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University of Northern Colorado

Greeley, Colorado

NEUROIMAGING AND FREE WILL: A PARTIAL TEST OF DEVINE'S "DIRECTOR'S CUT" THEORY OF JURY DECISION MAKING

A Thesis

Submitted in Partial

Fulfillment for Graduation with Honors Distinction and

the triple Degree of Bachelor of Arts

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College of Humanities and Social Sciences and
College of Education and Behavioral Sciences

December 2023

NEUROIMAGING AND FREE WILL: A PARTIAL TEST OF DEVINE'S "DIRECTOR'S CUT" THEORY OF JURY DECISION MAKING

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Abstract

The U.S. criminal justice system is based on the foundation that citizens are free-thinking and rational human beings. With the exception of cases of insanity, incompetency, mental disability, and children/juveniles, it is often the role of juries to decide the fate of defendant(s) in the criminal justice system.

New evidence has emerged over the last few decades that demonstrates that the brains of psychopaths and aggressive/reactive offenders are structurally and functionally different from those of non-psychopaths and non-offenders. This evidence suggests that some people may not have the physical brain structure and functioning – often due to factors beyond their control – to make thoughtful, empathetic, and rational decisions. Therefore, some have questioned whether such individuals should be held to the same degree of culpability (responsibility) as those without brain damage, deficiency, or dysfunction. Additionally, this neurological evidence has been shown to influence jury decision-making as a mitigating factor.

The present study aims to test the relationship between perceptions of the crime and the criminal, assigned responsibility (free will), and post-trial story status (the verdict); and will additionally explore the effect of neuroimaging on jury decision-making in capital punishment trials. The theoretical framework used for this analysis is Dennis J. Devine's 'Director's Cut' Integrative Multi-Level Theory of jury decision-making. This is the first study to incorporate considerations of characteristics of the case, perceptions of the defendant, and neurological evidence and its effect on the verdict and adds to the limited existing data regarding juror determination of the defendants' free will from neurological evidence. The data was collected in 2020 by Dr. Paul Hawkins via a Qualtrics survey. In the current study, 276 death-qualified and jury-eligible participants were analyzed through SPSS statistics software. Results suggest that biological evidence did not severely mitigate or aggravate the jury's decision and that the perception of the defendant is the most influential factor in post-trial story status.

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For my dog, Professor Goodboy, who will never know this exists because he can't read.

Table of Contents

Introduction

For the American criminal justice system, theories of formal handling of people labeled as “deviants” or “criminals” date back to the Classical School of Criminology, which dominated ideologies of the Enlightenment. Thought processes of the Classical School of Criminology assume the rationality and free will of all people, that all individuals have rights that must be respected, and created the notion of due process (where all individuals are innocent until proven guilty).

After the Classical School of Criminology dawned the age of the Positivist School of Criminology, founded by Cesare Lombroso. Lombroso, who is often cited as the most famous phrenologist in the field of criminology, claimed that violent behavior could be determined by biological features such as appearance, brain and skull features, and ethnicity. Needless to say, Lombroso’s research is dismissed as widely unfounded in today’s world of academia. In reasonable avoidance of Lombroso’s faults, modern criminological theorists primarily campaign sociological perspectives to explain criminal behavior. However, emerging neurological technologies have sparked debate among criminologists, as evidence shows that some criminal behaviors have biological explanations. Researchers have found certain physically and functionally different variations in the brains of violent offenders, non-violent offenders, incarcerated violent psychopaths, violent psychopaths who have not been caught, and non-violent controls (Raine, 2013). These findings indicate that people who commit violent crimes may have limitations in their ability to think rationally. With a justice system heavily based in sociological perspectives, defendants with brain dysfunction may be tried in court as rational and free-thinking, despite potential biological conditions that restrict brain

functions of rationality, empathy, and thoughtfulness. In other words, individuals who have fallen within the criminal justice system for committing criminal acts may have an underlying cognitive issue that is impacting their ability to follow the laws of a society that primarily recognizes social explanations for behavior.

Modern technology allows us to see inside the mind of a person who commits serious criminal acts via techniques such as MRI (Magnetic Resonance Imaging) or PET (Positron Emission Tomography). Upon finding brain damage, deficiency, or dysfunction, it may be questioned whether this evidence is too aggravating or mitigating to be used in a court of law and thus result in overly harsh or lenient sentences. Additionally, some may view brain scans as an invasion of privacy. Others fear the possibility of any biological implications resulting from neuroimages; specifically, there is a fear that using neuroimages could lead to a slippery slope of suggesting that there could be a "crime gene" and consequently result in accusations of eugenic motives (Rosen, 2007).

Emphasizing the research above, it is clear that the criminal justice system that has been built in place today does not accurately reflect how individuals behave. While new theories and innovative social science research is developing to better explain deviant conduct, these considerations may still not be taken into consideration after the crime has been committed and facing punitive consequences.

When an individual is tried for committing a particularly horrendous act, they may, depending on the state in which they are being tried, face capital punishment (also known as the death penalty). In these instances, it is often the decision of the jury to decide whether the accused person (the defendant) should receive capital punishment or a

life of incarceration. As jury deliberations are never observable, it is questioned how juries perceive the defendant and their behavior: do they consider that someone commits an act because it was their own free choosing; because of their social conditions; because of biological pre-dispositions; some combination of these; or other unknown factors?

The purpose of this quantitative study is to add to the limited existing research on the effect of neurological evidence on jury decision-making in capital trials. This study aims to answer the following research questions:

1. Is there an influence of assigned responsibility and perceptions of the crime and the defendant on the verdict in capital punishment trials?
2. Is there an association between neuroimaging conditions and capital punishment?

Lastly, it is important to note the terminology used in this thesis. This thesis sometimes uses phrases such as “offender,” “criminal,” and “inmate.” These phrases are only shorthand for more appropriate phrases. For example, “offender,” means “a person who has offended.” Shorthand versions replace the entire description in places where the appropriate terminology would be too long or confusing. It is important to remember that while some people have committed certain forbidden acts, they are still people. Terms such as “criminal,” “inmate,” and “offender” are labels that remove identity and humanity. Therefore, these words are not used when their appropriate description can be used; however, there are places throughout this thesis where for the sake of understanding, the briefer version of terminology must be used.

Definitions

The following definitions are a helpful guide to special language used in the following thesis.

Aggravating Factors – Evidence or information that increases the crime's severity, such as a prior criminal record or association with a criminal gang. Aggravating Factors can result in a more severe sentence.[1]

Capital Punishment – The lawful infliction of death as a punishment; the death penalty.[2]

Cross-Examine – Questioning of a witness by the attorney for the other side.[3]

Defendant – In a civil suit, the person complained against; in a criminal case, the person accused of the crime.[3]

Defense – A general term for the effort of an attorney representing a defendant during trial and in pre-trial maneuvers to defeat the party suing or the prosecution in a criminal case.[2]

Expert Witness – A person with extensive experience or knowledge in a specific field. [4]

Mitigating Factors – Any information or evidence that may lessen the crime's severity, resulting in a lighter sentence. Lack of a criminal record can be a mitigating factor.[1]

Prosecute – To charge someone with a crime. A prosecutor tries a criminal case on behalf of the government.[3]

Verdict – The formal decision or finding made by a jury concerning the questions submitted to it during a trial. The jury reports the verdict to the court, which generally accepts it.[2]

Voir Dire – The process by which judges and lawyers select a petit jury from among those eligible to serve by questioning them to determine knowledge of the facts of the case and a willingness to decide the case only on the evidence presented in court. "Voir dire" is a phrase meaning "to speak the truth."[3]

1. https://www.toronto-criminal-lawyer.co/aggravating-and-mitigating-factors-in-criminal-sentencing/
2. https://legal-dictionary.thefreedictionary.com

Literature Review

Philosophy of Law

The American justice system is heavily influenced by millennia of philosophical thinking. The two philosophical theories that ground contemporary American criminology and criminal justice are utilitarianism and retributivism.

