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CHRONIC TRAUMATIC ENCEPHALOPATHY:
MENTAL DISEASE OR DEFECT THAT CAN TRIGGER
A SUCCESSFUL CRIMINAL DEFENSE

By: Thomas Moszczynski

INTRODUCTION

When he was a child, he was called kind, gentle and even sweet.¹ He started playing football at a young age that ripened into a successful high school career that lasted from 2004 to 2007.² He was a dominant force on the gridiron under the Friday night lights as he played both offense and defense—rarely missing a play.³ College scouts took notice, and suddenly, the world was his oyster.⁴ A small-town kid from Bristol, Connecticut became the talk of college recruiters across the country.⁵ In 2007, a year after the death of his father, the quiet kid from Bristol moved to Gainesville, Florida where he played three incredible years as the tight end position at the University of Florida.⁶ That same year,

¹ See Kalyn Kahler, *Aaron Hernandez, According to the Journalists Who Covered Him*, SPORTS ILLUSTRATED (Apr. 21, 2017), <https://www.si.com/mmqb/2017/04/21/nfl-aaron-hernandez-suicide-high-school-bristol-central-college-florida-new-england-patriots>.

² Jeff Otterbein, *Hernandez Was Heavily Recruited Out Of Bristol Central High*, HARTFORD COURANT (June 26, 2013), <https://www.courant.com/sports/football/hc-xpm-2013-06-26-hc-aaron-hernandez-recruitment-0627-20130626-story.html>; Gary Davenport, *Complete Timeline of the Rise and Fall of Aaron Hernandez*, BLEACHER REPORT (June 26, 2013), <https://bleacherreport.com/articles/1685469-complete-timeline-of-the-rise-fall-of-aaron-hernandez>.

³ See Otterbein, *supra* note 2.

⁴ See Bill Pennington, *Aaron Hernandez Shed Tackles, but Not His Past*, N.Y. TIMES (Apr. 15, 2015), <https://www.nytimes.com/2015/04/16/sports/football/aaron-hernandez-guilty-of-murder-shed-tackles-but-not-his-past.html>.

⁵ See Kahler, *supra* note 1.

⁶ See Julio Ricardo Varela, *Death of Aaron Hernandez's dad in 2006 deeply impacted his life*, NBC LATINO (June 27, 2013), <http://nbclatino.com/2013/06/27/death-of-aaron-hernandezs-dad-in-2006-deeply-impacted-sons-life/>; Edgar Thompson, *Aaron Hernandez suicide: Signs of trouble began with Gators in Gainesville*, ORLANDO SENTINEL (Apr. 19, 2017), <https://www.orlandosentinel.com/sports/florida-gators/os-sp-aaron-hernandez-gators-20170419-story.html>.

his violent and criminal behavior started when he got into a bar fight, and on a separate occasion, was questioned for a shooting.⁷

During his career at Florida, he compiled an improbable twelve touchdowns, over 1,200 yards receiving, and 111 receptions.⁸ After winning a national championship at Florida, the young man from Bristol declared for the NFL Draft in 2010, and his talent was sure to get him drafted.⁹ However, during draft interviews, he admitted to failing a drug test for marijuana use, but he lamented that this failed drug test was during a rough patch followed by the death of his late father, and it would never happen again.¹⁰ The surefire superstar watched his draft stock crash to the floor, and the quiet kid from Bristol was now the young man with character issues in Florida.¹¹

As the one-hundred and thirteenth pick in the NFL Draft, the young man evolved into a New England Patriot and one of the top tight ends in the league.¹² His first two years were unprecedented for a tight end in the NFL: over 110 receptions, thirteen touchdowns, and over 1,400 yards receiving.¹³ Suddenly, NFL teams that passed on him with the previous 112 picks in the 2010 draft probably felt like fools. In his second year in the league, the quiet kid from Bristol scored a touchdown in the Super Bowl.¹⁴ In August 2012, he signed one of the largest contracts in NFL history for a tight end, which guaranteed him \$40,000,000 over a five-year span.¹⁵

⁷ See Varela, *supra* note 6; Kahler, *supra* note 1.

⁸ Greg Price, *NFL Player Charged With Murder: Who Is Suspect Aaron Hernandez? Former New England Patriot Appears In Court, Pleads Not Guilty*, INT'L BUS. TIMES (June 26, 2013, 2:52 PM), <http://www.ibtimes.com/nfl-player-charged-murder-who-suspect-aaron-hernandez-former-new-england-patriot-appears-court>.

⁹ See *id.*

¹⁰ See *id.*

¹¹ See *id.*

¹² See Iliana Lim, *2010 NFL draft ends: Patriots pick Aaron Hernandez, Titans select Myron Rolle*, ORLANDO SENTINEL (Apr. 24, 2010), <https://www.orlandosentinel.com/sports/os-xpm-2010-04-24-os-nfl-draft-florida-prospects-0424-story.html>.

¹³ See Price, *supra* note 8.

¹⁴ See *Hernandez 'Heartbroken' By Super Bowl Loss*, CBS BOS. (Feb. 5, 2012, 11:24 PM), <https://boston.cbslocal.com/2012/02/05/patriots-hernandez-heartbroken-by-super-bowl-loss/>.

¹⁵ Greg A. Bedard, *Aaron Hernandez deal worth up to \$40 million*, BOS. GLOBAL MEDIA PARTNERS, LLC (Aug. 27, 2012), https://www.boston.com/sports/extra-points/2012/08/27/hernandez_locke.

On June 18, 2013, he became the prime suspect in the murder investigation of his close friend, Odin Lloyd.¹⁶ On June 20, the quiet kid from Bristol was banned from entering the New England Patriots facilities.¹⁷ Six days later and ten months removed from a historic football contract, he was arrested for murdering Lloyd.¹⁸ Before this trial even began, the disgraced superstar was indicted for another crime, a double homicide that took place in 2012.¹⁹ The charges didn't stop there: gun charges and witness intimidation charges were later brought on to compound these homicide charges.²⁰ The quiet kid from Bristol took his final role as the convicted murderer of Odin Lloyd on April 15, 2015.²¹ He was sentenced to life in prison.²²

However, on April 14, 2017, two years later, a jury acquitted Hernandez on the double homicide, witness intimidation and gun possession charges.²³ But, several days later, he took his own life by hanging himself in his prison cell.²⁴ He was found with "John 3:16" written across his forehead.²⁵ This is the tragic and disturbing tale of Aaron Hernandez.

¹⁶ See John Breech, *One year later: A timeline of Aaron Hernandez's last 365 days*, CBS SPORTS (Jun. 18, 2004), <https://www.cbssports.com/nfl/news/one-year-later-a-timeline-of-aaron-hernandezs-last-365-days/>.

¹⁷ See Dave Wedge et al., *Source: Aaron Hernandez barred by Patriots*, BOS. HERALD (June 21, 2013), <https://www.bostonherald.com/2013/06/21/source-aaron-hernandez-barred-by-patriots/>.

¹⁸ See Breech, *supra* note 16.

¹⁹ See *id.*

²⁰ Eric Levenson, *Aaron Hernandez found not guilty of double murder*, CNN, <https://www.cnn.com/2017/04/14/us/aaron-hernandez-verdict/index.html> (last updated Apr. 19, 2017, 8:09 AM).

²¹ See Cindy Boren & Adam Kilgore, *Aaron Hernandez, former Patriots star convicted of murder, hangs himself in prison*, WASH. POST (Apr. 19, 2017, 12:03 PM), https://www.washingtonpost.com/news/early-lead/wp/2017/04/19/aaron-hernandez-found-dead-in-prison-cell/?utm_term=.09acce5c4a20.

²² Ken Belson & Victor Mather, *Aaron Hernandez Found Guilty of First-Degree Murder*, N.Y. TIMES (Apr. 15, 2015), <https://www.nytimes.com/2015/04/16/sports/football/aaron-hernandez-found-guilty-of-first-degree-murder.html>.

²³ See Boren & Kilgore, *supra* note 21; Caroline Connolly et al., *Aaron Hernandez Acquitted in Double Murder Trial*, NBC BOS., <https://www.nbcboston.com/news/local/6th-Day-of-Deliberations-in-Aaron-Hernandez-Trial-419463114.html> (last updated Apr. 14, 2017, 11:36 PM).

²⁴ Boren & Kilgore, *supra* note 21.

²⁵ Des Bieler, *Aaron Hernandez reportedly found with 'John 3:16' written on his forehead*, WASH. POST (Apr. 19, 2017, 9:26 PM), https://www.washingtonpost.com/news/early-lead/wp/2017/04/19/aaron-hernandez-reportedly-found-with-john-316-written-on-his-forehead/?utm_term=.a3c7206ec08c. John

Why did he commit these violent, harmful crimes? In the United States, our criminal justice system assigns the blame to the wrongdoers, but affirmative defenses grant defendants an opportunity to rationalize their behavior by taking deep looks in the causes of their criminal behavior.²⁶ When this dive into assignment of blame is weighed against affirmative defenses, the focal point of those criminal trials becomes causation.²⁷ What, if anything, caused the wrongdoer to act the way they did? For Hernandez, there is no question that there was a dramatic change to his behavior after his father's death.²⁸ Did this event cause Hernandez to seek out criminal activity as a coping mechanism? Or was it his history of drug and alcohol abuse that led him astray? Or did he commit these acts because of a brain degenerative disease known as Chronic Traumatic Encephalopathy?

The explanation into the criminality of Aaron Hernandez took a deeper dive after his death, which has become a growing trend with criminality of recently deceased athletes.²⁹ During his autopsy, Hernandez's brain showed significant signs of Stage III Chronic Traumatic Encephalopathy ("CTE"), which has known symptoms of violent, irrational, and explosive behavior.³⁰ After this discovery, doctors took the position that Hernandez's violent

3:16 says, "For God so loved the world that he gave his one and only son, that whoever believes in him shall not perish but have eternal life." *Id.*

²⁶ See DAVID C. BRODY ET AL., CRIM. L. 241 (Aspen Publication eds. 2001).

²⁷ *Id.* (describing that a defendant raising an excuse affirmative defense admits to committing the crime, but "that his or her actions should be excused because of some sort of extenuating circumstances . . ." caused the defendant to commit the crime).

²⁸ See Davenport, *supra* note 2 (stating that "Hernandez responded [to his father's death] by lashing out at his family, smoking marijuana and spending his free time hanging around with a rough crowd of young men in Bristol").

²⁹ See Dan Diamond, *Does Playing Football Make You Violent? Examining The Evidence*, FORBES (Sept. 16, 2014, 6:14 PM), <https://www.forbes.com/sites/dandiamond/2014/09/16/does-football-make-you-violent-examining-the-evidence/#26ae6a19fb7e> (looking at NFL players' brain autopsies to observe how brain functions after football head injuries may increase the propensity to commit violence).

³⁰ Matt Bonesteel, *Aaron Hernandez had Stage III CTE. What exactly does that mean?*, WASH. POST (Nov. 10, 2017), <https://www.washingtonpost.com/news/early-lead/wp/2017/11/10/aaron-hernandez-had-stage-iii-cte-what-exactly-does-that-mean/> (describing that CTE is a "neurological disorder that afflicts people who have suffered numerous head injuries" and that the symptoms of CTE increase in severity from Stage 1 to Stage 4); Ken Belson, *Aaron Hernandez Had Severe C.T.E. When He Died at Age 27*, N.Y. TIMES (Sept. 21, 2017), <https://www.nytimes.com/2017/09/21/sports/aaron-hernandez-cte-brain.html>.

crimes may have been attributable to years of football related head trauma.³¹

Unfortunately, Aaron Hernandez is just one example of several athletes that exhibited erratic and progressively violent behavior before their death, which autopsies confirmed the presence of CTE.³² Jovan Belcher, a former NFL player, had several incidents of domestic disturbance with his girlfriend that unfortunately lead to the climax of Belcher murdering her and committing suicide.³³ Additionally, Chris Benoit, a professional wrestler, was diagnosed with progressively worsening depression.³⁴ Before ending his life, Benoit committed familicide.³⁵ Lastly, James Snuka, another professional wrestler with a history of domestic violence, was charged with the murder of his girlfriend, but the charges were later dropped because of his inability to stand trial.³⁶ The autopsies of all three of these men, like Hernandez, revealed the presence of the brain degenerative disease that was caused by years of repetitive head trauma.³⁷ It is this recurring head trauma

³¹ See Sacha Pfeiffer et al., *A Terrible Thing to Waste*, BOS. GLOBE (Oct. 18, 2018), <https://apps.bostonglobe.com/spotlight/gladiator/cte/>.

³² Ian Smay, *CTE linked with violence in many professional athletes*, KREM (Jul. 1, 2019), <https://www.krem.com/article/news/health/cte-linked-with-violence-in-many-professional-athletes/293-de3f7df5-43cb-4499-baa4-026c1465724d>.

³³ See Nadia Kounang & Stephanie Smith, *Doctor: NFL player who killed girlfriend, self likely had CTE*, CNN (Sept. 30, 2014, 3:54 PM), <http://www.cnn.com/2014/09/29/health/jovan-belcher-cte/>; Sarah Devin, *Domestic Violence: Jovan Belcher and Kasandra Perkins*, SWHELPER (Dec. 13, 2012), <https://www.socialworkhelper.com/2012/12/13/domestic-violence-in-the-news-jovan-belcher-and-kassandra-perkins/>.

³⁴ See Ethan Nelson & Roxanna Sherwood, *Chris Benoit's Murder, Suicide: Was Brain Damage To Blame?*, ABC NEWS (Aug. 26, 2010), <http://abcnews.go.com/Nightline/chris-benoits-dad-son-suffered-severe-brain-damage/story?id=11471875>.

³⁵ See *id.* Familicide is defined as “[t]he murder of an entire family by a family member, followed by suicide.” *Definition of Familicide*, DEFINITIONS.ORG, <http://definition.org/define/familicide/> (last visited Oct. 24, 2019).

³⁶ See Kevin Conlon, *Jimmy Snuka—‘Superfly’ of wrestling fame—charged in 1980s slaying*, CNN (Sept. 2, 2015, 4:07 PM), <http://www.cnn.com/2015/09/01/us/jimmy-superfly-snuka-murder-charge/index.html>; Daniel Rapaport, *Three Former Wrestlers Diagnose With CTE or Similar Disease*, SPORTS ILLUSTRATED (Nov. 4, 2017), <https://www.si.com/nfl/2017/11/04/wrestlers-ww-e-lawsuit-cte-mr-fuju-superfly-snuka>; Mike Mooneyham, *The rise and fall of ‘Superfly’ Jimmy Snuka*, POST & COURIER (Jan. 21, 2017), https://www.postandcourier.com/sports/the-rise-and-fall-of-superfly-jimmy-snuka/article_2ea642fa-e02a-11e6-8040-6fd7c3a81534.html.

