOT, *supra* note 106, at 461.

146. 61 Va. (20 Gratt.) 860 (1871).

147. *Boswell v. Commonwealth*, 61 Va. (20 Gratt.) 860, 868 (1871).

148. 18 U.S.C. § 17 reads:

It is an affirmative defense to a prosecution under any Federal statute that, at the time of the commission of the acts constituting the offense, the defendant, as a result of a severe mental disease or defect, was unable to appreciate the nature and quality or the wrongfulness of his acts. Mental disease or defect does not otherwise constitute a defense.

. . . The defendant has the burden of proving the defense of insanity by clear and convincing evidence.

18 U.S.C. § 17 (1999); *see also* MYRON MOSKOVITZ, *CASES AND PROBLEMS IN CRIMINAL LAW* 315 (5th ed. 2003) (stating that the *M'Naghten* test for insanity has been adopted by most jurisdictions).

part focuses on his moral understanding.¹⁴⁹ If the defendant satisfies either portion of the test, he will be found legally insane.

The biggest obstacle to admission of frontal lobe evidence as the basis of an insanity defense is the language of the test itself. The first part of the insanity test requires the defendant to have suffered from “a defect of reason from *disease of mind*” at the time he committed the offense.¹⁵⁰ Expert testimony is necessary to establish the existence of an accepted “disease of mind.”¹⁵¹ The “disease of mind” requirement effectively acts to limit the types of mental disabilities that qualify for an insanity defense. Unless the genesis of the proffered disability is a diagnosable mental disease, the court will likely find the evidence irrelevant to the question of insanity and hold it inadmissible. The question then is whether the definition of “mental disease” is broad enough to include frontal lobe dysfunction. The Virginia courts have not definitively stated whether the term “mental disease” refers only to widely recognized and accepted conditions or whether it can include other disorders. In light of *Stamper*, however, it is clear that the courts reject diagnoses that appear to rely on “subtle and shifting gradations” of illnesses which “are frequently revised.”¹⁵²

In order to make an insanity claim in frontal lobe cases, the term “mental disease” must encompass frontal lobe dysfunction. An Axis 1 diagnosis is substantial proof that frontal lobe dysfunction qualifies as a disease for insanity purposes.¹⁵³ According to section 310.1 of the Diagnostic and Statistical Manual of Mental Disorders (“DSM”), changes in personality may be characterized as an Axis 1 disorder when the change results from a “general medical condi-

149. See *Price v. Commonwealth*, 323 S.E.2d 106, 110 (Va. 1984) (holding “that the actual *M’Naghten* test for insanity, stated in the disjunctive, is the rule in Virginia). The two parts of the insanity test and the different aspects of the defendant’s understanding that they address can be explained as follows:

The first portion relates to an accused who is psychotic to an extreme degree. It assumes an accused who, because of mental disease, did not know the nature and quality of his act; he simply did not know what he was doing. For example, in crushing the skull of a human being with an iron bar, he believed that he was smashing a glass jar. The latter portion of *M’Naghten* relates to an accused who knew the nature and quality of his act. He knew what he was doing; he knew that he was crushing the skull of a human being with an iron bar. However, because of mental disease, he did not know that what he was doing was wrong. He believed, for example, that he was carrying out a command from God.

2 CHARLES E. TORCIA, *WHARTON’S CRIMINAL LAW* § 101 (15th ed. 1994) (citations omitted).

150. *GROOT*, *supra* note 106, at 462.

151. *Id.* (stating that although lay testimony is helpful in establishing “the defendant’s attitude and demeanor in order to bolster his insanity defense,” an expert must first testify that the defendant does in fact suffer from the disease). If, before trial, an indigent defendant shows probable cause that his sanity will be an issue, the court is required to provide an expert to perform a sanity evaluation. VA. CODE ANN. § 19.2-169.5(A) (Michie 2000).

152. *Stamper*, 324 S.E.2d at 688.