Utilitarianism is grounded in the belief that good should be promoted whenever possible. John Wesley, the founder of the Methodist Church, summarizes utilitarianism's goal with this quote:

> Do all the good you can, by all the means you can, in all the ways you can, in all the places you can, at all the times you can, to all the people you can, as long as you ever can (as cited in Shafer-Landau, 2008, p. 120).

Utilitarians believe that the only true intrinsic value is that of well-being, and thus, the best actions are those that result in the greatest amount of net good produced. Therefore, according to utilitarianism, the ends justify the means. Unfortunately, this can create situations of immorality, such as a culture that promotes harm to a person or minority group in order to create substantial benefits for a greater majority (Shafer-Landau, 2018).

Jeremy Bentham, sometimes credited as the first criminologist, was also cited as one of the founding fathers of utilitarianism. The influence of utilitarianism is found in modern American "deterrence, treatment, and incapacitation" programs, seeking to reduce crime and maximize well-being (Gottfredson, 1999, p. 248). Yet, maximizing well-being in the modern

American justice system can mean satisfying the majority of the population at the expense of the minority.

Consider a situation where an individual violently or unethically breaks the law. Understandably, the community may hold feelings of anger towards this person and wish to separate them from law-abiding society members. Incarcerating this person would satisfy the larger society. However, treating a person who has offended as an outcast and prescribing lengthy incarceration sentences may push this person into isolation, create difficult social situations for them to navigate inside and outside the justice system, and potentially even cause further re-offending upon their release. In the eyes of utilitarianism, "incapacitation does not see segregation as a form of punishment" (Lab et al., 2021, p. 8).

Consider a more extreme example where again, an unlawful act occurs, and the community feels victimized, threatened, and angry towards the person responsible, who has not been caught. In their haste to find the person who committed the criminal act, an innocent person is mistakenly convicted. The community is satisfied, believing they have reached justice, while the wrongfully incarcerated person incurs a substantial amount of harm living a life in prison, or perhaps is sentenced to the death penalty, for a crime they did not commit. Unfortunately, this is a real issue, even in today's society. For further information on wrongful convictions, please visit innocenceproject.org.

While utilitarianism holds authority over the criminal justice system, retributivism is also an influential factor. Immanuel Kant is one of the most notable advocates for retributivism in criminal punishment (Shuster, 2011). Kant campaigned that humans are rational and autonomous with the ability to reason, make our own decisions, and set our own goals. Therefore, individuals who misuse free will, specifically in instances of harming others, are held accountable for their

misdeeds. Thus, punishment is not only appropriate for wrongdoers; it is necessary (Shafer-Landau, 2018). According to Kant, wrongdoers deserve *lex talionis* – also known as "eye-for-an-eye" – punishment. Criminology founding father Cesare Beccaria and contemporary criminologist Travis Hirschi support a form of *lex talionis*, claiming that a punishment should be proportionate to the crime (Gottfredson, 1999). This view can be observed in today's society, as the public tends to react negatively when they feel that a person who has broken the law is not receiving a proportional punishment. Individuals who have committed what are considered the worst crimes (e. g. murder, rape, terrorism) are expected by members of society to receive the worst punishments (i.e. life in prison with no chance of parole, the death penalty). Punishment accounts for most solutions for criminal behavior (Lab et al., 2021) because the justice system assumes that we are rational human beings with free will to choose our actions, which justifies retributive consequences (Fondacaro, 2014).

Retribution may lead to utilitarianism if the majority desires revenge and resolution over justice and morality. Both qualities are interconnected with the concept of punishment. Barak et al. (2018) assign five purposes of punishment: retribution, deterrence, rehabilitation, incapacitation, and restoration. Retribution is a type of emotional revenge that does not consider the risk of future criminality or reoffending and only seeks to punish for what has happened. Deterrence is a utilitarian concept with the target audience of both actual and potential offenders and can apply to specific individuals or the general public. The authors note that the name "penitentiary" comes from the idea of penance for the sins of crimes committed. People who have offended are incapacitated for public safety so that no one else's well-being is at risk. Lastly, restoration is the idea of restoring peace to the victim (if applicable) and the community.

Although there have been movements attempting to reform the criminal justice system, such as seeking rehabilitation for the offender or restoration between the person who has offended and those they have offended against, utilitarianism and retributivism remain strong philosophies that drive the justice system. The "get tough on crime era" that began in the 1970s is heavily cited as the movement that sparked the unnecessarily and aggressively high incarceration rates; inciting the normalization of overly harsh punishments on people labeled as deviant or criminal (Barak et al., 2018; Lab et al.; 2021). "Get tough" ideologies encourage demonized portrayals of those involved in the justice system. This continued into the 1990's with the adoption of the "three strikes" laws. Acts that were most strongly criminalized were those that targeted minority populations. Today, black people make for 38% of the U.S incarcerated population, but only 13% of the overall U.S population (*Race and ethnicity*). These eras also spiked the monetary industry of jail and prisons, which today cost over $80 billion to operate annually (*Economics of incarceration*).

Strong ideologies of utilitarianism and retributivism in society explain why America still operates with the death penalty. However, it is well noted in academic literature that the death penalty is anti-productive in deterring crime (Decker & Kohfeld, 1984; Fagan, 2005; Zeisel, 1976). The death penalty is disproportionately given to ethnic minorities (Race and the Death Penalty, 2003) and has resulted in executions of innocent people (Parker et al., 2003). Despite the fact that capital punishment increases violent crime rates, the United States is one of the last industrial societies that continues to practice capital punishment (Devine, 2012). Further, Barak et al. (2018) note that "even while the rest of the world moved away from the death penalty, the United States has expanded the number of offenses that can potentially result in execution" (p.

239). By maintaining capital punishment, the United States removes people, rather than underlying problems, that cause certain forbidden acts.

Neurology and Behavior

Popular criminological theories are almost exclusively rooted in sociology. For example, where one lives, childhood experiences, history of physical/emotional/sexual abuse, economic frustrations, and socialization are popular explanations for why people commit criminal acts. Thus, in the nature-versus-nurture debate, contemporary criminologists commonly side with nurture. Arguing that nature explains criminal behavior would be considered a slippery slope that would infer support for Lombrosian assumptions.

Biological explanations for crime are seen less in the academic community primarily due to Cesare Lombroso, a 19th-century phrenologist who campaigned his ideas of the "born criminal," that is, that certain individuals and groups were genetic evolutionary throwbacks, born to commit crime. Lombroso believed that if an individual had more than five "stigmata" – specific physical manifestations – they were a criminal (Raine, 2013; Tibbets, 2015). Lombroso's work is dismissed by modern criminologists, as his claims were severely unfounded.

Although Lombroso's claims were invalid and offensive, recent research suggests that biological explanations for criminal behavior should not be entirely discarded. The brain, after all, is a biological feature that controls behavior. Criminality is a type of behavior; therefore, the brain and criminality are linked.

Dr. Adrian Raine, Richard Perry University Professor of Criminology, Psychiatry, and Psychology at the University of Pennsylvania, is a leading authority on the biology of violence. Raine (2013) found differences in the prefrontal cortex, the limbic system, and the posterior

cingulate between convicted violent offenders, violent offenders who have not been caught and convicted, and non-offenders.