³⁷ See Chris William, *Top 20 Notorious Cases of CTE*, SPORTSTER (Oct. 16, 2014), <https://www.thesportster.com/entertainment/top-20-notorious-cases-of-cte-head-injury/>; Rapaport, *supra* note 35; Belson, *supra* note 30.

(not necessarily concussions) that progressively damages the brain resulting in CTE.³⁸

Could this brain degenerative disease explain Hernandez's abhorrent criminal behavior, as well as the criminal behavior of Snuka, Benoit and Belcher? If so, could CTE ever be the basis for a criminal defense for him or other criminal defendants diagnosed with CTE? Can defendants put forth a case that CTE negated the *mens rea*³⁹ of specific intent crimes? Could the attributable behavior from the disease prevent those afflicted from being able to control their actions without treatment under an insanity defense? Or can CTE prevent defendants from being competent to stand trial?

These questions are important to answer not only for defense attorneys but also for prosecutors as research indicates that the threat of CTE extends much further past professional athletes.⁴⁰ In a recent study at the Boston University CTE Research Center ("Research Center"), over twenty-one percent of high school athletes that played football for four years suffered from one of the four stages of CTE.⁴¹ If that number is not remarkable enough, there are currently over one million high school football players across the country.⁴² This could account for over 200,000 possible cases of CTE in the near future with those numbers growing each year as more and more high school football players suffer from untreated or repetitive head trauma.⁴³

With these numbers of current football players, it would be of little surprise that the number of confirmed cases of CTE will

³⁸ See William, *supra* note 37.

³⁹ "*Mens Rea* refers to criminal intent . . . A *mens rea* refers to the state of mind statutorily required in order to convict a particular defendant of a particular crime . . . [t]he *mens rea* requirement is premised upon the idea that one must possess a guilty state of mind and be aware of his or her misconduct . . ." See *Mens Rea: Overview*, CORNELL L. SCH.: LEGAL INFO. INST., https://www.law.cornell.edu/wex/mens_rea (last visited Oct. 26, 2019).

⁴⁰ Brandon E. Gavett et al., *Chronic Traumatic Encephalopathy: A Potential Late Effect of Sports-Related Concussive and Subconcussive Head Trauma*, CLIN SPORTS MED 179, 179 (2011), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2995699/>.

⁴¹ See Tom Goldman, *Study: CTE Found In Nearly All Donated NFL Player Brains*, NPR (July 25, 2017, 11:00 AM), <http://www.npr.org/2017/07/25/539198429/study-cte-found-in-nearly-all-donated-nfl-player-brains> (stating that three of the fourteen brains studied from individuals who only played football in high school had CTE).

⁴² See Pfeiffer et al., *supra* note 31.

⁴³ See *id.*; see also Goldman, *supra* note 41 (demonstrating that over one million kids play high school football and 21% of them are statistically likely to suffer from CTE).

sprout as the general public becomes increasingly aware of these side effects. For instance, from 2008 to the present, the number of confirmed cases has quadrupled at the Research Center since there are more participants in the studies.⁴⁴ One example is the story of Fred McNeill, who was a retired football player.⁴⁵ McNeill's family members noticed a change in his behavior, and after his wife conducted research, McNeill, along with several football players, participated in CTE research.⁴⁶ It was through the program that McNeill was provided treatment and doctors worked with him to handle his symptoms.⁴⁷ As the public and former athletes become more informed, it is without a doubt that the number of confirmed cases of CTE will progress.

Once criminal defense attorneys overcome causation questions, a second problem is that there remains no method or procedure at the present to diagnose CTE while the patient is still alive.⁴⁸ Thus, any defense arguing that CTE is the underlying cause of a defendant's violent behavior will rely heavily on case studies and expert opinion and not the defendant's definitive brain diagnoses. Several doctors concluded in their independent studies that CTE is absolutely attributable to violent behavior in retired NFL players.⁴⁹ When questioned about his opinion of Hernandez, Dr. Bennet Omalu, the man responsible for discovering the disease's connection to NFL players, stated, "[t]here is no question in my mind that CTE drove Aaron Hernandez to suicide and other criminal behavior."⁵⁰ This response by Dr. Omalu came as no

⁴⁴ See McKee et al., *The Spectrum of Disease in Chronic Traumatic Encephalopathy*, BRAIN: A J. OF NEUROLOGY 43, 44 (2012).

⁴⁵ See Nadia Kounang, *Ex-NFL player confirmed as 1st case of CTE in living patient*, CNN (Nov. 16, 2017, 9:11 AM), <http://www.cnn.com/2017/11/16/health/cte-confirmed-in-first-living-person-bn/index.html>.

⁴⁶ See *id.*

⁴⁷ See Maggie Fox, *Brain scan showed CTE in NFL's Fred McNeil before he died*, NBC NEWS (last updated Nov. 17, 2017, 11:13 AM), <https://www.nbcnews.com/health/health-news/brain-scan-showed-cte-nfl-s-fred-mcneill-he-died-n821601> (explaining that Fred McNeil, suffering from CTE and ALS, was admitted to a nursing home to assist with his debilitating motor functions until his death in 2015).

⁴⁸ See Bob Hohler, *BU might be closer to diagnosing CTE during life*, BOS. GLOBE (Sept. 26, 2017, 12:18 AM), <https://www.bostonglobe.com/sports/2017/09/26/discovery-raises-hopes-for-diagnosing-cte-during-life/wTKGvJzgR4ZqXDRtGV1Q4H/story.html>.

⁴⁹ See Kounang, *supra* note 45.

⁵⁰ Marcus DiNitto, *Dr. Bennet Omalu: 'No question in my mind' CTE led Aaron Hernandez to murder, suicide*, SPORTING NEWS (Sept. 22, 2017), <http://www.sportingnews.com/nfl/news/aaron-hernandez-cte-dr-bennet-omalu-oj-simpson-murder-suicide/1h9ajn49vxqia1niacz7lr9yrv>.

surprise, especially after he revealed his professional opinion on another famous NFL player, O.J. Simpson.⁵¹ When questioned about O.J. Simpson, the infamous NFL player that was acquitted of the double homicide of his wife and her lover, Dr. Omalu said, “I would bet my medical license [that O.J. Simpson suffers from CTE].”⁵² At the time of those comments, O.J. Simpson was in prison convicted of kidnapping and burglary.⁵³ As the science in CTE rapidly evolves and more questions are resolved, it will not be long before there is a procedure to diagnose patients with CTE while they are still alive.

Since the science shows that violent behavior can be caused by CTE, this Note explores the question of whether CTE can be the basis for successful claims of mental incompetence, the insanity defense, and the diminished capacity defense in criminal matters. Most jurisdictions in the United States adopted a form of three specific rules for insanity: M’Naughten test, Irresistible Impulse Test, or diminished capacity.⁵⁴ In states that follow the M’Naughten test, a criminal defendant will try to establish that he did not have the cognitive ability to understand that his conduct was wrong.⁵⁵ In other states that use the Irresistible Impulse Test, a person like Hernandez would be burdened to prove that the disease or defect caused temporary insanity.⁵⁶ Or could a person with CTE that committed a crime in a jurisdiction that follows diminished capacity defense as opposed to insanity be successful in arguing that CTE prevented them from having the specific intent required for the crime?⁵⁷

⁵¹ *See id.*

⁵² *Dr. Bennet Omalu ‘would bet my medical license’ that O.J. Simpson has CTE*, ESPN (Jan. 30, 2016), http://www.espn.com/nfl/story/_id/14677428/dr-bennet-omalu-bet-my-medical-license-oj-simpson-cte.

⁵³ *See id.*

⁵⁴ *See generally* Allen P. Wilkinson & Arthur C. Roberts, *Insanity Defense*, 41 AM. JUR. PROOF FACTS 2D 1, 14, 22-23 (Supp. 1985) (detailing the three types of insanity rules).

⁵⁵ *See* Russell D. Covey, *Temporary Insanity: The Strange Life and Times of the Perfect Defense*, 91 B.U. L. REV. 1597, 1608-1609 (2011).

⁵⁶ *See Irresistible Impulse Test*, CORNELL L. SCH.: LEGAL INFO. INST., https://www.law.cornell.edu/wex/irresistible_impulse_test (last visited Sept. 13, 2019).

⁵⁷ *See generally* Henry F. Fradella, *From Insanity To Beyond Diminished Capacity: Mental Illness and Criminal Excuse in the Post-Clark Era*, 18 U. FLA. J.L. & PUB. POL’Y 9, 47, 50 (2007) (describing that diminished capacity defenses can be raised by severely mentally ill individuals, which allows those individuals to admit evidence into court concerning their mental state in order to prove the presence of a mental disorder).

Thus far, CTE has been used sparingly as a criminal defense with very little success.⁵⁸ In 2013, in the Massachusetts case of *Commonwealth v. Fujita*, defense counsel for a high school football player charged with murder argued that the defendant suffered several undocumented head injuries during his seven years of football activities.⁵⁹ However, the prosecution and judge both found the defense unsubstantiated and weak, even calling it a “psychosis fairy” that had little weight as a criminal defense.⁶⁰ Alternatively in a 2016 prosecution in Pennsylvania, counsel for James Snuka successfully argued, that because of his advanced dementia resulting from repeated head trauma, he was unable to stand trial as a competent defendant, which resulted in the charges being dropped.⁶¹ While these are two early examples of using this type of insanity defense, the science has advanced greatly in that span,⁶² which could bare a possible jury granting more weight to the science of the brain degenerative disease. These examples lay an important groundwork that future defense attorneys could possibly seek to exploit as CTE research advances.

In this Note, I am going to examine whether CTE could increasingly be the basis for defenses to criminal behavior, especially murder. Section one will cover the history of the vast research into chronic traumatic encephalopathy, and it will focus on how recent advancements prove that CTE increases criminal behavior. Section two will tackle the available defenses that criminal defendants could use to bring a claim that CTE could have rendered them not responsible for their actions. This section of the Note dissects the various elements of classic health defenses in the criminal law and looks at the early efforts to fit CTE into those claims. Lastly, section three will examine the facts in the Hernandez case, as well as his behavioral history, and posit if a

⁵⁸ See Melinda Henneberger, *Blaming football in Lauren Astley's killing*, WASH. POST (Mar. 6, 2013), https://www.washingtonpost.com/blogs/she-the-people/wp/2013/03/06/the-commonwealth-v-football/?utm_term=.8e9be5168aa3; Ellie Kaufman, *Homicide charges dropped against ex-pro wrestler Jimmy 'Superfly' Snuka*, CNN (Jan. 5, 2017, 8:25 AM), <http://www.cnn.com/2017/01/04/health/jimmy-superfly-snuka-charges-dropped/index.html>.

⁵⁹ See Melinda Henneberger, *supra* note 58.

⁶⁰ See *id.*

⁶¹ See Ellie Kaufman, *supra* note 58.

⁶² Kat J. McAlpine, *Toward Diagnosing CTE in Living People*, BOS. UNIV. SCHOOL MED. <https://www.bumc.bu.edu/busm/2019/04/10/toward-diagnosing-cte-in-living-people/> (last visited Sept. 22, 2019).

CTE defense under the Massachusetts insanity defense would have been successful if tried by defense counsel.

I. THE HISTORY OF CHRONIC TRAUMATIC ENCEPHALOPATHY

The history of brain injuries developing after repetitive blows to the head has been around long before Aaron Hernandez and the CTE studies of NFL players.⁶³ In 1927, doctors began evaluating the evidence of brain degeneration in athletes.⁶⁴ After studying boxers, scientists and doctors concluded that the longer a boxer is exposed to persistent head trauma the more likely he will develop the effects of “dementia pugilistica” or “punch drunk” syndrome.⁶⁵ The symptoms ranged from slow speech to more advanced symptoms such as total mental incapacity that required hospitalization in medical facilities.⁶⁶ Additional studies concluded that retiring from boxing before symptoms appear did not prevent symptoms from arising later in life.⁶⁷ In fact, boxers were susceptible to developing the behavioral and emotional changes of punch-drunken syndrome as long as five years after their retirement.⁶⁸

In 1966, Dr. Henry Miller coined the medical terminology “chronic traumatic encephalopathy.”⁶⁹ Dr. Miller reclassified punch-drunken syndrome as a version of CTE and expanded the symptoms to include dementia, depression, and severe mood swings.⁷⁰ As a result of repeated head trauma, athletes and other patients subjected to this trauma developed these symptoms.⁷¹

⁶³ See Harrison S. Martland, *Punch Drunk*, 91 JAMA 1103, 1104, 1107 (1928).

⁶⁴ See *id.*

⁶⁵ See *id.* at 1103; Mckee et al., *supra* note 44.

⁶⁶ See Martland, *supra* note 63, at 1103.

⁶⁷ See Richard A. McCormick, *Is Professional Boxing Immoral?*, SPORTS ILLUSTRATED (Nov. 5, 1962), <https://www.si.com/vault/1962/11/05/670209/is-professional-boxing-immoral> (stating that even if people stop boxing before symptoms appear, each knockout causes definite irreparable damage to the brain which implies that even before symptoms appear, the damage is done).

⁶⁸ See *id.*

⁶⁹ Amanda Perkins, *Repetitive brain injury & CTE*, 14 WOLTERS KLUWERS HEALTH, INC. 32, 34 (May/June 2019).

⁷⁰ See *id.* at 34, 36 (describing the different names that CTE has been known by and the signs and symptoms of CTE).

⁷¹ See *id.*

In 2003, the most widely recognized study of CTE attributed repeated head trauma in football players as the direct cause of abnormal and violent behavior.⁷² In that study, Dr. Bennett Omalu performed the autopsy of Mike Webster,⁷³ who had suffered a heart attack brought on by dementia.⁷⁴ At first glance, autopsy results did not find any irregularities in Webster's brain.⁷⁵ However, Dr. Omalu conducted further incisions in Webster's brain that revealed abnormalities that were much akin to dementia.⁷⁶ These incisions revealed that there was a protein, called tau, that had built up in portions of the brain that impaired motor skills, mental cognition, and behavior in Webster.⁷⁷ Before his death, Webster, a former NFL player, exhibited behavior of violent outbursts, paranoia, delusion, and memory loss.⁷⁸ Webster would approach strangers on the street and yell, "Kill 'em! I'm gonna kill 'em!"⁷⁹ Dr. Omalu concluded that the Tau build-up resulted in CTE that in turn caused Webster's actions and bizarre states of mind.⁸⁰

⁷² See Jason M. Breslow, *The Autopsy That Changed Football*, PBS FRONTLINE (Oct. 6, 2013), <https://www.pbs.org/wgbh/frontline/article/the-autopsy-that-changed-football/> (detailing that in 2002, Dr. Bennett Omalu performed an autopsy on legendary football player, Mike Webster, and discovered CTE, which "was the first hard evidence that playing football could cause permanent brain damage").