153. See *APA*, *supra* note 79, at 25 (explaining the multiaxial classifications of mental disorders).

tion.”¹⁵⁴ The essential requirement of section 310.1 is that the personality change is “*due to* the direct physiological effects of a general medical condition.”¹⁵⁵ Thus, the personality change must be traceable to a condition and must demonstrate a marked change from the individual’s prior functioning. Examples of personality change are “affective instability, poor impulse control, [and] outbursts of aggression.”¹⁵⁶ Certain types of frontal lobe dysfunction, such as dysfunction resulting from head trauma, qualify for this type of Axis 1 diagnosis.¹⁵⁷ It is also likely that dysfunction related to a tumor or other disease would satisfy the diagnostic criteria for a section 310.1 diagnosis.¹⁵⁸ In capital cases in which the defendant’s frontal lobe damage resulted from these types of discrete causes, an Axis 1 diagnosis is appropriate. However, in cases in which no “general medical condition” can be identified, it is unlikely that the defendant’s disorder will be reported on Axis 1.

Another way to show that frontal lobe dysfunction is a “mental disease” for an insanity defense is by analogizing frontal lobe dysfunction to schizophrenia, which is an Axis 1 condition that is generally recognized as a disease of mind for purposes of an insanity claim.¹⁵⁹ Studies show that schizophrenics exhibit “abnormalities of frontal lobe function.”¹⁶⁰ Both conditions cause “affective changes, impaired motivation, [and] poor insight.”¹⁶¹ PET scans reveal decreased metabolic frontal lobe activity in schizophrenic patients.¹⁶² In addition, both frontally damaged individuals and schizophrenics display similarly poor performance on neuropsychological tests that indicate cognitive dysfunction associated

154. *See id.* at 171 (explaining the Axis 1 classification “Personality Change Due to a General Medical Condition”).

155. *Id.* at 171 (emphasis added).

156. *Id.* The DSM also states that “injury to the frontal lobes may yield such symptoms as lack of judgment or foresight, facetiousness, disinhibition, and euphoria.” *Id.*

157. *See id.* at 172 (listing the types of conditions which qualify as a “general medical condition”).

158. *Id.*

159. APA, *supra* note 79, at 26. The acceptance of an insanity defense based on schizophrenia depends, of course, on whether the defense can prove that the defendant was suffering from the effects of the disease “at the time of the act.” GROOT, *supra* note 106, at 462; *see Ake v. Oklahoma*, 470 U.S. 68, 72 (1985) (discussing the significance of defense counsel’s failure to elicit testimony from defense experts stating that the defendant was suffering from schizophrenia “*at the time of the offense*”).

160. *See* Thimble, *supra* note 47, ¶ 15 (discussing the evidence showing frontal lobe dysfunction in schizophrenic patients); Massimo Abbruzzese et al., *Frontal Lobe Dysfunction in Mental Illness*, 4 PSYCHOLOGY ¶ 1.2 (1993), at <http://psycprints.ecs.soton.ac.uk/archive/00000303/> (stating that CT scans on schizophrenics reveal frontal lobe abnormalities).

161. Thimble, *supra* note 47, ¶ 14.

162. Abbruzzese, *supra* note 160, ¶ 1.2.

with the frontal lobes.¹⁶³ The physical, psychological, and behavioral similarities between the two conditions are useful evidence for an argument that frontal lobe dysfunction should be considered a legitimate disease for insanity purposes.

It is important to note that the problem of defining frontal lobe dysfunction as a “mental disease” does not exist in jurisdictions that follow the Model Penal Code’s (“MPC”) test for insanity. The MPC test states that a person is not criminally responsible for conduct resulting from “mental disease *or defect*.”¹⁶⁴ This language is broader than the language followed by Virginia in that it includes no limitation on the genesis of the condition. An insanity defense based on frontal lobe dysfunction can easily qualify as “a defect” for purposes of the MPC test. The distinction between the two tests illustrates how narrow the *M’Naghten* test is in terms of which conditions qualify for an insanity defense.