Prefrontal cortex dysfunction has been found in individuals who have committed reactive (impulsive) murders. When the prefrontal cortex dysfunctions, emotions such as rage and anger become more prominent (Barrash et al., 2000, as cited in Raine, 2013). Behaviorally, it results in risk-taking, irresponsibility, and rule-breaking (Bechara et al., 1997, as cited in Raine, 2013). Dysfunction in the prefrontal cortex also creates changes in the personality, including increased impulsivity and the inability to modify and inhibit behavior appropriately (Blair, 2007, as cited in Raine, 2013). Socially, a person will be more immature and have poorer social judgement (Damasio, 1994, as cited in Raine, 2013). Lastly, the cognitive consequences of prefrontal cortex dysfunction include loss of intellectual flexibility and poorer problem-solving skills, which can result in school failure, unemployment, and economic deprivation (Bechara & Damasio, 2005, as cited in Raine, 2013). However, in a study by Raine, subjects who thoughtfully planned their murders had just as much prefrontal cortex functioning as non-violent controls (as cited in Raine, 2013).

Raine (2013) found higher activation in the limbic system as well as the emotional right hemisphere in the brains of both the proactive (planned) and reactive (impulsive) murderers when compared to nonviolent controls. Raine refers to the limbic system as enabling “primitive” functions of the brain, because the limbic system houses survival instincts, such as fight or flight responses, reproductive needs, and raw emotions such as anger or hunger. The amygdala is one of the primary areas of the limbic system. The amygdala controls emotions and predatory and affective attack as well as recognizes signals of distress in others (Blair, 2007, as cited in Raine, 2013). The amygdala has been found to be smaller in people with antisocial criminal tendencies

(Pardini et al., 2014). The thalamus and midbrain are also prominent areas of the limbic system, and they are associated with the emotional limbic areas and emotional aggression, respectively (Raine, 2013). The hippocampus is another primary area of the limbic system; its primary role in emotional processing is to associate context with emotional responses. Dysfunction in the hippocampus was found to be not only common in people who offend but was also found to be associated with higher scores of psychopathy (Amen et al. 2007, as cited in Raine, 2013; Kiehl, 2006; Müller et al., 2003; Raine, 2013; Soderstrom et al., 2000).

The posterior cingulate is another area of the brain that functions more poorly in psychopaths (Kiehl et al., 2001, as cited in Raine, 2013) and aggressive subjects (New, 2002, as cited in Raine, 2013). While psychopathy or aggression do not prescribe a life of crime, these are traits that are sometimes found in people who criminally offend. The posterior cingulate is vital for recalling emotional memories (Maratos et al., 2001, as cited in Raine, 2013), experiencing emotions (Mayberg et al., 1999, as cited in Raine, 2013), and considering the impact of one's behavior on others (Ochsner et al., 2005, as cited in Raine, 2013).

The brain matter that composes the central nervous system is related to behavior as well. There is more white matter surrounding the brains of children with higher intelligence as early as age three. They additionally have a thicker corex of neurons surrounding the brain (Levine & Munsch, 2022). The grey matter surrounding the brain is also linked to behavior. Specifically, antisocial boys and aggressive subjects were found to have a fraction of a percentage of less gray matter than non-antisocial and non-aggressive control subjects (Raine, 2013).

Intelligence is also associated with behavior. Lower levels of IQ is correlated with increased behavior that is considered to be deviant (Goodman et al., 1995; Raine, 2013). Meta-analysis studies have revealed that there is a small but positive correlation between larger brain

volume and higher intelligence (Goriounova & Mansvelder, 2019). However, IQ is not entirely a neurological issue; it relates to social context as well. Duncan et al. (2011) found a relationship between a child's familial income and their academic achievement. Children with higher economic resources thus fare better developmentally and educationally.

The effect of social circumstances and resources are not limited to education. Outside influences such as lead can contribute to deviant behavior. Reiman and Leighton (2020) explain this phenomenon in their book, *The Rich Get Richer and the Poor Get Prison:*

> Lead is a neurotoxin, which means it is a poison that kills brain cells and the nerves connecting them [. . .]. Children exposed to lead can have permanent problems like lowered IQ and attention deficits which can create problems in school, and an increased likelihood of dropping out or behavior in or being expelled and then becoming delinquent. Lead also affects the 'executive functions – judgment, impulse control, anticipation of consequences' – making aggressive and antisocial behavior more likely as children grow up into teenagers and young adults with decreased self-command (p. 24-25).

While sociological factors can account for many criminal behaviors, the influence of biological factors should not be discounted. However, because of the stigma of Lombroso's accusations, the implications of biological influences on behavior have been significantly deemphasized in the field of criminology.

A Biopsychosocial Approach to Criminology

In psychology, there is a concept known as the "biopsychosocial approach." The biopsychosocial approach incorporates biological, psychological, and social-cultural influences when considering explanations of behavior. This theory is widely used in studying and understanding mental illness in the field of psychology. The lack of a biopsychosocial counterpart in the analyses of criminal behavior is a major issue for the field of criminology. As Myers and DeWall (2022) explain, "Biological and psychological explanations of behavior are partners, not competitors" (p. 98). Yet unfortunately, most criminological theories focus exclusively on sociological perspectives with an occasional psychological concept incorporated.

Judging Those Who Have Offended

Jurors are the only entities allowed to hear and discuss deliberation. As a result, many jury studies are either mock jury trials or interviews and surveys inquiring about jury experience. Juries have existed for hundreds of years, however, studies on juries have occurred only over the last century. The earliest studies began in the 1920s and consisted of judges writing down elements of the trial, the jury decision, and whether or not the judge agreed with the verdict. These studies have shown that most of the time, judges agree with the jury's decision. The first mock juries also began around this time, and researchers found that contrary to popular belief, jurors did not wait until the end of the trial before forming an opinion about the verdict. Rather, jurors established initial impressions and reformed their opinions as new evidence was presented (Devine, 2012).

There are five types of jury studies: archival analysis of jury decision-making over time; post-trial surveys administered to ex-jurors, attorneys, and/or judges; post-trial interviews; field

experiments assessing rules or instructions for juries; and laboratory simulations of trials using mock jurors. The latter two are the most common and best-quality jury studies (Devine, 2012).

The outcome variable categories of jury studies include pre-deliberation, deliberation, and post-deliberation. Pre-deliberation studies explore juror preferences after immediate exposure to trial materials. Deliberation studies analyze occurrences during the trial such as demographics of the foreperson, juror participation in discussion, and content of the juror discussions. Post-deliberation studies investigate factors such as the verdict (which is the most common post-deliberation study), damages (in civil cases), and sentences (in criminal trials). Post-deliberation studies can also assess the accuracy of jury decisions, such as if a judge or other expert deems the decision legally appropriate (Devine, 2012).

Jury studies may have internal or external validity. Internal validity consists of greater control for independent and dependent variables, measures, and manipulations. Studies with high internal validity also allow larger sample sizes. External validity applies to realism (incorporating elements of a trial) and generalizability (the results applying nationally as opposed to just a certain jurisdiction). Internal and external validity are inversely related, meaning that emphasis on one sacrifices the quality of the other (Devine, 2012).

Theories of juror decision-making have built upon one another over time, beginning with 18th-century British clergy member Thomas Bayes who tried to prove the existence of God through mathematical algorithms. Bayes created the concepts of “a priori” and “a posteriori.” A priori refers to an initial belief in the probability of some event, and a posteriori is the final or updated probability of that event. In relation to juror decision making, a priori is the initial belief of whether the defendant is guilty or innocent, and a posteriori is the final verdict. Algebraic Models furthered the Bayesian Model by suggesting that each piece of evidence introduced to

the jurors was weighted, and some evidence is more heavily weighted and influential than others. Stochastic Models incorporated the concept of time, suggesting that at some point, jurors no longer consider new evidence in their decision-making. Reasons for this cessation of consideration could be a particularly affirmative piece of evidence that solidifies the jurors' belief but could also be fatigue or cognitive overload from the lengthy trial. These theories fall under the category of "Prescriptive;" they describe the way the jurors *should* logically make decisions via mathematical algorithms (Devine, 2012).