⁷³ See Perkins, *supra* note 69, at 34.

⁷⁴ Gary Mihoces, *Attorney: Report backs ex-players' brain damage claims*, USA TODAY SPORTS (Nov. 16, 2012), <https://www.usatoday.com/story/sports/nfl/steelers/2012/11/16/nfl-concussions-mike-webster/1710567/>.

⁷⁵ *League of Denial: The NFL's Concussion Crisis*, FRONTLINE INTERVIEWS, <https://www.pbs.org/wgbh/pages/frontline/oral-history/league-of-denial/cte-discovery-of-a-new-disease/> (last visited Sept. 22, 2019).

⁷⁶ See Jeanne Marie Laskas, *The Brain That Sparked the NFL's Concussion Crisis*, ATLANTIC (Dec. 2, 2015), <https://www.theatlantic.com/health/archive/2015/12/the-nfl-players-brain-that-changed-the-history-of-the-concussion/417597/>.

⁷⁷ See *id.*

⁷⁸ See *id.* Mike Webster, who was an offensive lineman in the NFL from 1974-1990, suffered from several reported concussions throughout his career. Gary Mihoces, *Documentary: For years, NFL ignored concussion evidence*, USA TODAY SPORTS (Oct. 7, 2013, 7:56 PM), <https://www.usatoday.com/story/sports/nfl/2013/10/07/frontline-documentary-nfl-concussions/2939747/>. Further, because of severe deterioration of motor skills and emotional state of mind, Webster spent his last years homeless and living in his pickup truck. See *id.*

⁷⁹ Laskas, *supra* note 76.

⁸⁰ See *id.*

In 2006, Dr. Omalu performed an autopsy on another former NFL player, Terry Long, who died at the age of 46.⁸¹ However, this time, Terry Long was the first player that exhibited symptoms of CTE and committed suicide.⁸² Before Long's death, he suffered from Alzheimer like symptoms, was in and out of psychiatric hospitals, and suffered from depression.⁸³ Upon examining his brain, Dr. Omalu compared Long's brain to that of a "90 year old with advanced Alzheimer's."⁸⁴ Like Webster, Long's brain contained the tau inflammations.⁸⁵

A. CTE Stages and Symptoms

Since Dr. Omalu's findings, research in the brain degenerative disease has grown rapidly at the Boston University's Chronic Traumatic Encephalopathy Center led by Dr. Ann McKee.⁸⁶ Opening in 2008, the Research Center has been a hub where players voluntarily donate their brains to science upon their passing.⁸⁷ These brain donations have enabled the Center to confirm four different stages of CTE.⁸⁸ Recently, the same Center improved the ability to detect tau proteins in living patients, which

⁸¹ Kayleigh R. Mayer, *This is Football, You're Supposed to Get Hit: Tackling Concussions and Chronic Traumatic Encephalopathy: Has the NFL Been Wrongful?*, 10 DEPAUL J. SPORTS L. & CONTEMP. PROBS. 31, 35 (2014).

⁸² See *id.* Since the death of Long, there have been a number of notable NFL players that have committed suicide and were diagnosed with CTE postmortem: Junior Seau, Andre Waters, Ray Esterling, and Dave Duerson (non-exhaustive list). See *id.* at 35-36. The connection of CTE and suicide is not limited to NFL players; Dave Mirra, a world-renown extreme athlete, was diagnosed with CTE and died from suicide in 2016. Jesse Hyde, *Dave Mirra's Tragic Death: CTE and Extreme Athletes*, ROLLING STONE (Sept. 13, 2006), <http://www.rollingstone.com/sports/dave-mirras-suicide-cte-and-extreme-athletes-w438361>. Also, there have been notable hockey players that killed themselves as a result of CTE like behavior, such as Rick Rypien and Wade Belak. Maxwell Strachan, *Yet Another NHL Enforcer Appears to Have Died by Suicide*, HUFFINGTON POST (Sept. 21, 2015, 2:53 pm), https://www.huffingtonpost.com/entry/todd-ewen-enforcer-dead-dies_us_56001a08e4b08820d919521d.

⁸³ See Mayer, *supra* note 81, at 35-36.

⁸⁴ *Id.* at 35.

⁸⁵ Jeanne Marie Laskas, *Bennet Omalu, Concussions, and the NFL: How One Doctor Changed Football Forever*, GQ (Sept. 5, 2009), <https://www.gq.com/story/nfl-players-brain-dementia-study-memory-concussions>.

⁸⁶ See *About the Center*, BOS. UNIV. RES.: CTE CTR., <https://www.bu.edu/cte/about/> (last visited Oct. 3, 2019).

⁸⁷ See McKee et al., *supra* note 44.

⁸⁸ See *id.* at 43.

is a “crucial step toward the ultimate goal of diagnosing CTE in living individuals.”⁸⁹

While no form of CTE should be taken lightly, Stage I CTE is the mildest form, and some of the patients have exhibited no symptoms at all.⁹⁰ When symptoms are present, those suffering from Stage I experienced headaches, some memory loss, and some minor cases of depression.⁹¹ Stage IV is the most severe case of CTE, and the subjects had profound dysfunction in the areas of impulsivity, depression, suicidal behavior, aggression, and explosivity.⁹² This stage revealed the highest rates of suicide at thirty-one percent.⁹³ Moreover, every brain studied at this stage was impaired with dementia.⁹⁴ Those diagnosed with dementia suffer from psychological symptoms (e.g., anxiety, paranoia, hallucinations, and agitation) and cognitive symptoms (e.g., memory loss, confusion, and difficulty with reasoning).⁹⁵ While dementia is commonly found in patients that are above the age of sixty, dementia induced by CTE has been found in athletes in their forties, such as Chris Benoit.⁹⁶ At the time of his death, doctors revealed that Benoit had a brain reminiscent of an “85-year-old Alzheimer’s patient.”⁹⁷

In 2013, the CTE research team at Boston University conclusively discovered the cause of the disease was repetitive mild head trauma and not necessarily concussions.⁹⁸ While evidence of concussions can be a determining factor, evidence

⁸⁹ Kat J. McAlpine, *supra* note 62.

⁹⁰ See McKee et al., *supra* note 44, at 52.

⁹¹ See *id.* As expected, subjects that were found to have Stage II exhibited symptoms at a higher percentage—just under 80%. See *id.* at 55. The symptoms most commonly found in these subjects were headaches, short term memory loss, depression, and mood swings. See *id.* A smaller percentage of the subjects were suicidal and had explosive behavior. See *id.* Stage III CTE is where subjects experienced more behavioral, emotional and impulsive problems. See *id.* at 56. Additional to the symptoms found in the two previous stages, Stage III subjects had a higher tendency of depression, mood swings, explosive behavior, and some cases of apathy were found. See *id.*

⁹² See *id.* at 59.

⁹³ See *id.*

⁹⁴ See *id.*

⁹⁵ See *id.*

⁹⁶ See *Dementia*, MAYO CLINIC, <https://www.mayoclinic.org/diseases-conditions/dementia/symptoms-causes/syc-20352013> (last visited Oct. 3, 2019).

⁹⁷ Matthew Michaels, *Benoit’s Brain “Resembled 85-Year Old Alzheimer’s Patient”*, INSIDE PULSE (Sept. 5, 2007), <https://insidepulse.com/2007/09/05/70198/>.

⁹⁸ See McKee et al., *supra* note 44.

indicated that the tau protein was found at a higher frequency in athletes and military members that were exposed to reoccurring head trauma that didn't trigger concussion symptoms.⁹⁹

Additionally, the length of time that a person is continuously exposed to repetitive brain injuries seems to have an effect on the likelihood that such a person will develop CTE.¹⁰⁰ For instance, the longer the career of a football player, boxer, or other athlete, the greater the risk of developing CTE, which includes the significant risk of progressing from Stage I to Stage II or even IV.¹⁰¹ In fact, the same studies revealed that most symptoms of CTE will not surface until eight to ten years after retirement or the end of prolonged repetitive head trauma.¹⁰² The ages of the victims of CTE varied by Stage as well. Symptoms of Stage I have been found in subjects in the age range of 17-30.¹⁰³ Stage IV has the widest age range; the youngest brain studied with Stage IV symptoms was 35 and the oldest was 83.¹⁰⁴

For example, one of the youngest players found to have advanced stages of CTE was twenty-five-year-old Jovan Belcher.¹⁰⁵ On December 1, 2012, Jovan Belcher, a linebacker for the NFL's Kansas City Chiefs, got into an argument with his girlfriend, Kasandra Perkins.¹⁰⁶ The nature of what the argument was about is unclear, but the altercation climaxed when Belcher shot and killed Ms. Perkins.¹⁰⁷ Soon thereafter, police officers were called to the Chiefs' practice facility where Belcher later committed suicide in front of his coaches.¹⁰⁸ One year after his

⁹⁹ *See id.*

¹⁰⁰ *See id.* ("Repetitive mild traumatic brain injury can trigger the development of chronic traumatic encephalopathy (CTE), a progressive neuro degeneration characterized by the widespread deposition of hyperphosphorylated tau as neurofilibrillary tangles.")

¹⁰¹ *See id.* at 60 (emphasizing the correlation between pathological stage with duration to exposure of American football, survival after football, and age at death in those who played football).

¹⁰² *See* Gavett et al., *supra* note 40.

¹⁰³ Bonesteel, *supra* note 30.

¹⁰⁴ *Id.*

¹⁰⁵ *See* Steve Delsohn, *OTL: Belcher's brain had CTE signs*, ESPN, http://www.espn.com/espn/otl/story/_id/11612386/jovan-belcher-brain-showed-signs-cte-doctor-says-report (last updated Sept. 30, 2014).

¹⁰⁶ *See Jovan Belcher kills girlfriend, himself*, ESPN (Dec. 2, 2012), https://www.espn.com/nfl/story/_id/8697360/kansas-city-chiefs-jovan-belcher-kills-girlfriend-commits-suicide-police-say.

¹⁰⁷ Delsohn, *supra* note 105.

¹⁰⁸ *See id.*

death, his family had his body exhumed to perform an autopsy of his brain, which revealed damage to his brain that was consistent with those that were diagnosed with CTE.¹⁰⁹ Despite not having a long history of concussions, there was one particular instance where Belcher was knocked unconscious during a game.¹¹⁰ Experts believe that years of repeated head trauma, coupled with concussions, were indicative of his high likelihood of CTE.¹¹¹

B. Diagnosing CTE

In addition to the advances in learning about the mechanics and the symptoms of CTE, milestones have also been achieved with respect to diagnosing CTE. The only assured method that doctors can use to diagnose the disease is through a postmortem examination of the brain, though progress is being toward diagnosing an individual prior to death.¹¹² In searching for any diagnostic tool for a disease, whether it be high blood pressure or CTE, doctors and scientists look for biomarkers that serve as an indicator or road sign that a “biological process” exists.¹¹³ Being able to locate a biomarker in a living patient allows for a diagnosis to occur without requiring a complete biopsy.¹¹⁴

In September 2017, the Boston Research Center found a high correlation of the presence of a biomarker—CCL11—in brains that were exposed to at least sixteen years of football.¹¹⁵ In fact, experiments could predict, with high levels of precision, rises in the presence of CCL11 with increases in the number of years exposed to football.¹¹⁶ Of further importance, the research concluded this biomarker was not present in other degenerative

¹⁰⁹ *Id.*

¹¹⁰ *See id.*

¹¹¹ *See* Kounang & Smith, *supra* note 33.

¹¹² *See* Hohler, *supra* note 48.

¹¹³ *See* Kyle Strimbu & Jorge A. Tavel, *What are Biomarkers?*, 5 CURR. OPIN. HIV AIDS 463, 464 (2010) (emphasizing that biomarkers are defined as “objective, quantifiable characteristics of biological processes”).

¹¹⁴ *See* Sarah Rimer, *BU Researchers ID Possible Biomarker for Diagnosing CTE during life*, BRINK (Sept. 26, 2017), <http://www.bu.edu/articles/2017/diagnosing-cte-during-life>.

¹¹⁵ *See* Cherry et al., *CCL11 is increased in the CNS in chronic traumatic encephalopathy but not in Alzheimer’s disease*, PLOS ONE (Sept. 26, 2017), <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0185541>.

¹¹⁶ *Id.*

brain diseases, the most notable being Alzheimer's.¹¹⁷ Thus, doctors are able to correctly diagnose patients with CTE where the biomarker is found in a patient, instead of mistakenly attributing their symptoms to other degenerative brain diseases. While this finding is a monumental step into diagnosing CTE, Dr. McKee has predicted that with their limited funding and resources, the medical world still needs years to find an actual method of diagnosis in live patients.¹¹⁸

In November 2017, Dr. Omalu and his research team revealed Fred McNeill as the first living patient diagnosed with CTE.¹¹⁹ McNeill, a former NFL player, began to display symptoms commonly found in other NFL players that were confirmed to have CTE.¹²⁰ In 2012, McNeill and fourteen other retired players participated in Dr. Omalu's research study utilizing a positron emission tomography ("PET") scan of the brain for diagnosis.¹²¹ The method utilizes a radioisotope that attaches and highlights tau proteins.¹²² Dr. Omalu hypothesized that, if successful, the PET scan will reveal the distinct patterns of the protein commonly found in confirmed cases of CTE without the requirement of dissecting the brain.¹²³

During the initial scan in 2012, the team confirmed that McNeill's brain contained those distinct tau patterns.¹²⁴ As McNeill's symptoms worsened to those of Stage IV, the scans confirmed the progression of the tau proteins in his brain that confirmed the disease's progression.¹²⁵ In 2015, McNeill passed away at the age of 63, and after an autopsy, it was confirmed that McNeill did in fact suffer from CTE resulting in the team's first successful diagnosis of CTE in a living person.¹²⁶ Because of the

¹¹⁷ *Id.*

¹¹⁸ *See* Goldman, *supra* note 41.