Because of the difficulty in categorizing generalized frontal lobe dysfunction as a mental disease, it is unlikely that it can satisfy the *M’Naghten* test. Even if frontal lobe dysfunction could be characterized as a mental disease, it still may not satisfy either branch of the *M’Naghten* test. The first part of the test, whether the defendant understood the nature and consequences of his actions, addresses the defendant’s “cognitive or perceptive abilities.”¹⁶⁵ Depending on the cause, location, and extent of the frontal lobe damage, the defendant may retain normal intellectual functioning.¹⁶⁶ For example, a frontally damaged individual may still be able to understand that pointing a gun at another person and pulling the trigger may result in that person’s death. Therefore, in most cases the first part of the *M’Naghten* test will not encompass a frontally damaged defendant. Additionally, frontal lobe damage would not satisfy the second part of Virginia’s insanity test because it addresses the defendant’s moral understanding. Although frontally damaged individuals may *act* immorally, they still *know* “that the act is considered morally reprehensible by society.”¹⁶⁷ For example, the Virginia schoolteacher “went to great lengths to conceal his activities because he felt that they were unacceptable.”¹⁶⁸ If a defendant retains the capacity to understand that his actions are wrong, he cannot be found insane under the second part of the *M’Naghten* test. Thus, it is unlikely that a frontally damaged individual will be found insane under the standard *M’Naghten* test.

163. *Id.* ¶ 5.1. Both conditions appear to cause poor performance on the Weigl Sorting Test (“WST”) and the Word Fluency Test (“WFT”). *Id.* The WST assesses a person’s ability to “shift from one strategy to another” and the WFT assesses “verbal fluency.” *Id.* ¶¶ 3.2, 3.3.

164. *See* TORCIA, *supra* note 149, § 104, at 28 (emphasis added) (quoting MODEL PENAL CODE § 4.01(1) (1985)).

165. GROOT, *supra* note 106, at 462.

166. *See* PINCUS, *Base Instincts*, *supra* note 22, at 75 (discussing how Phineas Gage, after suffering severe frontal lobe damage, retained the ability to “walk, talk, read, write, calculate, and remember”).

167. GROOT, *supra* note 106, at 463.

168. Burns & Swerdlow, *supra* note 1, at 437.

2. Irresistible Impulse

For a frontally damaged defendant who fails the *M'Naghten* test, an irresistible impulse instruction might save him from conviction. In *Dejarnette v. Commonwealth*,¹⁶⁹ the Supreme Court of Virginia supplemented its insanity test with an irresistible impulse doctrine.¹⁷⁰ The court affirmed the trial judge's instruction to the jury that a defendant's actions may be excused if he was compelled by an irresistible impulse.¹⁷¹ The court explained that an irresistible impulse is "a diseased state of the mind, the tendency of which is to break out in a sudden paroxysm of violence, venting itself in homicide or other dangerous and violent acts upon friend and foe indiscriminately."¹⁷² However, the court stated that the question of irresistible impulse only arises after a determination that the defendant was able to tell right from wrong.¹⁷³ As set forth in *Dejarnette*, the irresistible impulse doctrine is only applicable when the defendant "know[s] that if he does the act he will do wrong and receive punishment" but nonetheless "is incapable of resisting" the criminal impulse.¹⁷⁴ Therefore, a defendant must first prove that he is sane, in that he knew right from wrong, before he can argue that his actions were compelled by an irresistible impulse.¹⁷⁵

The focus of an irresistible impulse inquiry is whether a defendant's "mind has become so impaired by disease that he is totally deprived of the mental power to control or restrain his act."¹⁷⁶ As in the *M'Naghten* test, the irresistible impulse test requires the defendant to prove that he was suffering from a "disease of mind" at the time he committed the act.¹⁷⁷ Thus, the same strict limitation on the genesis of the disorder recurs in the irresistible impulse test. In *Godley v. Commonwealth*,¹⁷⁸ the Virginia Court of Appeals affirmed the trial court's rejection of the defendant's irresistible impulse claim.¹⁷⁹ At trial, the defense presented psychiatric testimony that the defendant suffered from

169. 75 Va. 867 (Va. 1881).

170. *Dejarnette*, 75 Va. at 878.

171. *Id.*

172. *Id.*

173. *Id.*

174. *See id.* (stating that an irresistible impulse is "an irresistible inclination to kill or commit some other offence—some unseen pressure on the mind, drawing it to consequences which it sees, but cannot avoid, and placing it under a coercion which, while its results are clearly perceived, it is incapable of resisting").