Lastly, the social cognitive models of juror decision-making suggest two theoretical frameworks for how jurors rationalize their decisions. The first is common sense justice. According to common sense justice, jurors develop their understanding of legal concepts based on their own life experiences. However, these understandings of legal concepts may not be accurate. Secondly, jurors may have generic prejudice. This can include a specific problem that a juror may have with a person or element of the case or an interest in the outcome of the trial. Both common sense justice and generic prejudice can be reasons for dismissal from the trial during voir dire (Devine, 2012). Such jurors may be biased towards the defendant, unable to fairly assess evidence, or have too strong of a priori beliefs to impartially contribute to trial proceedings.

Devine (2012) builds upon previous research with his Story Model, which deemphasizes the use of mathematics and focuses on narratives. Devine describes how the Story Model functions: "Instead of simply absorbing a flood of information and storing it verbatim, jurors are seen as sifting through the massive evidence presented to them, focusing on some elements, and discarding others" (p. 26-27). The prosecution and defense each tell a story, and additionally, jurors may form stories of their own. Stories are also influenced by juror characteristics, such as

cultural upbringing and personal experiences. Devine calls this his 'Director's Cut' Integrative Multi-Level Theory of Jury Decision Making, using the metaphor of a director to explain how juries examine and accumulate evidence, just as a film director analyzes and assembles filmed scenes to create a movie. In this theory, he suggests factors that influence the verdict, or as Devine refers to it, "post-trial story status" (p. 187).

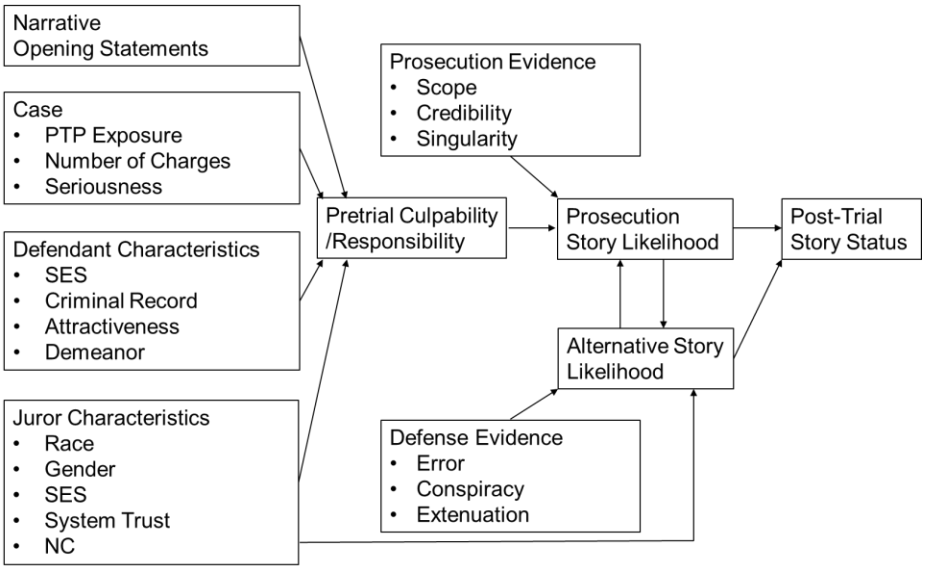


FIGURE 1: Adopted from Jury Decision Making: The State of the Science (p. 187), by D. J. Devine, 2012, New York University Press.

The Director's Cut Model suggests that four categories of influences can impact juror determination of pretrial culpability/responsibility. These four categories are: narrative opening statements, factors of the case, defendant characteristics, and juror characteristics. From the beginning, juror members form a story in an attempt to piece together the chain of events, and these four categories lay the foundation of a priori beliefs. Throughout the trial, the juror members edit and alter their initial impressions to include new evidence presented, such as when the prosecution and defense present their cases. Jurors consider the likelihood of each narrative, which may be more or less persuasive depending on the attorney's execution of their argument.

Sifting, sorting, weighing, and accepting or rejecting information as it is presented, the jurors enter deliberation and determine post-trial story status (Devine, 2012).

Importantly, Devine's theory is the first in the last thirty-five years to consider the characteristics of the case, the participants, and the evidence in relation to juror or jury decision-making.

Neuroscience and Punishment

Testing Neurological Evidence

Upon finding biological evidence to explain behavior, it may be questioned whether this evidence is too aggravating or mitigating to be used in a court of law, resulting in overly harsh or lenient sentences (Saks et al., 2014). Although neurobiological evidence is not more persuasive for the defense or for the prosecution (Greene & Cahill, 2012; Saks et al., 2014), neurological evidence is typically presented by the defense as mitigating evidence (Du, 2022).

Greene and Cahill (2012) were among the first to assess the influence of neurological evidence on capital jury decision-making. The participants in this study were psychology students at a university. The researchers ran a 2 x 3 test, with the two representing ratings of dangerousness (high; low), and the three representing the type of evidence given to the mock juror (some only received the dangerous diagnosis; some received the diagnosis in addition to summaries of the neuropsychological tests of the defendant and the interpretation of the results; and some groups received all evidence plus neuroimaging). Similarly, Saks et al. (2014) tested the persuasiveness of neuroimaging versus nonimage neurological evidence on capital trial mock jurors. Like Greene and Cahill (2012), the researchers in this study also provided evidence of dangerousness assessment, but their other conditions of evidence included clinical, genetic, neurological sans images, and neuroimages. Additionally, the researchers offered a diagnosis of

a mental disorder (psychopathic, schizophrenia, or normal), and clarified whether the evidence was presented by the prosecution or defense.

These studies come with limitations. Both Greene and Cahill (2012) and Saks et al. (2014) claim to have jury-eligible participants, but they do not clarify how they earned such qualification. Further, Saks et al. (2014) use a death qualification question of a yes or no question of "whether the participant would be willing to sentence a person to death 'if called for and supported by the proper evidence'" (p. 114). Jury voir dire, however, is not so simple. For example, before Colorado abolished the death penalty, jury voir dire removed potential jurors that were opposed to capital punishment and also those who were extremists in support of the death penalty. Jurors were rated on a scale, and the extremists from both sides are excused (Rubenstein, 2010). Therefore, the binary options from Saks et al. (2014) do not account for overly enthusiastic supporters of the death penalty, and thus some participants in the sample may not have been qualified to be on a death penalty jury in the first place. Additionally, none of these studies use audio or visual aids in their studies, which give mock jurors the best experience (Bornstein, 1999, as cited in Berryessa, 2021).

Conclusions of Prior Work

Greene and Cahill (2012) found that when neurobiological evidence was used, jurors perceived the defendant to have less responsibility. Other researchers have only found this effect when neuroimages were used to demonstrate psychopathy (Berryessa et. al, 2021; Saks et al., 2014). This reduction in responsibility could be justified by the fact that individuals are viewed more sympathetically when it can be demonstrated that there are factors beyond their control that influence their behavior, such as a mental illness or hardship (Berryessa, 2018; Greene & Cahill,

2012). However, neurological evidence does not influence juror findings of the defendant's guilt or insanity (Du, 2022; Berryessa et. al, 2021).