¹¹⁹ *See* Kounang, *supra* note 45.

¹²⁰ *See* Nadia Kounang, *CTE in the NFL: The tragedy of Fred McNeill*, CNN (Feb. 5, 2016), <http://www.cnn.com/2016/02/04/health/fred-mcneill-cte-football-player/index.html> (showing that Dr. Omalu would bet his life on the fact that McNeil had CTE because McNeill began forgetting to pick up the kids from school, had trouble concentrating on tasks, and even complaining of headaches).

¹²¹ *See id.*

¹²² *Id.*

¹²³ *See id.*

¹²⁴ *See id.*

¹²⁵ *See id.*

¹²⁶ *See* Kounang, *supra* note 45.

success of this diagnosis, Dr. Omalu predicted that, with proper funding and approval by the U.S. Food and Drug Administration, his PET scan method could be used to diagnose patients within a few years.¹²⁷

These recent medical advancements by teams are significant because they point to a future when doctors will be able to testify in court that a criminal defendant is afflicted with CTE and even identify what stage of CTE. Diagnoses before death will enable a criminal defendant to put forth stronger claims of classic defenses such as diminished capacity and insanity.

C. Victims of Chronic Traumatic Encephalopathy

In a recent study that was published by Boston University, researchers examined 202 brains that were subjected to football at differing levels of play.¹²⁸ Of the 202 brains examined, 177 of them suffered from CTE—an incredible 88 percent.¹²⁹ The study was consistent with previous findings that the severity and duration of head trauma is a true indicator of the greater likelihood of the more advanced stages of CTE.¹³⁰ For instance, in a study published by the Journal of the American Medical Association, 21 percent of individuals that played football only in high school suffered from “mild CTE.”¹³¹ Former college football players tested at a rate of 90 percent and former NFL players tested at an incredible 99 percent.¹³² As if these numbers were not alarming enough, 133 of those subjects displayed severe CTE, such as violent behavior, suicidal thoughts, explosive behavior.¹³³

To emphasize the importance of this study, the bigger picture should focus on the vast rates of participants in football and how confirmed cases of CTE can be expected to rise. Just at the high school level, there were 1,086,748 teenagers playing football at a

¹²⁷ *See id.*

¹²⁸ Goldman, *supra* note 41.

¹²⁹ *Id.*

¹³⁰ *See id.*

¹³¹ *Id.*

¹³² *Id.* (emphasizing that the study found 48 out of 53 brains of former college football players tested positive for CTE and 110 out of 111 brains of former NFL players tested positive for CTE).

¹³³ *See id.*

competitive level in the 2016-2017 school year.¹³⁴ In 2007, there were a reported number of more than 100,000 concussions suffered by high school athletes—football players being the majority number.¹³⁵ If experts were to apply the twenty-one percent of high school players afflicted by CTE to the current population, there could be over 200,000 current participants that could show symptoms of mild CTE by the age of thirty. Further, this number is only based on confirmed concussions.¹³⁶ Research has shown that fifty percent of student athletes will not or have not reported a concussion to a coach or athletic trainer.¹³⁷ This number is troubling in that “[a] high school athlete who has not fully recovered from a single concussion before a second injury occurs could experience catastrophic complications.”¹³⁸ Therefore, the projected number could be significantly higher if researchers consider unreported concussions. Taking these numbers into account just at the high school level alone, the threat of the growing number of CTE like behavior will continue to increase even as additional research is conducted and an eventual living diagnosis is achieved.

Lastly, it is important to note that CTE has been found in professional hockey players, soccer players, military members, professional wrestlers, and anyone who has been subjected to repeated head trauma.¹³⁹ However, the research into athletes suffering from CTE has been skewed because of bias based upon availability.¹⁴⁰ As part of its research, Boston University created a “brain bank” that accepts brains of those exhibiting signs of CTE during their lifetime.¹⁴¹ Thus, because the overwhelming number

¹³⁴ *High School Sports Participation Increases for 28th Straight Year, Nears 8 Million Mark*, NAT'L FED. ST. HIGH SCHOOL ASS'N. (Sept. 6, 2017), <https://www.nfhs.org/articles/high-school-sports-participation-increases-for-28th-straight-year-nears-8-million-mark/>.

¹³⁵ Luke M. Gessel et al., *Concussions Among United States High School and Collegiate Athletes*, 42 *J. ATHLETIC TRAINING* 495, 496 (2007), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2140075/>.

¹³⁶ Jessica Wallace et al., *Knowledge of Concussion and Reporting Behaviors in High School Athletes With or Without Access to an Athletic Trainer*, 52 *J. ATHLETIC TRAINING* 228, 228 (2017).

¹³⁷ *Id.*

¹³⁸ *See id.*

¹³⁹ *See* Gavett et al., *supra* note 40.

¹⁴⁰ Barbara Moran, *CTE Found in 99 Percent of Former NFL Players Studied*, *BRINK* (Jul. 24, 2017), <http://www.bu.edu/research/articles/cte-former-nfl-players/>.

¹⁴¹ *Id.*

of brains donated were from former football players, the statistics and research has been primarily focused on football brains.¹⁴² As awareness grows in other sports and those players become more involved, confirmed instances of CTE are guaranteed to exponentially grow.

II. CRITICISMS OF CTE RESEARCH

Despite the vast efforts by the teams of Dr. Omalu and Dr. McKee, the research into CTE has faced its lion's share of criticism, as described below. Defense attorneys and prosecutors grapple with causation questions for specific intent crimes.¹⁴³ For a disease like CTE, the defense must argue that their client suffered from CTE symptoms at the time of the alleged crime.¹⁴⁴ Prosecutors can rebut this argument by bringing in evidence of the criticisms of CTE research. The three recurring and most common criticisms prosecutors will address include: (1) the minute sample size of brains dissected are biased towards the desired results,¹⁴⁵ (2) there is not sufficient evidence supporting the correlation that those with CTE are more prone than the general public to commit violent acts,¹⁴⁶ and (3) the subjects that had been studied also had alcohol and drug dependencies, which create causation issues for violent or aggressive behavior.¹⁴⁷

¹⁴² *Id.*

¹⁴³ See *The Impact of Specific Intent Crimes on the Defendant*, HG.ORG, <https://www.hg.org/legal-articles/the-impact-of-specific-intent-crimes-on-the-defendant-51372> (last visited Oct. 26, 2019) ("When the prosecution uses specific intent rather than general intent, they are saying that the defendant not only knowingly committed the crime but had the intention to cause the outcome directly . . . [i]f the prosecuting lawyer is successful in this endeavor, he or she can ensure that the penalties [for the defendant] are harsher in normal circumstances . . .").

¹⁴⁴ See Covey, *supra* note 55 at 1642 ("Generally, a defendant who asserts an insanity defense alleges that, *at the time of her criminal act*, she either did not know what she was doing or she did not know what she was doing was wrong.") (emphasis added).

¹⁴⁵ See Daniel Engber, *Inflategate*, SLATE (July 26, 2017, 6:21 PM), http://www.slate.com/articles/sports/sports_nut/2017/07/the_press_is_overhyping_the_latest_study_on_cte_in_the_nfl.html.

¹⁴⁶ See Diamond, *supra* note 29.

¹⁴⁷ See McKee et al., *supra* note 44.

A. *Sample Bias*

The Boston University study received criticism for its “small sample size” and a bias of brains donated.¹⁴⁸ It should be noted by 2009 there were only 51 CTE case studies, while the number ballooned to over 320 cases of CTE in 2018.¹⁴⁹ Additionally, this criticism towards the study focuses on the fact that the families who donated these brains of former football players were motivated by their observations of behavior consistent with CTE symptoms.¹⁵⁰ Thus without a way to diagnose a defendant, the prosecution will point out that any evidence introduced is slanted to only the small number of confirmed cases of CTE. In her counter to this criticism, Dr. Ann McKee admits these numbers are skewed, but the rising numbers of CTE diagnosis is indicative of how prevalent the disease is in society.¹⁵¹ Even though the sample size is small and biased, it is clear that there is an overwhelming connection between football and CTE.

B. *Conditioning of the Sport is the Actual Cause for Violent and Explosive Behavior*

Furthermore, since CTE is primarily found in football players, doubters of the CTE studies have held that the nature of the sport is the more probable causation for violent behavior rather than the brain disease.¹⁵² Supporters of this argument take the position that NFL players have been conditioned since a young age to be more aggressive than the general public.¹⁵³ Thus, they argue the conditioning, not the brain trauma, is the cause of violent behavior.¹⁵⁴ However, a study in England indicated that 60

¹⁴⁸ See Engber, *supra* note 145.

¹⁴⁹ VA-BU-CLF Brain Bank: About, BOS. UNIV. RES.: CTE CTR., <http://www.bu.edu/cte/our-research/brain-bank/> (last visited Oct. 6, 2019).

¹⁵⁰ See McKee et al., *supra* note 44.

¹⁵¹ *Id.* (describing that new scientific research is showing CTE is not limited to only boxers, but instead is being found in other members of society).

¹⁵² See Dan Diamond, *Are NFL Concussions Linked to NFL Domestic Violence? More Are Asking, As League's Problems Mount*, FORBES (Sept. 18, 2014), <https://www.forbes.com/sites/dandiamond/2014/09/18/nfl-possible-concussions-domestic-violence-link-getting-more-scrutiny/#555c1b891d2d>.

¹⁵³ See *id.*

¹⁵⁴ *Id.* When football players are young, they are “cultivated” for their aggression and holding onto a job in professional football is inherently stressful, which leaves players “on

percent of criminal inmates suffered brain trauma from car accidents, fighting, sports activities, or other traumatic physical experiences.¹⁵⁵ In a separate study in Australia, scientists concluded males who suffered brain trauma had an 18 percent likelihood of having a conviction record compared to the 10 percent of males that did not suffer brain trauma.¹⁵⁶ In South Carolina, a survey revealed that 65 percent of male prisoners and 73 percent of female prisoners suffered brain trauma before their convictions.¹⁵⁷

By looking at the general population of convicts, these studies independently conclude that with or without conditioning, CTE and other head trauma makes individuals more prone to violent behavior.¹⁵⁸ In several interviews with family members of former football players with CTE, the families revealed those players did not display violent or aggressive behavior until much later in their careers and lives.¹⁵⁹ For instance, George Visger, a former NFL player, described himself as “happy-go-lucky” and enjoyable to be around.¹⁶⁰ However, after suffering several concussions, Visger acknowledged his temperament changed to being short and

edge.” *Id.* Some doctors are cautious about linking aggression to brain damage and point out that it is “difficult to retrospectively look at a violent population – especially one that doesn’t include football players – and come to the conclusion about a link between concussions and domestic violence.” *Id.*

¹⁵⁵ Sarah Knapton, *Up to 60 per cent of prisoners have head injuries, as experts warn brain damage may fuel crime*, TELEGRAPH (Feb. 26, 2018, 11:30 PM), <https://www.telegraph.co.uk/science/2018/02/26/60-per-cent-prisoners-have-head-injuries-experts-warn-brain/>.

¹⁵⁶ Peter Schofield et al., *Does Traumatic Brain Injury Lead to Criminality? A Whole-Population Retrospective Cohort Study Using Linked Data*, PLOS ONE (Jul. 14, 2015), <https://doi.org/10.1371/journal.pone.0132558>.

¹⁵⁷ Katherine Harmon, *Brain Injury Rate 7 Times Greater among U.S. Prisoners*, SCI. AM. (Feb. 4, 2012), <https://www.scientificamerican.com/article/traumatic-brain-injury-prison/>.

¹⁵⁸ See Schofield et al., *supra* note 156 (“The results support a modest causal link between [traumatic brain injury] and criminality after comprehensive adjustment for confounding.”); see also Harmon, *supra* note 150 (“[Traumatic brain injuries], which can alter behavior, emotion and impulse control, can keep prisoners behind bars longer and increases the odds they will end up there again.”).

¹⁵⁹ See John McDermott, *The Connection Between Concussions, CTE And Acts Of Violence*, MEL MAG. (Jul. 12, 2017), <https://melmagazine.com/the-connection-between-concussions-cte-and-acts-of-violence-ae43e8566a5c>. (describing the stories of former football players George Visger, Mike Webster, Dave Duerson, and Terry Tautolo).

¹⁶⁰ See *id.*

explosive.¹⁶¹ Visger, who is still alive, has participated in many studies while his condition has progressively become worse.¹⁶²

Another example is that of Justin Strzelczyk, who died at the age of thirty-six and never had a history of violent behavior.¹⁶³ However, months before his death in 2004, he became increasingly aggressive.¹⁶⁴ On the day of his death, police attempted to pull Strzelczyk over for erratic driving in New York.¹⁶⁵ Rather than pulling over, he led the police on a high-speed chase that included him driving against traffic and colliding with a truck that killed him on impact.¹⁶⁶

The examples of Visger and Strzelczyk are just two examples that relate to the studies of convicts. Where a defendant shares the same progression of these two men, a defense attorney will be able to argue against the conditioning argument made by prosecutors through evidence that his or her client did not exhibit violent behavior during their playing years. Therefore, attorneys providing evidence that their client maintained a peaceful demeanor off the field throughout their career will provide proof that repetitive head trauma caused a change in personality and the ability of their client to control their actions.

C. Alcohol and Drug Dependencies are the Cause of a Criminal Defendant's Actions

Many of the players examined also had a history of drug, steroid, and alcohol abuse that could have been the causation of their violent or explosive behavior.¹⁶⁷ A prosecutor would argue that addiction was the actual cause for the erratic behavior, which is

¹⁶¹ *See id.*

¹⁶² *See id.*; Patrick Hruby, *The Damage Done*, PATRICK HRUBY (Feb. 2013), <https://www.patrickhruby.net/2013/02/the-damage-done.html>.

¹⁶³ *See* Alan Schwartz, *Lineman, Dead at 36, Exposes Brain Injuries*, N.Y. TIMES (June 15, 2007), <http://www.nytimes.com/2007/06/15/sports/football/15brain.html>; *see also* Associated Press, *Justin Strzelczyk, Former Steeler, Dies in Highway Chase*, N.Y. TIMES (Oct. 1, 2004), <https://www.nytimes.com/2004/10/01/sports/football/justin-strzelczyk-former-steeler-dies-in-highway-chase.html>.

¹⁶⁴ *See* Schwartz, *supra* note 163.