175. GROOT, *supra* note 106, at 463.

176. *Thompson v. Commonwealth*, 70 S.E.2d 284, 292 (Va. 1952).

177. *See Herbin v. Commonwealth*, 503 S.E.2d 226, 231 (Va. 1998) (stating that "a defendant must present more than a scintilla of evidence of a mental disease in order to receive a jury instruction").

178. 343 S.E.2d 368 (Va. Ct. App. 1986).

179. *Godley v. Commonwealth*, 343 S.E.2d 368, 369 (Va. Ct. App. 1986).

borderline personality disorder and had problems with impulse control.¹⁸⁰ However, the court of appeals found that “[t]he psychiatric testimony was inconclusive on the issue of irresistible impulse.”¹⁸¹ The court stated that “[a]lthough Godley may have had ‘trouble with impulse control,’ neither psychiatrist testified that he was ‘totally deprived of the mental power to control or restrain’ himself from shooting his girlfriend.”¹⁸²

Godley is significant because of what it does, and does not, focus on in its discussion of irresistible impulse. The court did not focus on whether the defendant’s personality and impulse control disorder constituted a disease of mind. Rather, the court focused on whether these disorders affected the defendant to the degree that he was totally unable to control his actions. Although the question of “disease of mind” is still relevant, “irresistible impulse is solely a question of ability to control behavior known to be wrong.”¹⁸³

Recent Virginia court decisions have markedly narrowed the irresistible impulse defense. In *Bennett v. Commonwealth*,¹⁸⁴ the Virginia Court of Appeals stated that “[e]vidence that an accused planned his or her criminal acts precludes, as a matter of law, any finding that the accused acted under an irresistible impulse.”¹⁸⁵ Unlike the broad irresistible impulse defense laid out in *Dejarnette*, the newly limited defense is unavailable if there is any evidence that the defendant premeditated his actions.¹⁸⁶ The United States Court of Appeals for the Fourth Circuit has stated that “[i]mpulsivity is the essence of this definition of insanity; planning or deliberative conduct is inconsistent with the defense.”¹⁸⁷ Defense attorneys should be aware of this strict limitation if they plan to use an irresistible impulse defense in a frontal lobe dysfunction case. Although irresistible impulse creates the best chance for an insanity defense, the Virginia courts will not allow an instruction if the Commonwealth produces evidence of premeditation. According to *Bennett*, premeditation and irresistible impulse are mutually exclusive. If the prosecution successfully proves that the defendant acted in a planned or deliberate manner, an irresistible impulse argument will necessarily fail. Thus, the defense must aggressively counter evidence of premeditation in order to preserve an irresistible impulse defense.

180. *Id.*

181. *Id.* at 370.

182. *Id.*

183. GROOT, *supra* note 106, at 463 (citing *Thompson*, 70 S.E.2d at 292).

184. 511 S.E.2d 439 (Va. Ct. App. 1999).

185. *Bennett v. Commonwealth*, 511 S.E.2d 439, 447 (Va. Ct. App. 1999).

186. *See Rollins v. Commonwealth*, 151 S.E.2d 622, 625 (Va. 1966) (stating that “[t]he word ‘impulse’ implies that which is sudden, spontaneous, [and] unpremeditated”).

187. *Reid v. True*, 349 F.3d 788, 802 (4th Cir. 2003).

C. Mitigation

The final way in which evidence of frontal lobe dysfunction can be used in a capital proceeding is as mitigation evidence. If the defendant is convicted in the guilt/innocence phase of the trial, evidence of frontal lobe dysfunction should be a major factor in the sentencing phase. During a capital sentencing proceeding, evidence of frontal lobe dysfunction is admissible as mitigation evidence. Section 19.2-264.4(B) of the Virginia Code states that the defendant may present facts that establish that “the capital felony was committed while the defendant was under the influence of extreme mental or emotional disturbance” or that “at the time of the commission of the capital felony, the capacity of the defendant to appreciate the criminality of his conduct or to conform his conduct to the requirements of law was significantly impaired.”¹⁸⁸