More dangerous perceptions of a defendant result in more punitive punishments (Berryessa & Wohlstetter, 2019). Defendants determined as high risk of future dangerousness are significantly more likely to receive the death penalty (Greene & Cahill, 2012; Saks et al., 2014).

Research that explores the effect of neuroimaging on capital punishment verdicts is limited. Greene & Cahill (2012) found that neurological evidence was a mitigating factor for defendants determined to be dangerous: neuropsychological evidence and neuroimaging created greater sympathy for the defendant and resulted in fewer death sentences. However, neurological evidence had no effect on sentencing recommendations for defendants determined to be a low danger. Similarly, Saks et. al (2014) found that neurological evidence had no effect on sentencing decisions for defendants without a schizophrenia or psychopathy diagnosis. Thus, there is limited research exploring the relationship between free will, perceptions of the defendant, and capital trial jury decision-making when neurological evidence is used in death penalty cases. Currently, there are no studies that consider the potential effects of neurological evidence under a theoretical framework for jury decision-making.

Project Design

This study aims to assess the influence of perceptions of the defendant's responsibility, perceptions of the crime, and perceptions of the defendant on mock jurors' verdict decisions. This study also evaluates whether the type of neuroimaging given can mitigate or aggravate the likelihood of capital punishment. The data for this research was originally collected by Dr. Paul Hawkins in the spring of 2020 for his dissertation.

This study is a laboratory simulation using mock jurors. This study focuses on pre-deliberation because it explores juror preferences after immediate exposure to the trial materials. This study holds internal validity and therefore lacks external validity. However, the data set is a national sample and therefore has some external validity in its generalizability. The hypotheses are as follows:

Hypothesis 1: There is an influence of assigned responsibility and perceptions of the crime and the defendant on the verdict.

Hypothesis 2: There is an association between neuroimaging conditions and capital punishment.

This study will be the first research conducted that uses a theoretical framework of jury decision-making in the analyses of the effect of neuroimaging, perceptions of the crime, and perceptions of the defendant on the verdict. The theoretical framework used for this analysis is Devine's 'Director's Cut' Integrative Multi-Level Theory of Jury Decision Making and thus it is the first study to incorporate considerations of characteristics of the case, the participants, and the evidence into jury decision-making under theoretical framework.

Although this study focuses on juror, and not jury decision-making, research shows that majorities prevail: if a majority of jurors prefer a certain verdict, then the final verdict has a high probability of being that verdict (Devine, 2012).

Methods

This is a secondary data analysis of aggregated data with a sample population of 276 death-qualified and jury-eligible subjects participating in a mock capital trial. Participants were randomly assigned to participate in one of four experimental conditions, described explicitly below. Important features were presented to participants, such as "a summary of the case and background information, opening and closing judicial instructions, and the presentation of one of four possible variations in expert aggravating and mitigating testimony and evidence" (Hawkins 2020, p. 43). Assigned responsibility, sentencing recommendation, and confidence in their sentence were among many variables measured in this study.

Participants

The demographics of the participants in this study were analyzed with consideration of intersectionality. Intersectionality is the combination of multiple demographics, as an individual is not just "male" or "Hispanic," for example. Considerations of intersectionality are important to acknowledge, as an individual's race, gender, and class can create a distinct paradigm that is often overlooked when only looking at one of these demographics. Intersectionality in criminal justice and social science research is not always acknowledged, so this study is novel in this approach.

There were 276 participants in this study. Of these participants, 272 reported their demographic information. Thus, the following statistics only represent 98.6% of the participants.

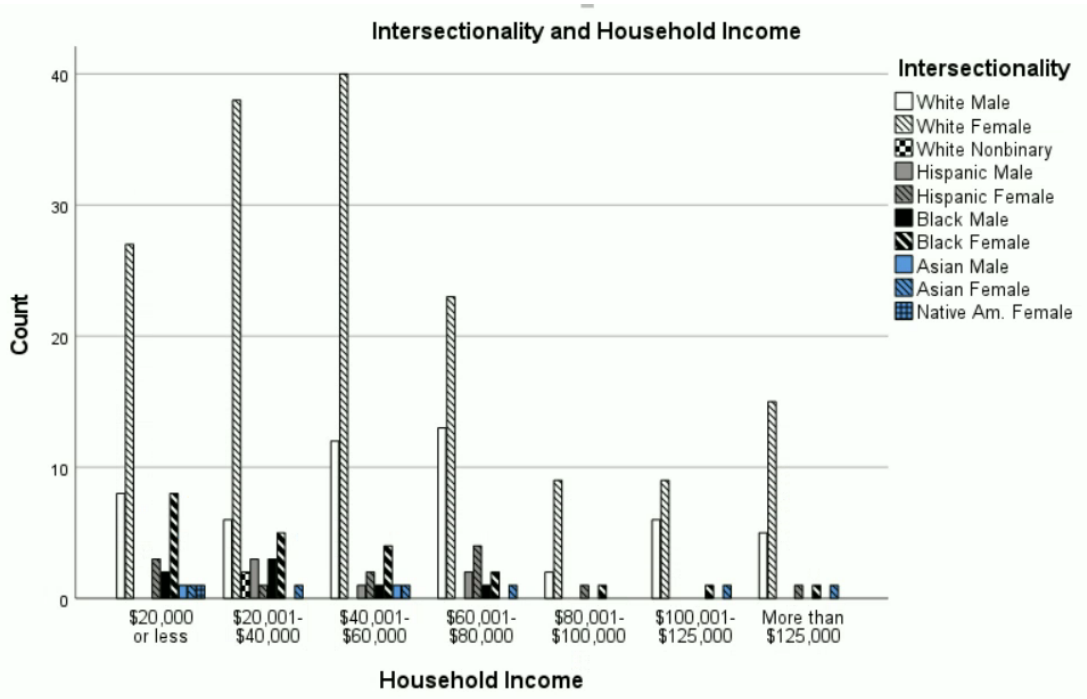


FIGURE 2: Intersectionality and Household Income Bar Graph.

Figure 2 shows all participants in this study and their demographics, including race, gender, and household income. White women have the greatest amount of representation across all income categories in this study, accounting for half or more than half of the total amount of participants in every income category bracket. In total, 161 of the 272 participants that reported their demographics are white women. The income category with the most participants is $40,001-60,000, with 62 participants, 40 of whom are white women. A majority of the participants in this study (approximately 63%) have an annual household income of less than $60,000, which is represented again below in Figure 2. Additionally, this graph shows that the first three income categories have the highest number of participants.

Intersectionality and Verdict Crosstabulation

Count

		Verdict		
		Death	Life in Prison	Total
Intersectionality	White Male	9	43	52
	White Female	28	134	162
	White Nonbinary	0	2	2
	Hispanic Male	1	5	6
	Hispanic Female	3	9	12
	Black Male	0	7	7
	Black Female	1	21	22
	Asian Male	0	2	2
	Asian Female	1	5	6
	Native Am. Female	1	0	1
Total		44	228	272

TABLE 1: Intersectionality Verdict Crosstabulation.

Table 1 shows the participant verdict by race and gender. Across all demographics, participants were more likely to select life in prison over the death penalty, including all black males, Asian males, and white nonbinary participants. Approximately 20% of all white males, white females, Hispanic males, and Asian females selected the death. Three of the nine Hispanic females selected death. The Native American female participant also selected the death penalty. These results are shown below in Figure 3.