¹⁶⁵ *See id.*

¹⁶⁶ *See id.*

¹⁶⁷ *See* Jesse Mez et al., *Clinicopathological Evaluation of Chronic Traumatic Encephalopathy in Players of American Football*, 318 JAMA 360, 368 (2017).

not an affirmative defense for defendants.¹⁶⁸ However, a defense attorney could argue the addiction stemmed from their client's declining physical and mental health resulting from CTE. In a study of 111 former NFL players' brains, over 53 percent of the players examined had a history of alcohol or drug abuse.¹⁶⁹ Experts indicate those suffering from CTE are self-medicating to deal with their symptoms.¹⁷⁰

The strongest example of experts taking a stance of blaming drugs or blaming brain trauma for violent acts was ever present in the nightmarish investigation of Chris Benoit. Benoit started wrestling as a teenager and played organized football for five years.¹⁷¹ By the time he was eighteen-years-old, he became a professional wrestler.¹⁷² Throughout his twenty-two year professional career, Benoit participated in many stunts that involved aerial stunts, kicks and punches to the head, and he suffered injuries from being hit in the upper body with props such as steel chairs and ladders.¹⁷³ Also, Benoit's "signature move" is best described as a "diving headbutt."¹⁷⁴ These incidents resulted in many concussions before his death.¹⁷⁵ Further, Benoit's behavior began indicating mental issues at the age of thirty-six, and in a diary, he described his depression and lapses in memory over the following years.¹⁷⁶

On June 25, 2007, the bodies of Chris Benoit, his wife, and their seven-year-old son were found dead.¹⁷⁷ Over a forty-eight-hour period, Benoit murdered his wife and son and hanged himself.¹⁷⁸

¹⁶⁸ See Stephen J. Morse, *Addiction, Choice and Criminal Law*, U. PA. L. FAC. SCHOLARSHIP 1, 21 (2017).

¹⁶⁹ See Mez et al., *supra* note 167.

¹⁷⁰ See *The Connection Between Drug Addiction and Brain Trauma*, MICHAEL'S HOUSE, <https://www.michaelshouse.com/blog/the-connection-between-drug-addiction-and-brain-trauma/> (last visited Sept. 18, 2019).

¹⁷¹ See Bennet I. Omalu et al., *Chronic traumatic encephalopathy in a professional American wrestler*, 6 J. FORENSIC NURSING 130, 131 (2010). Despite playing football, Benoit had no history of head injuries and never missed a game or practice. *Id.*

¹⁷² *Id.*

¹⁷³ See Lauren K. Wolf, *Racing to Detect Brain Trauma*, 92 CHEMICAL & ENGINEERING NEWS 9, 9 (July 21, 2014); Nelson & Sherwood, *supra* note 34.

¹⁷⁴ See Wolf, *supra* note 173 (describing the maneuver as one Benoit sometimes used "[t]o finish off an opponent").

¹⁷⁵ See Omalu et al., *supra* note 171.

¹⁷⁶ *Id.*

¹⁷⁷ See Nelson & Sherwood, *supra* note 34.

¹⁷⁸ *Id.*

The official cause of death for his wife and son was asphyxiation.¹⁷⁹ A toxicology report revealed that Benoit had ingested an anabolic steroid, which triggered many to suggest Benoit killed himself and his family while exhibiting “roid rage.”¹⁸⁰ However, Dr. Justin Bailes suggested that instances of roid rage are temporary fits, which was inconsistent with Benoit murdering his family over a span of multiple days.¹⁸¹

With the assistance of Dr. Bennet Omalu, Dr. Bailes examined Benoit’s brain and revealed that Benoit was suffering from an extreme case of CTE, which was consistent with the results found in the Mike Webster study.¹⁸² In a published report, Dr. Bailes and Dr. Omalu confirmed their findings that Benoit was suffering from dementia that was likely caused by CTE.¹⁸³ The doctors reported that Benoit’s brain was comparable to that “of an 85-year-old Alzheimer’s patient.”¹⁸⁴

In conclusion, the Chris Benoit tragedy illustrates that causation is the strongest foot upon which critics to CTE research will stand because experts on both sides will not agree to whether, in this instance, steroids or CTE caused the catastrophic events that unfolded in the Benoit household. The importance of this section is to illustrate how vital expert testimony and jurors are when faced with a CTE defense. How will juries weigh the defense’s expert witness in comparison with the prosecution’s expert?

¹⁷⁹ See *Canadian pro wrestler killed family then himself: police*, CBC NEWS (June 26, 2007, 9:55 AM), <https://www.cbc.ca/news/world/canadian-pro-wrestler-killed-family-then-himself-police-1.638182>.

¹⁸⁰ See Miranda Hitti, *Chris Benoit: Was Roid Rage to Blame?*, WEBMD, <https://www.webmd.com/mental-health/features/roid-rage-14-questions-and-answers#1> (last updated June 27, 2007) (explaining the correlation between anabolic steroids and testosterone, both of which were found to be abnormally high in Benoit’s blood).

¹⁸¹ See Nelson & Sherwood, *supra* note 34.

¹⁸² See Sports Legacy Inst., *Wrestler Chris Benoit Brain’s Forensic Exam Consistent With Numerous Brain Injuries*, SCIENCEDAILY (Sept. 6, 2007), <https://www.sciencedaily.com/releases/2007/09/070905224343.htm>; Nelson & Sherwood, *supra* note 34.

¹⁸³ See Sports Legacy Inst., *supra* note 182. As mentioned above, the symptom of dementia (along with the other accompanying symptoms) are signs of the most severe stage of CTE—stage IV. See McKee et al., *supra* note 44, at 43-44.

¹⁸⁴ See Michaels, *supra* note 97.

III. DEFENSES MOST APPLICABLE TO CTE

The proceeding sections will address the possible ways that criminal defendants can pursue a defense that their actions were influenced by chronic traumatic encephalopathy. Each section serves a purpose to illustrate, that just as the science and research has evolved, the courts are beginning to evolve their thinking by accepting testimonial and physical evidence of CTE to establish an affirmative defense. The first section will focus on raising defenses due to insanity, including another example of allowing CTE to be argued as a defense. The third and final section here will address diminished capacity. Insanity and diminished capacity will be highlighted in this section and section three of the Note. Both defenses are the most logical and most applicable in addressing Aaron Hernandez case since there was question as to whether Hernandez was mentally incompetent to stand trial,¹⁸⁵ which is the focus of the third and final section. This area discusses James Snuka, who developed dementia from CTE and was charged with a homicide over twenty years before charges were brought against him.¹⁸⁶ While the case is incredibly rare for prosecutors and defense attorneys because of the time lapse between the act and indictment, the important aspect to derive is how a Pennsylvania court welcomed CTE evidence in a hearing.

A. *Insanity Defense*

Unlike mental competency to stand trial, the insanity defense is not about whether the defendant is unfit at the present, but about whether the defendant at the time of the crime was under the influence of some “mental disease or defect.”¹⁸⁷ Instead of pleading guilty or not guilty, the defendant asserting the affirmative

¹⁸⁵ See Aly Vander Hayden, *Defense Attorney Jose Baez Reveals What He Thought About Aaron Hernandez's CTE Diagnosis*, OXYGEN (Mar. 7, 2018, 10:16 AM), <https://www.oxygen.com/aaron-hernandez-uncovered/crime-time/defense-attorney-jose-baez-aaron-hernandez-cte>.

¹⁸⁶ See Barry Werner, *Jimmy Snuka suffers from brain damage, dementia, says psychologist in court*, FOX SPORTS (May 13, 2016), <https://www.foxsports.com/wwe/story/jimmy-snuka-suffers-from-brain-damage-dementia-says-psychologist-in-court-051316>.

¹⁸⁷ See *Insanity Defense FAQs*, FRONTLINE, <http://www.pbs.org/wgbh/pages/frontline/shows/crime/trial/faqs.html> (last visited Oct. 31, 2017).

defense¹⁸⁸ of insanity pleads “not guilty by reason of insanity.”¹⁸⁹ Thus, the defendant may admit that he committed the act of the crime, but he cannot be held “morally blameworthy” for his actions.¹⁹⁰

There are several different insanity rules that the states have adopted.¹⁹¹ Most states are mainly divided between the M’Naughten test and Model Penal Rule § 4.01, while a few other states utilize the Irresistible Impulse Test or the Product Test.¹⁹² The main difference between the jurisdictions is the focus on cognitive understanding or volitional actions.¹⁹³

B. M’Naughten Test

The M’Naughten test traces its origins to nineteenth century England.¹⁹⁴ The rule developed, and later adopted in the United States, focused primarily on whether the criminal defendant had

¹⁸⁸ See Julie E. Grachek, Note, *The Insanity Defense in the Twenty-First Century: How Recent United States Supreme Court Case Law Can Improve the System*, 81 IND. L. J. 1479, 1480 (2006). Thirty-six states, including New York, place the burden of proof on the defendant. See *The Insanity Defense Among The States*, USLEGAL, <https://criminallaw.uslegal.com/defense-of-insanity/the-insanity-defense-among-the-states/> (last visited Sept. 20, 2019). The states that place the burden on the state include New Jersey and Massachusetts. *Id.*

¹⁸⁹ See Ira Mickenberg, *A Pleasant Surprise: The Guilty but Mentally Ill Verdict Has Both Succeeded in its Own Right and Successfully Preserved the Traditional Role of the Insanity Defense*, 55 U. CIN. L. REV. 943, 979 (1987).

¹⁹⁰ *Id.* at 954. However, because of the low success rate of the insanity defense, a minority of the states have adopted a verdict of “guilty but mentally ill,” which addressed the growing societal concerns that mentally ill persons were not receiving treatment in correctional facilities. See Natalie Jacewicz, ‘Guilty But Mentally Ill’ Doesn’t Protect Against Harsh Sentences, NPR (Aug. 2, 2016, 1:22 PM), <https://www.npr.org/sections/health-shots/2016/08/02/486632201/guilty-but-mentally-ill-doesnt-protect-against-harsh-sentences>. In essence, the guilty but mentally ill verdict is a charge that holds the defendant criminally responsible for his crimes, but during his prison sentence, the defendant will be court-ordered to receive the proper medical treatment. See FRONTLINE, *supra* note 187.

¹⁹¹ See Jeffrey S. Janofsky et al., *AAPL Practice Guideline for Forensic Psychiatric Evaluation of Defendants Raising the Insanity Defense*, 42 J. AM. ACAD. PSYCHIATRY & L. S3, S8 (2014). Idaho, Kansas, Montana, and Utah no longer have the insanity defense after it was repealed by each state. *Id.*

¹⁹² See *id.* at S5-S6; FRONTLINE, *supra* note 187.

¹⁹³ See Janofsky et al., *supra* note 191 (“Legal standards [for the insanity defense] can be categorized by the presence of a cognitive or a volitional prong.”).

¹⁹⁴ See Christopher Slobogin, *The Integrationist Alternative to the Insanity Defense: Reflections on the Exculpatory Scope of Mental Illness in the Wake of the Andrea Yates Trial*, 30 AM. J. CRIM. L. 315, 317 (2003).

a cognitive understanding that his conduct was wrongful.¹⁹⁵ “Generally, a defendant who asserts an insanity defense alleges that, at the time of her criminal act, she either did not know what she was doing or she did not know what she was doing was wrong.”¹⁹⁶ As of 2002, twenty-five states used the M’Naughten test to determine a defendant’s insanity.¹⁹⁷

C. Irresistible Impulse Test

Because there were many critics to the cognitive focus of the M’Naughten test, another rule was developed that took center aim at the volitional arguments for insanity: the Irresistible Impulse Test.¹⁹⁸ The Irresistible Impulse Test is a narrow volitional test because

under this test, the defendant will be found not guilty by reason of insanity if they can show that as a result of mental disease or defect, they could not resist the impulse to commit the crime of which they are accused, due to an inability to control their actions.¹⁹⁹

Essentially, these states look to whether the defendant’s “free agency” to control their actions has been overcome by the disease from which they are suffering.²⁰⁰ To satisfy this burden, defendants must show that their ability to control their actions have been totally impaired.²⁰¹

¹⁹⁵ See Covey, *supra* note 55, at 1642 (“Generally, a defendant who asserts an insanity defense alleges that, at the time of her criminal act, she either did not know what she was doing or she did not know what she was doing was wrong.”); State v. Tamplin, 986 P.2d 914, 916 (Ariz. Ct. App. 1999); see also M’Naughten Case (1843) 8 Eng. Rep. 718 (HL), <http://www.bailii.org/uk/cases/UKHL/1843/J16.html>.

¹⁹⁶ See Covey, *supra* note 55.

¹⁹⁷ Grachek, *supra* note 188, at 1485.

¹⁹⁸ See *id.* at 1483.

¹⁹⁹ CORNELL L. SCH.: LEGAL INFO INST., *supra* note 54. This test was first introduced by the Supreme Court of Alabama. See *Parsons v. State*, 2 So. 854, 866 (Ala. 1887) (recognizing that mental disease may render a defendant “powerless to resist” committing a crime).

²⁰⁰ See Grachek, *supra* note 188, at 1483 (quoting *Parsons*, 2 So. 854, 866).

²⁰¹ See *id.* at 1483-84.

D. Model Penal Code § 4.01

When the American Law Institute created the Model Code in 1955, the creators drafted a two-prong insanity defense that essentially combined M’Naughten and Irresistible Impulse:²⁰²

A person is not responsible for criminal conduct if at the time of such conduct as a result of mental disease or defect he lacks substantial capacity either to appreciate the criminality [wrongfulness] of his conduct or to conform his conduct to the requirements of law.²⁰³

By combining the two tests, § 4.01 provides a defense for both cognitive insanity and volitional insanity.²⁰⁴ Additionally, unlike the strict requirement not to “know the nature or quality of the act” under M’Naughten, the American Law Institute only requires the defendant to “lack substantial capacity.”²⁰⁵

This rule, or some variant of the Model Penal Code rule, has been adopted by twenty states, including Massachusetts.²⁰⁶ The insanity law in Massachusetts establishes that a criminal defendant is “not responsible for criminal conduct if at time of such conduct as a result of mental disease or defect he lacks substantial capacity either to appreciate the criminality [wrongfulness] of his conduct or to conform his conduct to the requirements of law.”²⁰⁷

In 2013, defense counsel for Nathaniel Fujita unsuccessfully invoked Massachusetts insanity defense based upon a psychotic break caused by CTE.²⁰⁸ In 2011, eighteen-year-old Nathaniel Fujita was charged with first-degree murder²⁰⁹ for the death of his ex-girlfriend.²¹⁰ After ending their relationship, eighteen-year-old Lauren Astley was concerned about Fujita’s well-being and agreed

²⁰² See Janofsky et al., *supra* note 191, at S6.