Under the United States Supreme Court’s decisions in *Lockett v. Ohio*¹⁸⁹ and *Eddings v. Oklahoma*,¹⁹⁰ it is clear that the sentencer in a capital case cannot be precluded from hearing evidence of frontal lobe dysfunction.¹⁹¹ In *Lockett* the Court “conclude[d] that the Eighth and Fourteenth Amendments require that the sentencer, in all but the rarest kind of capital case, not be precluded from considering, *as a mitigating factor*, any aspect of a defendant’s character or record and any of the circumstances of the offense that the defendant proffers as a basis for a sentence less than death.”¹⁹² The Court reiterated this holding in *Eddings* and stated “that the sentencer in capital cases must be permitted to consider any relevant mitigating factor.”¹⁹³ Evidence of frontal lobe dysfunction is relevant to both the defendant’s character and the circumstances of the offense. Thus, according to *Lockett* and *Eddings*, evidence of frontal lobe dysfunction must be admitted during the sentencing phase of a capital proceeding.

Two clauses of section 19.2-264.4(B) are particularly relevant to the admissibility of frontal lobe dysfunction evidence. The first of these two clauses allows the defendant to introduce evidence “of extreme mental or emotional disturbance.”¹⁹⁴ Unlike insanity and irresistible impulse, this rule contains no limitation on the genesis of the type of mental condition evidence presented. Thus, this clause is much broader than the *M’Naghten* test for insanity or the irresistible

188. VA. CODE ANN. § 19.2-264.4(B)(ii), (iv) (Michie Supp. 2003).

189. 438 U.S. 586 (1978).

190. 455 U.S. 104 (1982).

191. *Lockett v. Ohio*, 438 U.S. 586, 604 (1978) (plurality opinion) (holding that the sentencer in a capital case must consider all mitigating evidence); *Eddings v. Oklahoma*, 455 U.S. 104, 113–14 (1982) (stating that “[j]ust as the State may not by statute preclude the sentencer from considering any mitigating factor, neither may the sentencer refuse to consider, *as a matter of law*, any relevant mitigating evidence”).

192. *Lockett*, 438 U.S. at 604 (plurality opinion).

193. *Eddings*, 455 U.S. at 112.

194. VA. CODE ANN. § 19.2-264.4(B)(ii) (Michie Supp. 2003).

impulse doctrine. The second clause that concerns the introduction of frontal lobe evidence allows evidence showing that the defendant's ability "to conform his conduct to the requirements of law was significantly impaired."¹⁹⁵ Of the two clauses, the second is more relevant to the introduction of frontal lobe evidence because the language is concerned with the defendant's lack of self-control. As discussed previously, frontal lobe dysfunction can damage impulse control while leaving intellectual function intact. Thus, it is the effect of the dysfunction on the defendant's ability to restrain his conduct that is of primary importance in the mitigation context.

By presenting mitigating evidence that the defendant lacks the ability to control his conduct, defense counsel runs the risk of inadvertently proving future dangerousness. The defendant's lack of impulse control may support an inference "that he would commit criminal acts of violence that would constitute a continuing serious threat to society."¹⁹⁶ When the defendant's conduct is the result of a tumor which is subsequently excised, there is no danger in proving the future dangerousness aggravator. If frontal lobe dysfunction is caused by another type of disease or trauma, the sentencer may infer that the defendant's condition is permanent. However, frontal lobe dysfunction often works in conjunction with other factors to exacerbate criminality.¹⁹⁷ When those other factors, such as alcohol and drugs, are removed from the defendant's environment his behavior may improve despite an existing neurological impairment.¹⁹⁸ In addition, medications used to treat behavioral problems, such as Ritalin, anti-depressants, or mood stabilizers, may help treat frontally damaged individuals.¹⁹⁹ In general, the benefit of introducing evidence of frontal lobe dysfunction in mitigation outweighs the risk of inadvertently proving future dangerousness. The effects of frontal lobe damage are well documented and offer compelling reasons for sentencing a defendant to life imprisonment instead of death.