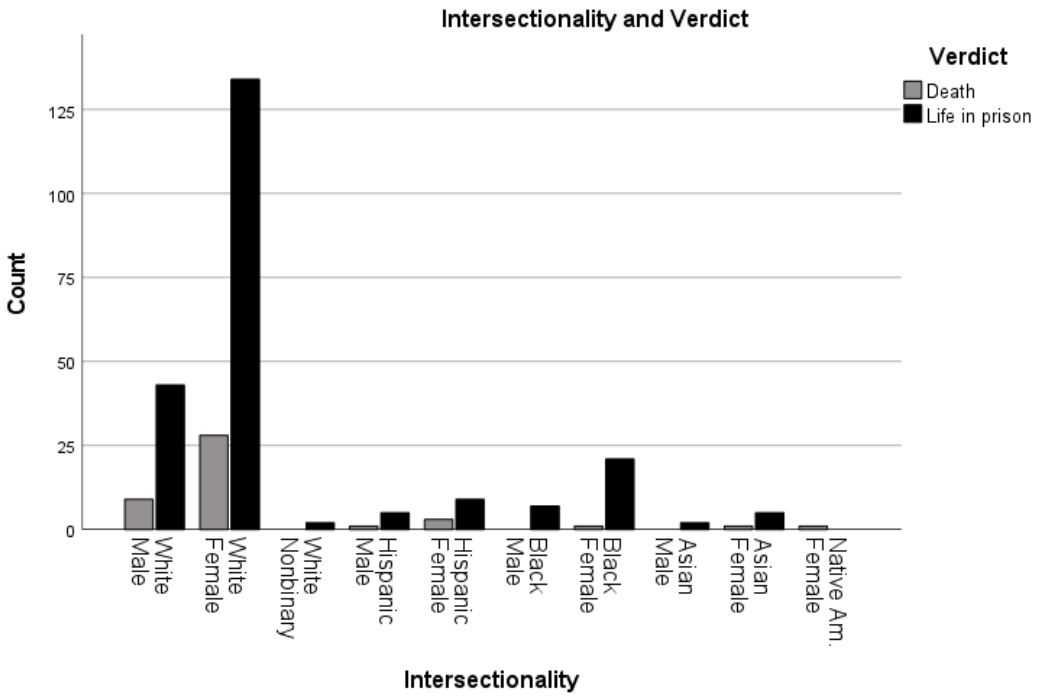


FIGURE 3: Intersectionality Verdict Bar Graph.

Figure 3 shows the participant verdict by race and gender. This graph demonstrates that participants were far more likely to select life in prison over death, with Hispanic females having the highest proportional selection of death and black males having the highest selection of life in prison.

Data Collection Procedures

Data were collected through a Qualtrics survey with IRB approval and was distributed nationally. Participants answered questions about their demographics. Participants were death-qualified and jury eligible. The participants completed a mock capital trial. This study began with 816 participants. Participants who did not complete the survey were eliminated from the sample. Upon completion, participants were financially compensated through the survey vendor.

At the beginning of the simulation, prospective participants completed a U.S Eligibility questionnaire. To proceed with the simulation, participants were required to be “a U.S citizen,

over the age of 18, proficient in the English language, not diagnosed with a serious mental, physical, or intellectual disability, and had not been convicted of a felony or subjected to felony charges punishable by imprisonment for more than one year" (Hawkins, 2020, p. 58). These requirements ensure that these participants could theoretically be summoned for jury duty in actuality. Participants who did not meet these criteria were removed from the study.

Next, U.S Eligible participants were tested for death qualification. The death qualification question was adopted from the Greene and Cahill (2012) study, where participants expressed their views of the death penalty on a sliding scale:

> (a) If a defendant was found guilty of a murder for which the law allowed a death sentence, I would sentence the defendant to death even if the case facts did not show that the defendant deserved a death sentence; (b) I am in favor of the death penalty but would not necessarily vote for it in every case where the law allowed it. I would consider the case facts that pertain to the death penalty and then decide whether to sentence the defendant to death; (c) Although I have doubts about the death penalty, I would be able to find a defendant guilty and vote for a death sentence where the law allowed it, if the case facts showed that the defendant was guilty and should be given a death sentence; or (d) I have such strong doubts about the death penalty that I would be unable to find a defendant guilty and vote for a death sentence where the law allowed it, even if the case

> facts showed that the defendant was guilty and deserved a death sentence (Greene & Cahill, 2012, p. 288).

Participants who selected A or D were removed from the simulation as each represents an extreme side of pro- or anti-death penalty and therefore are ineligible to participate in a capital jury trial.

The final number of jury-eligible and death-qualified participants was 276. Mock-jurors were assigned one of four possible conditions. These conditions are labeled A1B1, A1B2, A2B1, and A2B2. All conditions provided expert testimony, direct examination, and cross-examination from both the prosecution and defense. In all conditions, the prosecution attempted to present aggravating factors and the defense attempted to present mitigating factors.

Condition A1B1 (n = 67) was the control group, as no neuroimages were used in this condition. In condition A1B1, the prosecutorial expert testimony (Dr. Roberts) claimed that the defendant was a "high risk" for future reoffending and violent behavior "based on an antisocial personality disorder" (Hawkins, 2020, p. 165). However, in cross-examination, Dr. Roberts testifies that there is no link found between anti-social personality disorders and violent behavior.

The defense expert testimony (Dr. Lewis) in condition A1B1 provided neuropsychological evidence from tests that were given to the defendant. The psychological evidence was "a documented history of substance abuse" and "a long history of mental illness documented by professionals" (p. 166). Dr. Lewis also administered neurological testing and found that the defendant's brain demonstrated dysfunction, specifically in areas involved in "attention and memory, lack of behavioral control, poor impulse inhibition, and deficient problem-solving" (p. 166). Dr. Lewis indicates that there could be damage to the defendant's

brain from previous head injuries and concludes that the combination of mental illness and potential brain damage could be the cause of the defendant's criminal history. In cross-examination, Dr. Lewis testifies that "although the prevalence rate of violence among those with psychoses and frontal lobe damage is ten percent higher than among the general population, most who suffer from such ailments are never criminally violent" (p. 167).

Evidence in condition A1B2 (n = 69) was the same as in condition A1B1 (the control) with the exception of the addition of neuroimaging and the defense's expert witness interpretation of this evidence. The neuroimaging was presented at the same time as the neuropsychological tests that had been previously given to the defendant. In these MRI and PET scans, mock-jurors could see the defendant's brain damage. In the cross-examination of this evidence, the prosecution raised doubt about the ability of the defendant's specific brain damage to predict future behavior. In this condition, the neurological scans were presented as a mitigating factor explaining the defendant's behavior.

Evidence in condition A2B1 (n = 70) was the same as in condition A1B1 (the control) with the exception of the addition of neuroimaging and the prosecution's expert witness interpretation of this evidence. The neuroimaging was presented during Dr. Roberts's testimony that the defendant has an antisocial personality disorder. In these MRI and PET scans, mock-jurors could see the defendant's brain damage. Dr. Roberts concludes that the defendant is a "high risk" for future reoffending and violent behavior. This evidence was the same as the evidence presented in A1B2, but alternatively, it was presented by the prosecution as an aggravating factor explaining the defendant's behavior.

Evidence in condition A2B2 (n = 70) was the same as in condition A1B1 with the exception of the addition of neuroimaging by both the prosecution and defense and the

interpretations by each expert witness, and cross-examination supplemented by both the prosecution and defense. Hawkins (2020) explains, “In this scenario both experts reached the conclusion that the defendant’s brain was damaged, as indicated by MRI and PET scans,” (p. 56). The prosecution asserted that the defendant was a “high risk” for future reoffending and violent behavior because of the brain damage and antisocial personality disorder. The defense concluded that the combination of mental illness, substance abuse, and brain damage could be the cause of the defendant’s criminal history.