²⁰³ MODEL PENAL CODE § 4.01 (AM. LAW INST. 1985).

²⁰⁴ See Janofsky et al., *supra* note 191.

²⁰⁵ *Id.* at S6.

²⁰⁶ See *id.* at S38-S45 (indicating 20 states using either “Strict ALI” or “ALI Variant”).

²⁰⁷ Commonwealth v. McHoul, 226 N.E.2d 556, 557-58 (Mass. 1967).

²⁰⁸ See Evan Allen, *Expert pans Fujita’s psychosis defense*, BOS. GLOBE (Mar. 4, 2013, 2:19 PM), <https://www.bostonglobe.com/metro/2013/03/04/rage-not-psychosis-drove-nathaniel-fujita-kill-girlfriend-psychiatrist-testifies-for-prosecution/HM6PGmqLYKiLsG2yNvEzkl/story.html>.

²⁰⁹ See MASS. GEN. LAWS ANN. ch. 265, § 1 (West 2019) (“Murder committed with deliberately premeditated malice aforethought, or with extreme atrocity or cruelty . . . is murder in the first degree.”).

²¹⁰ See Henneberger, *supra* note 58.

to meet him at his parent's house.²¹¹ After a brief conversation in her car, Fujita lashed out and punched Astley several times before strangling her and taking a knife to her throat.²¹²

At the trial, defense counsel asserted that Fujita should not be charged with first-degree murder because Fujita was suffering from CTE symptoms stemming from playing football.²¹³ Fujita was allowed to proceed with an insanity defense through testimony from expert witnesses and others who witnessed a prior violent lash out.²¹⁴ The key expert witness for the defense maintained that Fujita's murderous actions were a product of a psychotic break as result of years of head trauma coupled with his depression and predisposition to other mental illnesses.²¹⁵ However, the jury ultimately sided with the prosecution's expert witness, who asserted Fujita's actions were only the product of rage and anger that resulted from Astley calling off their relationship.²¹⁶ The court and the jury were in agreement that Fujita was fully aware and in total control of his actions on that fateful night and thus, not insane.²¹⁷ Although the defense was futile, this case was an early example of a court acknowledging CTE as a possible mental disease or defect.

E. Diminished Capacity Defense

Another possible defense that a defendant can assert is under diminished capacity. This doctrine is not a complete defense to the

²¹¹ See Mark Arsenault & Vivian Yee, *A flurry of texts, a final meeting*, BOS. GLOBE (July 10, 2011), http://archive.boston.com/news/local/massachusetts/articles/2011/07/10/fujita_pushed_hard_to_see_astley_the_night_she_died/?page=full.

²¹² See Sharyn Alfonsi & Kelly Hagan, *Chilling Details Emerge in Lauren Astley's Killing*, ABC NEWS (Aug. 25, 2011), <https://abcnews.go.com/US/chilling-details-emerge-lauren-astleys-killing/story?id=14377421>.

²¹³ See Henneberger, *supra* note 58.

²¹⁴ See *id.*

²¹⁵ See Norman Miller, *Expert: Fujita not criminally responsible for murder*, METROWEST DAILY NEWS (Mar. 2, 2013, 12:01 AM), <https://www.metrowestdailynews.com/article/20130302/NEWS/303029624>.

²¹⁶ See Allen, *supra* note 208.

²¹⁷ See Evan Allen & Lisa Kocian, *Nathaniel Fujita found guilty in Wayland murder*, BOS. GLOBE (Mar. 8, 2013, 12:00am), <https://www.bostonglobe.com/metro/massachusetts/2013/03/08/jury-deliberations-resume-trial-nathaniel-fujita-accused-murdering-girlfriend-wayland/nos9cTCbqZLaJ1ls0p8WuK/story.html>.

crimes charged.²¹⁸ Rather, the defendant is not contesting that he committed the *actus reus*,²¹⁹ but that he did not have the *mens rea* to be charged with that crime.²²⁰ Thus, the defendant is claiming that he should be charged with a lesser crime.²²¹ To do this, the defendant, like defending based on insanity, will call expert witnesses to testify on his or her behalf that the defendant could not form that specific intent because of some mental disease or defect.²²²

Massachusetts's version of diminished capacity is described as "mental impairment short of insanity."²²³ Analogous to the federal rule, mental impairment short of insanity is a defense that the defendant did not have the specific intent required for the crime charged.²²⁴ The burden of proof rests with the prosecution to establish specific intent for certain crimes, but the defendant can show lack of specific intent because an existing mental condition impaired the defendant's ability to form that intent.²²⁵

Post-Traumatic Stress Disorder (PTSD) is one example of a mental disease or defect that has been used to prove diminished capacity.²²⁶ PTSD is caused after a person, adult or child, has been exposed to a severe traumatic experience.²²⁷ An individual may be diagnosed with PTSD after suffering several symptoms that have

²¹⁸ See Fradella, *supra* note 57, at 47-48.

²¹⁹ "Actus reus refers to the act or omission that comprise the physical elements of a crime as required by statute." *Actus Reus: Definition*, CORNELL L. SCH.: LEGAL INFO. INST., https://www.law.cornell.edu/wex/actus_reus (last visited Oct. 26, 2019).

²²⁰ See Fradella, *supra* note 57, at 48.

²²¹ See *id.* at 47.

²²² See *id.* at 50.

²²³ See 2 MASS. MODEL JURY INSTRUCTIONS IN DIST. CRT. – CRIM. 9.220 (2009).

²²⁴ See *id.* ("Sometimes a person's mental condition may be such that he or she is not capable of having the necessary intent to commit the crime. Such a defendant must be acquitted.")

²²⁵ See *Commonwealth v. Grey*, 505 N.E.2d 171, 175 (Mass. 1987) ("We are concerned with the Commonwealth's proof of a specific intent, which in some instances . . . is part of the Commonwealth's proof of guilt."); *id.* at 173 ("[W]e should permit the jury to consider evidence of mental impairment at the time of the crime in deciding whether the Commonwealth has proved the defendant's specific intent.") (internal citations omitted). However, unlike the federal rule, the state courts in Massachusetts have discretion to refuse to provide the jury with instructions in regards to specific intent crimes if the court is dissatisfied with the defense due to lack of standing or evidence. See *Commonwealth v. Casey*, 428 Mass. 867, 868 (1999) ("We have not required the giving of such an instruction. The matter lies in the judge's discretion.") (citations omitted).

²²⁶ See Fradella, *supra* note 57, at 53.

²²⁷ See *id.*

been linked to chronic PTSD for at least one month.²²⁸ Some of those symptoms include apathy, violent outbursts, depression, agitation, irritability, frightening thoughts, and flashbacks to the traumatic event.²²⁹ Just like any other mental disease or defect, PTSD can be asserted under diminished capacity with the aid of expert testimony to provide evidence of the disability.²³⁰

F. Mentally Incompetent to Stand Trial

Since the 1960 Supreme Court decision in *Dusky v. United States*, federal and state courts have recognized that criminal defendants must be mentally competent to stand trial as required by the Due Process Clause.²³¹ While some states have their own standard for mental incompetency, the Court in *Dusky* stated the mental incompetency test as follows: “whether [the defendant] has sufficient present ability to consult with his lawyer with a reasonable degree of rational understanding—and whether he has a rational as well as a factual understanding of the proceedings against him.”²³² All states have adopted standards to meet this constitutional requirement.²³³

But what happens to a defendant when they are found mentally incompetent to stand trial? In every state, the courts will remand the defendant to a medical facility for evaluation called “restoration” time.²³⁴ This is to say that defendants will be involuntarily held in a treatment facility until they are mentally competent.²³⁵ The only significant difference that jurisdictions

²²⁸ See Bradley D. Grinage, *Diagnosis and Management of Post-traumatic Stress Disorder*, 68 AM. FAM. PHYSICIAN 2401, 2401 (2003), <https://www.aafp.org/afp/2003/1215/p2401.html>.

²²⁹ See *id.* at 2401-02.

²³⁰ See Fradella, *supra* note 57, at 54-55.

²³¹ See Douglas Mossman et al., *AAPL Practice Guideline for the Forensic Psychiatric Evaluation of Competence to Stand Trial*, 35 J. AM. ACAD. PSYCHIATRY & L. S3, S5 (2007).

²³² *Dusky v. United States*, 362 U.S. 402, 402 (1960).

²³³ See Andrew D. Reisner & Jennifer L. Piel, *Mental Condition Requirement in Competency to Stand Trial Assessments*, 46 J. AM. ACAD. PSYCHIATRY & L. 86, 86 (2018) (“After the *Dusky* decision, states adopted competence standards to meet the requirements set forth by the Supreme Court.”).

²³⁴ See Mossman et al., *supra* note 231, at S59-S67 (displaying a chart of all the fifty states and the varying amount of maximum time allowed by each state for “restoration” of a defendant).

²³⁵ See *id.*

have is the maximum length of restoration time.²³⁶ For instance, Massachusetts law dictates that a person being tried for a crime with a maximum sentence of twenty years can be held in a state institution for twenty years or until the defendant is found competent.²³⁷ In Pennsylvania, the law requires institutionalization for either ten years or the maximum sentencing, whichever is less.²³⁸ When the restoration time is up, the states are required either to “initiate civil commitment proceedings or release the defendant.”²³⁹

While the case below would not be binding precedent on cases arising in Massachusetts, this Pennsylvania criminal trial serves great importance as the first successful case that utilized expert testimony of CTE to find the defendant unfit to stand trial. The following case illustrates not that the defendant’s CTE influenced his actions that took place thirty years before the actual trial, but rather that a person exhibiting Stage IV symptoms was found mentally incompetent.²⁴⁰

IV. *COMMONWEALTH OF PENNSYLVANIA V. JAMES SNUKA*

James Wiley Smith, better known by his stage name, Jimmy “Superfly” Snuka, was a highly regarded professional wrestler.²⁴¹ He began his career in the early 1970s, and notwithstanding an on-and-off again career, Snuka maintained a twenty-year career as a wrestler.²⁴² Snuka was well-known for several signature moves throughout his career, such as a diving head butt,²⁴³ but his most consistent move was the “Superfly Splash”—a leap from the

²³⁶ *See id.*

²³⁷ *Id.* at S62.

²³⁸ *Id.* at S65 (excepting murder charges).

²³⁹ *Id.* at S9.

²⁴⁰ *See* Laurie Mason Schroeder & Manuel Gamiz Jr., *Judge dismisses homicide charges against Jimmy Snuka*, MORNING CALL (Jan. 3, 2017, 9:16 PM), <https://www.mcall.com/news/breaking/mc-jimmy-snuka-charges-dismissed-20170103-story.html>.

²⁴¹ *See* Jason Diamond, *Jimmy ‘Superfly’ Snuka, Wrestling Legend, Dead at 73*, ROLLING STONE (Jan. 15, 2017, 8:52 PM), <http://www.rollingstone.com/sports/news/jimmy-superfly-snuka-wrestling-legend-dead-at-73-w461187>.

²⁴² *See id.*

²⁴³ *See* Ryan Chase, *WWE Rankings: Top 5 High Fliers of All-Time*, BLEACHER REP. (May 3, 2011), <https://bleacherreport.com/articles/688799-top-five-high-flyers-of-all-time>. The diving head butt, as mentioned earlier, was the same move that Chris Benoit used as his signature move. *See* Wolf, *supra* note 165.

top rope that ended with him slamming his body against the body of a laid-out opponent.²⁴⁴

In 2015, Lehigh Valley District Attorney James Martin filed charges against Snuka for third-degree murder for the death of Snuka's former girlfriend, Nancy Argentino.²⁴⁵ Nancy Argentino died on May 10, 1983, over thirty years before charges were filed.²⁴⁶ After what was described by Snuka as an incident as the two were "fooling around," paramedics arrived at the scene to find Argentino appearing to suffer a head injury with poor vital signs.²⁴⁷ No charges were brought at the time, but the victim's family was insistent that Snuka abused Argentino.²⁴⁸ Charges were finally brought twenty-three years later after new evidence surfaced, which confirmed the Argentino family's assertions.²⁴⁹

However, Snuka was diagnosed with dementia, which doctors believed to be a cause of years of head trauma.²⁵⁰ After being diagnosed with stomach cancer, Snuka's dementia worsened,²⁵¹ and his attorney filed a petition that the now 74-year-old was not mentally fit to stand trial.²⁵² The Pennsylvania incompetency standard states that "[w]henver a person who has been charged with a crime is found to be substantially unable to understand the nature or object of the proceedings against him or to participate and assist in his defense, he shall be deemed incompetent"²⁵³ In his motion, Snuka's attorney cited CTE as a likely cause of his extreme case of dementia.²⁵⁴ The motion

²⁴⁴ See Darran Simon, *Jimmy 'Superfly' Snuka dies*, CNN (Jan. 16, 2017), <https://www.cnn.com/2017/01/15/us/jimmy-superfly-snuka-obit/index.html>.

²⁴⁵ See Conlon, *supra* note 36.

²⁴⁶ See *id.*

²⁴⁷ See *id.*

²⁴⁸ See *id.* (describing why Argentino's family discontinued attempt to have Snuka criminally charged).

²⁴⁹ See *id.*

²⁵⁰ See Kaufman, *supra* note 58.

²⁵¹ See *id.* Snuka underwent intensive surgery, and it was later revealed that the anesthesia accelerated his dementia; at the competency hearing, a doctor testified that "anesthesia can worsen a person's dementia, causing their symptoms to be more noticeable and advance at an alarming rate" *Id.*

²⁵² *Id.*

²⁵³ 50 PA. STAT. AND CONS. STAT. ANN. § 7402 (West 2014).

²⁵⁴ See Kaufman, *supra* note 58. Before his death, Snuka was one of several wrestlers to file a class action lawsuit against the World Wrestling Entertainment for "long term neurological injuries" in the course of working for the company, which "fraudulently misrepresented and concealed" the nature and extent of those injuries, and for improper diagnosis and treatment of injuries. See Des Bieler, *Dozens of wrestlers sue WWE over*

contained evidence of Snuka's medical records, including MRIs of his brain.²⁵⁵ Before the judge made her ruling, Snuka was moved into hospice.²⁵⁶ On January 3, 2017, six months after his competency evaluation, the judge ruled that his condition was only worsening and ordered the charges to be dropped.²⁵⁷ Two weeks later, James Snuka passed away.²⁵⁸

In conclusion, someone medically diagnosed and confirmed to have dementia from CTE could likely receive similar treatment to that of James Snuka. As in Snuka's case, a defendant can be released on bail and submit to periodic evaluations to determine their competency.²⁵⁹ While dementia and dementia-like symptoms are only found in those suffering from Stage IV CTE,²⁶⁰ the singular value of this case is its pioneering admission of CTE evidence at a mental health assessment in criminal matter. As deployed by Snuka's attorney,²⁶¹ a defense attorney can establish concrete proof and validity by demonstrating that the dementia was brought upon by years of head trauma. Lastly, because Aaron Hernandez did not display signs of dementia,²⁶² this section will not be applied to facts of his murder trial.