IV. *Getting the Jury to Understand*

One of the biggest obstacles to presenting a defense based on frontal lobe dysfunction is the jury itself. People often have the "tendency to conceive of moral and ethical judgments as coming from some source other than the brain."²⁰⁰ For instance, it is a commonly held belief that a person's sense of "morality and ethics" is connected to the spiritual self as opposed to the physical

195. VA. CODE ANN. § 19.2-264.4(B)(iv).

196. VA. CODE ANN. § 19.2-264.4(C).

197. See Pincus, *Aggression*, *supra* note 49, at 550 (stating that neither "intoxication, psychosis, or frontal damage alone, is sufficient to cause violence").

198. *Id.*

199. *Id.* at 555.

200. PINCUS, *Base Instincts*, *supra* note 22, at 74.

self.²⁰¹ Jurors may think of morality and free will in terms of the soul or the mind as opposed to thinking of them as a function controlled by the brain. This tendency to separate the *mind* from the *brain* can negatively impact a case based on a frontal lobe dysfunction defense. Relevant scientific evidence will be unpersuasive if the jury does not understand the role the brain plays in allowing individuals to express their morality:

This analogy may help: The only way in which a composer can present to an audience what he has conceived is by having his musical composition performed by an orchestra. In a similar way, the expression of a person's will must involve the brain. The brain is the symphony orchestra of a person's spirit.²⁰²

If an orchestra plays with broken instruments it is probable that it will perform poorly despite the composer's efforts to write a good piece of music.²⁰³ Similarly, if a person's brain does not function properly he may act inappropriately despite his best intentions.²⁰⁴ Just as a well written piece of music cannot sound good when played with broken instruments, a well-formed sense of morality can go astray when processed by a dysfunctional brain.

Lawyers must recognize that jurors enter the courtroom with notions of morality and free will that do not immediately dissipate upon learning about frontal lobe dysfunction. Using the Virginia schoolteacher as an example, it is easy to see how jurors could reject the argument that the tumor turned the man into a pedophile overnight. Most people are inherently resistant to the idea that an injury could rob them of free will and cause them to commit crimes such as molesting children. Because juries are forced to make moral value judgments in criminal cases, defense attorneys cannot ask them to separate ideas of morality from their decision-making process. Instead of fighting this tendency, attorneys should integrate a discussion of morality into an explanation of frontal lobe dysfunction.

It is essential for lawyers to explain that a frontally damaged individual is not necessarily an immoral individual. In fact, research shows that frontal lobe damage does not destroy a person's sense of morality.²⁰⁵ Lawyers need to emphasize that there is an important difference between *being* immoral and *acting* immoral. A defendant who *acts* immorally as a result of a physical disability is arguably not as culpable as a defendant who simply *is* immoral. Frontally damaged individuals should not be sentenced based upon a mere determination of

201. *Id.*

202. *Id.* at 75.

203. *Id.*

204. *Id.*

205. Burns & Swerdlow, *supra* note 1, at 438–39.

morality. The jury must understand that frontal lobe dysfunction acts as an impediment to moral behavior and therefore lessens the defendant's culpability.

V. Conclusion

Frontal lobe dysfunction is ripe for consideration as a valid defense in capital proceedings and as strong mitigation evidence during sentencing. A diminished capacity argument must focus on the inability of a frontally damaged individual to premeditate due to deficits in executive functioning and poor impulse control. In addition, an analogy to voluntary intoxication is a helpful way of showing why frontal lobe damage reduces culpability. If the defense intends to present an insanity defense, expert testimony will be necessary to establish that frontal lobe dysfunction is a recognizable "mental disease." Once it has been established that the defendant knew right from wrong, an irresistible impulse instruction provides the best opportunity for a successful insanity defense. However, attorneys must be aware that Virginia courts are likely to be reluctant to accept frontal lobe dysfunction as a defense. The strongest use for evidence of frontal lobe dysfunction is during the sentencing proceeding as mitigation evidence. The defense must use such evidence to show that the defendant was unable to "conform his conduct to the requirements of law" and should therefore receive life imprisonment.²⁰⁶ Despite the difficulties in using evidence of frontal lobe dysfunction in capital proceedings, it is an important defensive avenue that must be pursued.

206. VA. CODE ANN. § 19.2-264.4(B)(iv) (Michie Supp. 2003).