In all conditions, the mock jurors reviewed the evidence and then provided their sentencing recommendation and confidence in that decision. The verdict was as follows:

1 = Death

2 = Life in prison without the possibility of parole.

The confidence rate was a sliding scale from 0-100%.

Variables

The participants were then asked to give a rating on a Likert Scale regarding their perceptions of the defendant:

Scale: 1= Strongly Agree; 2 = Agree; 3 = Neutral; 4 = Disagree; 5 = Strongly Disagree

P_Defendant_1	The defendant poses a future danger to society.
P_Defendant_2	The defendant’s actions were heinous and vicious.
P_Defendant_3	The defendant was remorseful.
P_Defendant_4	The defendant accepts responsibility for the murder.
P_Defendant_5	The defendant is evil.
P_Defendant_6	The defendant is subhuman.
P_Defendant_7	The defendant will most likely kill again.

For the question of assigned responsibility, participants were asked the following:

On a scale from 0 to 100%, please indicate how responsible you believe the defendant is for the murder.

Data Analysis Procedures

For the first research question, a logistic regression was run to determine if assigned responsibility and perceptions of the crime and the defendant had an effect on the verdict. The logistic regression was used because the outcome was a binary verdict decision.

For the second research question, a Chi-square test of association was administered to see if one condition was more associated with capital punishment or life in prison without chance of parole. A chi-square test was used because the condition variable and the verdict were categorical. Additionally, a Phi and Cramer's V was used to measure the strength of associations for each condition and verdict. The standard value for determining significance was a P_Defendant value <.05.

Results

The Omnibus Test of Model Coefficients used a Chi-square which determined the model with all of the predictors (Assigned Responsibility and P_Defendant variables) was significantly different from the Intercept Only Model ($\chi^2 = 47.338$, $p < .001$).

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	47.338	8	<.001
	Block	47.338	8	<.001
	Model	47.338	8	<.001

The equation for the overall model of the logistic regression was:

Log odds(death penalty) = -.371(Constant) + .451(P_Defendant_1) + -.412((P_Defendant_2) + .142(P_Defendant_3) + -.296(P_Defendant_4) + .327(P_Defendant_5) + -.293(P_Defendant_6) + 1.171(P_Defendant_8) + -.006(AssignedResponsibility)

This model had a Nagelkerke R Square value of .268, which means that 26.8% of the variability in verdict can be accounted for by the predictors in this model.

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	198.126[a]	.158	.268

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

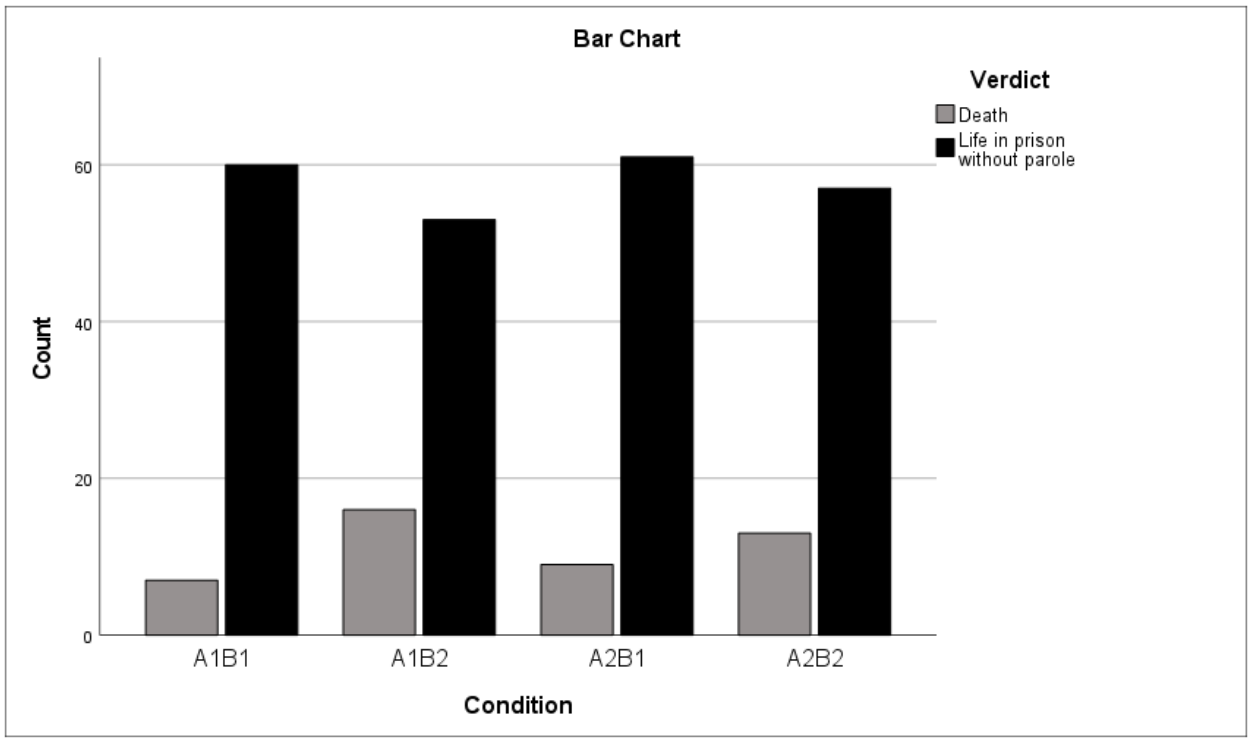
The only significant variable was P_Defendant_7 with a significance value of <.01. The corresponding exponential B value was equal to 3.226, which meant that for every unit increase on the Likert Scale a mock juror was 3.226 times more likely to select the death penalty.

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	P_Defendant_1	.451	.338	1.785	1	.181	1.570
	P_Defendant_2	-.412	.298	1.901	1	.168	.663
	P_Defendant_3	.142	.249	.327	1	.567	1.153
	P_Defendant_4	-.296	.224	1.755	1	.185	.744
	P_Defendant_5	.327	.251	1.702	1	.192	1.387
	P_Defendant_6	-.293	.265	1.216	1	.270	.746
	P_Defendant_7	1.171	.308	14.472	1	<.001	3.226
	AssignedResponsibility	-.006	.010	.333	1	.564	.994
	Constant	-.371	1.276	.084	1	.771	.690

a. Variable(s) entered on step 1: P_Defendant_1, P_Defendant_2, P_Defendant_3, P_Defendant_4, P_Defendant_5, P_Defendant_6, P_Defendant_7, AssignedResponsibility.

For the second research question, there were no significant difference in condition. The chi-square test reveals that no neurological evidence condition had a greater association with a particular verdict ($\chi^2 = 4.954$, p =.175, Cramer's V =.134).



Across all conditions, participants were far more likely to select life in prison over death. However, Condition A1B2 had the highest outcome for most death penalty verdicts, with more than twice as many death selections than Condition A1B1.

Discussion

The emergence of neurological evidence research has been accompanied by hesitancy because of a historically negative reputation from Cesare Lombroso's phrenological practices (Tibbets, 2015; Raine, 2013). Researchers tend to agree that neurological evidence alone is not

overtly mitigating or aggravating (Greene & Cahill, 2012; Saks et al., 2014). While some evidence indicates that neurobiological evidence can reduce perceptions of free will (Berryessa et. al, 2021; Greene & Cahill, 2012; Saks et al., 2014), neurological evidence does not influence juror findings of the defendant's guilt or insanity (Du, 2022; Berryessa et. al, 2021). Perhaps because neurobiological evidence can reduce perceptions of free will, neurological evidence was a mitigating factor for defendants determined to be dangerous, resulting in lower death sentence verdicts. However, this is only the case for dangerous defendants, and not necessarily applicable for defendants determined as a low danger (Greene & Cahill, 2012) or defendants without certain mental health diagnosis (Saks et. al, 2014).