V. COULD CTE HAVE BEEN A PROPER DEFENSE TO MURDER FOR AARON HERNANDEZ?

In this section, I will utilize the facts from the Aaron Hernandez murder trials to explore whether two defenses in Massachusetts could have been available to him as defense strategies: (1) diminished capacity and (2) Model Rule § 4.01 insanity defense, which was adopted in *Commonwealth v. McHoul*.²⁶³ The largest

CTE, effects of traumatic brain injuries, WASH. POST (July 19, 2016), <https://www.chicagotribune.com/sports/breaking/ct-wwc-cte-lawsuit-20160719-story.html>.

²⁵⁵ See Kaufman, *supra* note 58.

²⁵⁶ See *id.*

²⁵⁷ See *id.*

²⁵⁸ Simon, *supra* note 244.

²⁵⁹ See Lee H. Elkins, *The Psychiatric Examination – Procedure*, 1A CRIMINAL DEFENSE TECHNIQUES § 17.05 1, 2, 3 (Alison Garfield, Leslie Y. Garfield Tenzer & Stuart Sacks eds. 2019).

²⁶⁰ See McKee et al., *supra* note 44, at 2.

²⁶¹ See Henneberger, *supra* note 58.

²⁶² Bonesteel, *supra* note 30 (describing that Stage IV CTE is when dementia starts to occur, but Aaron Hernandez only showed signs of Stage III CTE).

²⁶³ See *McHoul*, 226 N.E.2d at 563.

immediate hurdle to establish a defense under diminished capacity or insanity is whether courts will find it plausible to appreciate CTE as a medical disease or defect.²⁶⁴ A key issue will be the diagnosis conundrum that defense attorneys must establish their client is suffering from CTE.²⁶⁵ Without the proper diagnosis, attorneys will face a mountain to climb. However, the science on CTE diagnosis is accelerating, and judges are already accepting evidence in cases such as the Fujita prosecution.²⁶⁶ In the near future, many more defendants will likely be raising CTE-based claims of diminished capacity and insanity.

These sections will focus entirely on a defense under Stage III CTE, which shows symptoms such as depression and explosivity.²⁶⁷ While I do not believe the “mild” symptoms of Stage I would raise a persuasive defense, Stage II CTE could probably be the earliest stage where a defendant can make their defense. I believe this to be the case because most of the symptoms of Stage III are more enhanced and more prevalent symptoms found at Stage II.

A. Background on Aaron Hernandez and a History of Football and Concussions.

Even before entering the NFL, Hernandez had a history of troubling behavior.²⁶⁸ However, his school principal stated that he was a well-behaved child who enjoyed playing football.²⁶⁹ But, while in high school, Hernandez suffered multiple concussions

²⁶⁴ See J. Amy Dillard & Lisa A. Tucker, *Is C.T.E. a Defense for Murder?*, N.Y. TIMES (Sept. 22, 2017), <https://www.nytimes.com/2017/09/22/opinion/aaron-hernandez-cte.html>.

²⁶⁵ See *id.*

²⁶⁶ See KEVIN DAVIS, *THE BRAIN DEFENSE: MURDER IN MANHATTAN AND THE DAWN OF NEUROSCIENCE IN AMERICA'S COURTROOMS* 257 (Penguin Press, 2017).

²⁶⁷ See McKee et al., *supra* note 44, at 14.

²⁶⁸ See Natalie Finn, *Aaron Hernandez's Double Life: Inside the Aftermath of His Suicide and the Questions Left Unanswered*, E NEWS (Mar. 17, 2018, 6:00am), <https://www.eonline.com/news/921294/aaron-hernandez-s-double-life-inside-the-aftermath-of-his-suicide-and-the-questions-left-unanswered> (describing how Hernandez got in trouble for fighting and smoking marijuana before entering the NFL).

²⁶⁹ See Paul Doyle, *Terri Hernandez, Mother Of Patriots Tight End Aaron Hernandez, Gets A Super Sendoff*, HARTFORD COURANT (Feb. 1, 2012), <https://www.courant.com/sports/football/hc-xpm-2012-02-01-hc-terri-hernandez-sendoff-0202-20120131-story.html>.

during his four years.²⁷⁰ At age seventeen, his behavior began to change when he moved to play college football at the University of Florida.²⁷¹ Many family members believed the change in his behavior was a result of his father's death in 2006.²⁷² While in the NFL, Hernandez was diagnosed with only one concussion during his brief three-year career.²⁷³ However, Hernandez may have suffered several undocumented concussions through the more than ten years of playing football.²⁷⁴ This is consistent with previous statistics mentioned in Section II that fifty percent of high school athletes do not report concussions.²⁷⁵ Further, CTE is the result of repeated mild head trauma.²⁷⁶ Thus, the lack of documented concussions would not be persuasive to establish that Hernandez did not suffer from CTE.

B. Did Hernandez Exhibit Signs of CTE?

Over the span of six years, 2007 to 2013, Hernandez was implicated in and arrested for several instances of violence, including gun charges.²⁷⁷ In 2007, Hernandez at seventeen-years-old punched a restaurant manager in the head after the manager kicked Hernandez out of a bar.²⁷⁸ In 2012, Hernandez was implicated, based on eye witness testimony, in the double homicide

²⁷⁰ See Dan Wetzel, *That Aaron Hernandez had CTE is devastating news for the NFL*, YAHOO SPORTS (Sept. 21, 2017, 5:38 PM), <https://sports.yahoo.com/aaron-hernandez-cte-devastating-news-nfl-213810596.html>.

²⁷¹ See *id.* ("This is a young man who first showed signs of outrageous violence when he sucker punched a Gainesville bar manager, rupturing his eardrum, as a freshman with the [Florida] Gators. He was 17 at the time.")

²⁷² See Varela, *supra* note 6.

²⁷³ See Teddy Cutler, *Aaron Hernandez CTE Diagnosis Asks NFL Another Horrible Concussion Question*, NEWSWEEK (Sept. 22, 2017, 4:42 AM), <http://www.newsweek.com/aaron-hernandez-cte-new-england-patriots-nfl-sport-669348>.

²⁷⁴ See Kevin Duffy, *Aaron Hernandez was diagnosed with one concussion while playing for New England Patriots*, MASSLIVE (Sept. 22, 2017), https://www.masslive.com/patriots/2017/09/aaron_hernandez_cte_concussion.html.

²⁷⁵ See Wallace et al., *supra* note 136.

²⁷⁶ See *What Is CTE?*, CONCUSSION LEGACY FOUND., <http://concussionfoundation.org/CTE-resources/what-is-CTE> (last visited Sept. 14, 2019).

²⁷⁷ See Associated Press, *Before arrest, Aaron Hernandez no stranger to violence*, CBS NEWS (July 3, 2013, 1:17 PM), <https://www.cbsnews.com/news/before-arrest-aaron-hernandez-no-stranger-to-violence/>.

²⁷⁸ See Kevin Manahan, *Tim Tebow couldn't stop Aaron Hernandez from slugging bouncer in 2007*, USA TODAY SPORTS (July 3, 2013, 10:29 AM), <https://www.usatoday.com/story/sports/nfl/2013/07/02/aaron-hernandez-tim-tebow-barfight/2483559/>.

of two men after one of the men spilled a drink on him.²⁷⁹ In 2013, Hernandez was charged for the murder of Odin Lloyd in what the prosecution described as a way of covering up loose ends.²⁸⁰ Hernandez lost trust in Lloyd after he saw Lloyd speaking with men whom Hernandez previously fought.²⁸¹ Additionally, Lloyd discovered Hernandez owned several guns and weapons.²⁸² After he grew suspicious of Lloyd, Hernandez murdered Lloyd by shooting him six times.²⁸³ Once again, in 2013, Hernandez turned on another one of his close friends, Alexander Bradley, shooting Bradley in the face after the two got into a disagreement, but luckily Bradley survived.²⁸⁴ After his recovery, authorities granted Bradley immunity for his involvement in the 2012 double homicide to testify against Hernandez.²⁸⁵ It was the prosecution's theory that Hernandez murdered Lloyd and shot Bradley because he believed they were on to his involvement in criminal activity.²⁸⁶

It is obvious that Hernandez showed signs of explosive, violent behavior and paranoia. There is no indication of any other symptoms listed from the four different stages of CTE. However, in an article written after we learned the results of his autopsy, Dr. Omalu stated that the football community should not have

²⁷⁹ See Kristin LaFratta, *Aaron Hernandez was often angry and paranoid, former friend says on stand during murder trial*, MASSLIVE (Mar. 20, 2017), http://www.masslive.com/news/boston/index.ssf/2017/03/aaron_hernandez_double-murder_alexander_bradley.html.

²⁸⁰ See Susan Candiotti & Laura Dolan, *Source: Aaron Hernandez's anger over two trivial incidents linked to killing*, CNN (June 21, 2014, 3:45 PM), <https://www.cnn.com/2014/06/21/justice/aaron-hernandez-motive/index.html> (indicating that the true motivation behind the killing was the information Lloyd had about Hernandez).

²⁸¹ See Marcia Scott Harrison, *Hernandez charged with murder in 'execution' of pal who allegedly talked to people at club with whom NFLer was fighting: 'You can't trust anyone anymore'*, N.Y. POST (June 27, 2013, 4:00 AM), <https://nypost.com/2013/06/27/hernandez-charged-with-murder-in-execution-of-pal-who-allegedly-talked-to-people-at-club-with-whom-nfler-was-fighting-you-cant-trust-anyone-anymore/>.

²⁸² See Candiotti & Dolan, *supra* note 280.

²⁸³ See *How prosecutors proved former NFL player Aaron Hernandez guilty of murder*, BUS. INSIDER (Apr. 19, 2017, 9:24 AM), <https://www.businessinsider.com/aaron-hernandez-murder-case-2017-4>.

²⁸⁴ See Candiotti & Dolan, *supra* note 280.

²⁸⁵ See Eric Levenson, *Key witness: Aaron Hernandez shot 2 men, then warned, 'Don't say nothing'*, CNN (Mar. 20, 2017, 4:46 PM), <https://www.cnn.com/2017/03/20/us/aaron-hernandez-trial-alexander-bradley/index.html>.

²⁸⁶ See Candiotti & Dolan, *supra* note 280.

been surprised that Hernandez had CTE.²⁸⁷ Omalu pointed to the research conducted into CTE that the presence of brain trauma suffered at a young age by playing football has been shown to increase the likelihood of violent behavior, loss of control, and impulsive behavior later in life.²⁸⁸

Despite the above paragraph showing the type of evidence Aaron Hernandez would have had to rely on, it is important to look at his autopsy report that confirmed his symptoms.²⁸⁹ Hernandez's brain contained Stage III CTE, which Dr. McKee noted has never been identified in someone so young.²⁹⁰ Dr. McKee stated his brain showed the type of tau protein buildup usually found in players twenty years older than him.²⁹¹ In fact, the areas most affected by Tau buildup were the parts of the brain that control memory, emotions, and judgment.²⁹² The evidence established by the autopsy is a confirmation that CTE as a defense is viable, but the major hurdle is still persuading a juror that the disease caused Hernandez's actions.

Is there another explanation for his actions? Before he was ever charged with any crimes, Aaron Hernandez was a hardworking athlete and honor roll student.²⁹³ Hernandez and his father were incredibly close, and like Hernandez, his father was a star high school football player.²⁹⁴ Football contributed in large part to their strong bond.²⁹⁵ However, this all changed after his father died

²⁸⁷ Bennet Omalu, *CTE Discoverer: We Shouldn't Be Surprised That Aaron Hernandez Had CTE*, FORTUNE (Sept. 26, 2017), <http://fortune.com/2017/09/26/bennet-omalu-cte-aaron-hernandez/>.

²⁸⁸ *See id.*

²⁸⁹ *See* Nadia Kounang, *Aaron Hernandez suffered from worst CTE seen in someone his age*, CNN (Nov. 10, 2017, 4:57 AM), <https://www.cnn.com/2017/11/09/health/aaron-hernandez-brain-cte/index.html>.

²⁹⁰ *See id.* ("This is the first case that we've seen that kind of damage in such a young individual . . .").

²⁹¹ *See id.*

²⁹² *See id.*

²⁹³ *See Former NFL Star Aaron Hernandez Starts Murder Trial*, NBC NEWS, (Jan. 9, 2015), <https://www.nbcnews.com/storyline/aaron-hernandez/former-nfl-star-aaron-hernandez-starts-murder-trial-n282556>.

²⁹⁴ *See id.*; Varela, *supra* note 6.

²⁹⁵ *See* Ron Borges & Paul Solotaroff, *Aaron Hernandez: Inside Dark, Tragic Life of Former Patriots Star*, ROLLING STONE (Aug. 28, 2013), <https://www.rollingstone.com/culture/culture-sports/aaron-hernandez-inside-dark-tragic-life-of-former-patriots-star-118525/> (describing how Hernandez's dad used to go to every scrimmage and support Hernandez in his development as a player).

from surgery complications in 2006²⁹⁶ Hernandez admitted that his father's death left a void, and he did not know how to handle this situation.²⁹⁷ Despite coaches admitting that Hernandez could always find some trouble to get into, his father's death propelled Hernandez into a lifestyle of hanging around criminals and doing drugs.²⁹⁸ The evidence presented in this paragraph will be what jurors would be presented in coming to their verdict.

VI. COULD DEFENSES BASED ON CTE HAVE BEEN RAISED DURING HIS TRIALS?

For the remainder of this Note, there will be an examination of Aaron Hernandez's defense options as if he was diagnosed with Stage III CTE before his death. If the court is satisfied that CTE has been established to be a medical disease or defect, the next step would be to apply the affirmative defenses laid out in Section II. This Note will not address mental incompetence to stand trial as Hernandez's competency was not an issue. Thus, the focus will be on insanity and diminished capacity defenses. For the state of Massachusetts, those defenses would be Model Penal Code § 4.01, which was first adopted in *McHoul*,²⁹⁹ and the diminished capacity defense, which is recognized in the state as "mental impairment short of insanity."³⁰⁰

A. Model Penal Code § 4.01

Since Model Penal Code § 4.01 is a combination of the M'Naughten and the Irresistible Impulse Tests,³⁰¹ both prongs of the rule will be examined individually in relation to the facts of the Hernandez case.

²⁹⁶ See Effie Orfanides, *Aaron Hernandez's Parents: 5 Fast Facts You Need to Know*, HEAVY (Mar. 17, 2018, 5:56 PM), <https://heavy.com/sports/2018/03/aaron-hernandez-parents-mom-dad-terri-dennis/>.

²⁹⁷ See *id.*

²⁹⁸ See Dave Altimari & Suzanne Carlson, *A Life of Dodging Trouble*, HARTFORD COURANT (June 23, 2013), <https://www.vnews.com/Archives/2013/06/hernandez-gjf-vn-062313>.

²⁹⁹ See *McHoul*, 226 N.E.2d at 563.

³⁰⁰ See 2 MASS. MODEL JURY INSTRUCTIONS IN DIST. CRT. – CRIM. 9.220 (2009).

³⁰¹ See Janofsky et al., *supra* note 191, at S6.

The first prong of the Model Code covers M'Naughten, which deals strictly with the cognitive aspect of Hernandez's crimes.³⁰² Cognitive insanity goes to the focus that the defendant was unaware that his actions were wrongful.³⁰³ The cognitive side effects of CTE that Hernandez suffered from were confusion and impaired judgment.³⁰⁴ As I mentioned in the previous section, Hernandez resorted to murdering a close friend, Odin Lloyd, and shooting another friend, Alexander Bradley, in the face, after Hernandez developed immense anxiety and paranoia.³⁰⁵

Additionally, CTE symptoms include irrational behavior or actions.³⁰⁶ A defense team might have been most persuasive in establishing that Hernandez's actions were not wrongful by arguing that his anxiety and paranoia caused him to irrationally believe he had to resort to murder. On June 16th, one day before Lloyd was murdered, Hernandez texted two men saying, "You can't trust anyone anymore."³⁰⁷ Here, it appears that Hernandez's paranoia caused him to resort to murder. Based upon the conversations Lloyd had with Hernandez's adversaries,³⁰⁸ there is a strong argument that Hernandez was irrational to immediately resort to murdering a close friend. However, the trouble with raising a defense on his paranoia is that it would elicit testimony implicating him in other alleged criminal activity because it is believed that Hernandez's paranoia was based on Lloyd finding him with weapons and speaking to men Hernandez did not like.³⁰⁹

³⁰² See MODEL PENAL CODE § 4.01 (AM. LAW INST. 1985). ("A person is not responsible for criminal conduct if at the time of such conduct as a result of mental disease or defect he lacks substantial capacity either to appreciate the criminality [wrongfulness] of his conduct or to conform his conduct to the requirements of law.")

³⁰³ See *id.*

³⁰⁴ See *Jessicah Lahitou, What Does CTE Do To You? Aaron Hernandez Was Posthumously Diagnosed With The Brain Disease*, BUSTLE (Sept. 22, 2017), <https://www.bustle.com/p/what-does-cte-do-to-you-aaron-hernandez-was-posthumously-diagnosed-with-the-brain-disease-2429687> (describing that research has shown confusion and impaired judgement to be symptoms of CTE and Hernandez was found to have "classic features of CTE").

³⁰⁵ See Candiotti & Dolan, *supra* note 280.

³⁰⁶ See CONCUSSION LEGACY FOUND., *supra* note 276; *Possible CTE Symptoms*, PATRICK RISHA CTE AWARENESS FOUND., <http://stopcte.org/whats-cte/symptoms-of-cte/> (last visited Oct. 7, 2019).

³⁰⁷ See Harrison, *supra* note 281.

³⁰⁸ See Candiotti & Dolan, *supra* note 280.

³⁰⁹ See *id.*

Thus, testimony about his extreme paranoia would open the door to testimony that his friends were onto his criminal activities.

The second prong of the Model Code, the Irresistible Impulse Test, is a volitional insanity defense, which asks whether Hernandez could control his behavior.³¹⁰ Once again, CTE symptoms include the inability to control one's actions, exhibited by explosive behavior and impulsivity.³¹¹ It is unclear when exactly Aaron Hernandez made the decision to murder Odin Lloyd. On June 14th, Hernandez and Lloyd engaged in a disagreement at a club.³¹² Three days later, Hernandez murdered his best friend.³¹³ Hernandez had also allegedly been involved in an argument with another friend, Alexander Bradley, at a club in Florida.³¹⁴ While the details of that argument are unknown, apparently Hernandez acted much more quickly on that occasion, shooting Bradley in the face shortly after the incident.³¹⁵ Both acts of violence seem rather quick and impulsive since Hernandez considered both men close friends.

While the defense would argue that both the Lloyd and Bradley situations are clear examples of spontaneous violent behavior, the prosecution would have a strong counterargument to this defense based on the premeditation of his actions because in fact, the evidence in the Odin Lloyd murder establishes that Hernandez's actions were premeditated.³¹⁶ The prosecution would successfully point to the text messages from Hernandez that led up to the murder of Lloyd³¹⁷ as well as Hernandez's predisposition to act violently to thwart this defense.³¹⁸

³¹⁰ See MODEL PENAL CODE § 4.01 (AM. LAW INST. 1985) ("A person is not responsible for criminal conduct if at the time of such conduct as a result of mental disease or defect he lacks substantial capacity . . . to conform his conduct to the requirements of law.")

³¹¹ See McKee et al., *supra* note 44, at 55.

³¹² See Harrison, *supra* note 281.

³¹³ See *id.*

³¹⁴ See Joshua Rhett Miller, 'I plotted to kill Aaron Hernandez after he shot me in the eye', N.Y. POST (Mar. 21, 2017, 11:01 AM), <https://nypost.com/2017/03/21/i-plotted-to-kill-aaron-hernandez-after-he-shot-me-in-the-eye/>.

³¹⁵ See *id.*

³¹⁶ See Harrison, *supra* note 281 (detailing how Hernandez asked two individuals from out-of-state to come to Massachusetts and then there was approximately an hour between when Hernandez picked up Lloyd and then allegedly shot him).

³¹⁷ See *id.*

³¹⁸ See Miller, *supra* note 314.

B. Diminished Capacity/Mental Impairment Short of Insanity

In a successful diminished capacity defense, the defense proves that the defendant should be found not guilty since at the time of the crime the defendant's mental disease or defect prevented him from acting intentionally.³¹⁹ The prosecution indicted Hernandez for the first-degree murder of Odin Lloyd.³²⁰ In pertinent part, the Massachusetts statute for first-degree murder requires the defendant to kill another "with deliberately premeditated malice aforethought . . ."³²¹ To be successful in arguing diminished capacity, evidence of the defendant's mental disease or defect would need to negate that the defendant acted deliberately.³²² The defendant's malice aforethought is what the prosecution must prove to show that the defendant intended to cause "death or great bodily harm."³²³ Did Hernandez act intentionally or consciously when he murdered Lloyd?

The evidence provided in the case tying Hernandez to the murder was Hernandez's possession of incriminating ammunition and clothing³²⁴ and the tire marks at the scene which matched Hernandez's rental car.³²⁵ However, Hernandez was not the only man in the car that night.³²⁶ He was accompanied by two men, and no direct evidence established Hernandez as the shooter.³²⁷ Evidence of Hernandez's mental state could have been the piece of evidence that would have disrupted what his attorney deemed circumstantial.³²⁸ The evidence provided indicates that

³¹⁹ See Fradella, *supra* note 57, at 47–48.

³²⁰ See Harrison, *supra* note 281.

³²¹ MASS. GEN. ANN. LAWS ch. 265, § 1 (West 2019).

³²² See Fradella, *supra* note 57, at 48–50.

³²³ See *Malice Aforethought*, CORNELL L. SCH.: LEGAL INFO. INST., https://www.law.cornell.edu/wex/malice_aforethought (last visited Sept. 22, 2019).

³²⁴ See Associated Press, *Hernandez's Apartment Is Searched by Police*, N.Y. TIMES (July 3, 2013), <http://www.nytimes.com/2013/07/04/sports/football/hernandezs-apartment-is-searched-by-police.html> [hereinafter *Hernandez's Apartment Is Searched by Police*].

³²⁵ See *Tire tracks are focus of testimony at Aaron Hernandez trial*, FOX SPORTS (May 5, 2015, 11:09 AM), <https://www.foxsports.com/nfl/story/aaron-hernandez-tire-tracks-are-focus-of-testimony-at-trial-030515>.

³²⁶ See *Hernandez's Apartment Is Searched by Police*, *supra* note 310.

³²⁷ See Harrison, *supra* note 281.

³²⁸ See Liles Demmink, *Aaron Hernandez: A victim of circumstance or circumstantial evidence?*, CAMPBELL L. OBSERVER (Mar. 16, 2015), <http://campbelllawobserver.com/aaron-hernandez-a-victim-of-circumstance-or-circumstantial-evidence/> (describing the circumstantial evidence that was presented at trial against Hernandez).

Hernandez was involved in the crime, but the defense would raise doubt by introducing testimony that Hernandez's actions were the result of his CTE symptoms. Hernandez may have acted impulsively and irrationally when he killed Lloyd.

Meanwhile, the prosecution would have a valid argument that Hernandez's premeditated actions were indicative of his intent and knowledge because the circumstances of that night seem to indicate that Hernandez had intention to kill Lloyd. The text message on June 16th suggests Hernandez was suspicious of Lloyd.³²⁹ Further, a valet saw Hernandez bring a gun into his car after leaving the club that night, and ammunition for the gun used to kill Lloyd was found in Hernandez's apartment, implying Hernandez's possession of the gun used to murder Lloyd.³³⁰ Additionally, Lloyd sent text messages to his sister raising suspicion that he knew something was wrong with Hernandez.³³¹ Lloyd told his sister that he was with "Nfl," which was code for Hernandez, and sent another text saying, "Just so u know."³³² The second text reasonably implies that Lloyd wanted his sister to know where he was just in case anything happened. Lastly, the crime scene and the matter in which Lloyd was murdered indicates premeditation. Hernandez drove Lloyd to an industrial lot where Hernandez and his two accomplices murdered Lloyd execution style.³³³ Because there is more evidence from the prosecution that indicates Hernandez acted deliberately, premeditated, and with malice aforethought, the defense would be asking for the jury to consider that Hernandez acted throughout the entire process under the effects of CTE. For those reasons, it is not likely Hernandez would have succeeded under diminished capacity.

C. Causation Argument

The last sticking point that a prosecutor would attack is causation. It is without a doubt that, at some point in time, Aaron

³²⁹ *See id.*

³³⁰ *See Aaron Hernandez criminal cases timeline*, FOX SPORTS (May 14, 2014, 3:06 PM), <https://www.foxsports.com/nfl/story/aaron-hernandez-murder-case-timeline-051414>.

³³¹ *See id.*

³³² *Id.*

³³³ *See Harrison, supra* note 281.

Hernandez changed as a person. While a defense team would illustrate the severe signs and symptoms of violent and explosive behavior that comes along with Stage III, the defense would have a difficult task overcoming several causation issues. Is it a coincidence that Hernandez began his criminal lifestyle a year after his father's death? Could it have been his tendency to do drugs or consume alcohol at a young age? Both of these causation questions are linked to each other.

After his father died, Hernandez went off to college where he was associated with "unsavory characters" and found himself getting into trouble.³³⁴ One of those occasions includes the time Hernandez punched a bouncer for kicking him of a bar.³³⁵ Also, Hernandez tested positive and admitted to smoking marijuana before he was drafted by the New England Patriots.³³⁶ Would these indications of drinking and smoking marijuana be enough to discredit an affirmative defense? Not entirely. However, many former teammates and family members admitted that Hernandez changed substantially when his father passed away.³³⁷ After that time, he was described as a young man that could always find trouble and was constantly filled with anger.³³⁸ Hernandez began socializing with other men with their own criminal history, and even Hernandez admitted in a 2009 interview that he sought the company of these men because he lost his way.³³⁹ Because of the substantial impact his father's death had on his life, a prosecutor might have successfully established that CTE was not the cause of his actions. Hernandez's life took a substantial turn in 2006.³⁴⁰ Even though the evidence tips its hand toward the prosecution,

³³⁴ See Bob Hohler, *Inside the double life of Aaron Hernandez*, BOS. GLOBE (Aug. 15, 2013), <https://www.bostonglobe.com/sports/2013/08/14/hometown-link-double-life-aaron-hernandez/JA34t8HVP3srfqakDqHb1K/story.html>.

³³⁵ See *id.*

³³⁶ See *id.*; *How did Aaron Hernandez pass NFL drug tests?*, FOX SPORTS (Apr. 6, 2015, 10:37 AM), <https://www.foxsports.com/nfl/story/how-did-aaron-hernandez-pass-nfl-drug-tests-040615>.

³³⁷ See Hohler, *supra* note 334.

³³⁸ See Erik Brady, *Life and death of Aaron Hernandez: 'There was so much anger'*, USA TODAY SPORTS, <https://www.usatoday.com/story/sports/nfl/2017/04/19/aaron-hernandez-troubled-life-death-new-england-patriots/100672240/> (last updated Apr. 20, 2017).

³³⁹ See *id.*

³⁴⁰ 2006 is the year Hernandez's father died. See *id.*

the causation issue would depend on whether the jury found the defense or prosecution more credible.

CONCLUSION

Despite the slim chance that Hernandez would have been successful with a defense of insanity or diminished capacity, his defense still had enough evidence to present these issues to a court and jury. Chronic Traumatic Encephalopathy is a debilitating and vicious disease that attacks the cognitive and volitional abilities of those inflicted with its symptoms.³⁴¹ Regardless of the current inability to diagnose the disease definitively before a patient's death, the evidence of violent and explosive behavior associated with mild head trauma is mounting.³⁴² If criminal defendants are to be given the fair trials to which they are constitutionally entitled, they should be granted the ability to present defenses based on CTE evidence. The evidence of the severe symptoms CTE imposes on athletes is real, and the day a jury finds an argument involving CTE as a valid defense will one day come.

³⁴¹ See McKee et al., *supra* note 44, at 44, 55–56.

³⁴² See *id.* at 44, 52, 55–56, 62.