This is the first study to consider the potential effects of neurological evidence in consideration under a theoretical framework for jury decision-making. This study is a partial test of the 'Director's Cut' Integrative Multi-Level Theory of Jury Decision Making by testing how prosecutorial and defense evidence influences responsibility; whether neurological evidence increases or decreases the severity of the perception of the defendant's dangerousness, and whether there is an association between this evidence and capital punishment decisions.

The first research question of this study sought to observe whether assigned responsibility and perceptions of the crime and the defendant influenced the verdict in capital punishment trials. It was hypothesized that there is an influence of assigned responsibility and perceptions of the crime and the defendant on the verdict. This study found that the only statistically significant variable to increase the likelihood that the juror would select the death penalty was believing the defendant would kill again. This finding agrees with previous research that an individual perceived to be more dangerous is more likely to incur harsher criminal sanctions (Berryessa & Wohlstetter, 2019) such as the death penalty (Greene & Cahill, 2012; Saks et al., 2014).

In Devine's model, the defendant's characteristics do not directly influence the verdict. However, this study found that a defendant's characteristic (perceived dangerousness) does directly influence the verdict. This suggests that contrary to Devine's model, a juror does not synthesize all information at the beginning and then change their assumed story as they filter through considerations of responsibility and the attorneys' presentations. Rather, a defendant's characteristic either has a direct influence on the verdict, or the juror's decision making is not so linear as Devine proposes.

The second research question in this study explored whether there is an association between neuroimaging conditions and capital punishment verdict. Devine theorizes that evidence plays an interactive role in determining the prosecution and defense story likelihood. However, in disagreement with Devine, previous research, and the hypothesis, this study found that neuroimaging evidence was not significantly aggravating or mitigating in a capital punishment trial. In other words, having neurological evidence (or not) had no statistically significant influence on the verdict. This disagrees with the Greene and Cahill (2012) finding that neurological evidence is mitigating. This may be because the participants in the Greene and Cahill (2012) study were psychology students and may have had preexisting sympathy towards individuals with explanations for behavior. When jury studies consist of students, the juries tend to differ in "age, work experience, education, and attitudes" and thus do not accurately represent an organic jury pool (Bartol & Bartol; 2019; p. 139).

Limitations and Future Research

Like much jury research, this study is limited in that it is juror, not jury decision-making. In an actual trial, there is deliberation between jurors, and that is a factor that could not be controlled for in this study. Additionally, as Saks et al. (2014) highlighted, studies such as these

that attempt to simulate juror decision-making are limited in that the experiment is entirely theoretical, and there is not an actual life at stake.

While the data set used for this study has excellent internal validity, it is consequentially limited in its external validity (Devine, 2012). Because so many variables were controlled for, there was less realism for mock jurors, such as the lack of visuals (besides the neurological evidence) and the absence of opening and closing statements from the prosecution and defense.

This study may be limited by the fact that it was an online survey and dependent on honest and truthful participants. Distorted data could occur if participants dishonestly clicked through the survey in order to receive the monetary award at the end. However, it is impossible to tell from simply looking at the results if the participant was dishonest or if they are a fast reader. Future online survey research would benefit from somehow controlling for surveyor dishonesty.

Although the majority of verdict preference within a group of jurors tends to become the final outcome (Devine, 2012), this study does lack the important phase of juror deliberation. All states that still practice capital punishment require unanimous votes, and therefore deliberation is an important factor in the jury's process. Further, some research indicates that juries required to reach a unanimous decision deliberate longer, more thoroughly, and more inclusively than juries not required to reach unanimity (Devine, 2012).

Future research would benefit from creating in-person simulated jury trials, with either real prosecution or defense attorneys or actors delivering these statements and evidence. The role of expert testimonies, the credibility of experts, and their influence over jury decision-making would be a further test of Devine's method and may produce a more organic result of jury decision-making.

Seeking a more equally diverse participant sample in future research would yield more comprehensive results. This study's sample was primarily composed of white female participants with the least amount of participants from Native American, Asian, and Hispanic ethnicities. Additionally, exploring verdict decisions of nonbinary individuals would be an intriguing avenue for future research. A follow-up study could explore whether individuals with the demographics less represented in this study are more or less inclined to select the death penalty.

Finally, future research would benefit from including some of the social-cognitive series that go into jury decision-making. For example, some questions could inquire about the participants' understanding of legal concepts to account for common sense justice. Other questions could inquire about bias to account for generic prejudice. Participants with strong measurements of common-sense justice or generic prejudice could be excused from the simulation, just as potential jurors would be dismissed during voir dire.

Conclusion

The justice system is built on the foundation that humans are rational creatures who may choose to commit crime (Barak et al., 2018; Fondacaro, 2014; Gottfredson, 1999; Lab et al., 2021; Shafer-Landau, 2018; Shuster, 2011). However, research in neurology shows us that not all brains are equal in their ability to mediate what the justice system defines as rational behavior (Goriounova & Mansvelder, 2019; Kiehl, 2006; Levine & Munsch, 2022; Müller et al., 2003; Pardini et al., 2014; Raine, 2013; Reiman & Leighton, 2020; Soderstrom et al., 2000). Few researchers have studied the impact of neurological evidence on capital trials, yet none of these studies include a theoretical framework of jury decision-making.

This study adds to existing research (Berryessa et. al, 2021; Du, 2022; Greene & Cahill, 2012; Saks et. al, 2014) of neurobiological evidence on jury decision making. This is the first study to incorporate Devine's theoretical framework when considering the influence of neurological evidence. Additionally, the findings of this study suggest that there may be room for revision in Devine's 'Director's Cut' Integrative Multi-Level Theory of Jury Decision Making. The findings of this study disagree with Devine's theoretical model, as juror decision-making may not be so linear. Further, this study found no relationship between the type of evidence used and the verdict. This was only a partial test of Devine's theory and more needs to be tested and considered.

If neuroimaging was a mitigating factor because students of psychology empathize with explanations for behavior, as is suggested by the contrast between this study and the findings of the Greene and Cahill (2012), then more education is needed for all individuals who are eligible to serve on a jury. It is easy to make decisions without knowing the full story, yet more education can lead to a clearer picture for explanations of behavior. Within behavior, there are more factors

beyond an individuals' control than is accounted for by the law. In punishment, the death penalty is ineffective (Decker & Kohfeld, 1984; Fagan, 2005; Zeisel, 1976), outdated in industrialized societies (Barak et al., 2018; Devine, 2012), disproportionately targets ethnic minorities (Race and the Death Penalty, 2003), has executed wrongfully incarcerated individuals (Parker et al., 2003), and dehumanizes the people who are sentenced to death. For further considerations of the morality of sentencing people to death, I leave you with an excerpt of writing from James A. Johnson, an individual on death row.

> To the men and women convicted and sentenced to 'death,' I am sure that their lives matter to them. If not to them, then to their loved ones and friends. To the victims of each man or woman on death row, both legal and wrongful, I am sure that their lives matter to them. If not to them then to their loved ones and friends. We as a nation cannot and will not heal until all lives matter regardless of color, religion, nationality, sentence, or affiliation (On Wings of Hope, 2023).

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The following appendices are directly copied from Dr. Hawkins's dissertation.

Appendix A

Informed Consent

CONSENT FORM FOR HUMAN PARTICIPANTS IN RESEARCH
You are invited to participate in a research project being conducted through Indiana University of Pennsylvania. It involves an electronic anonymous survey. You can use speakers or headphones as most of the text in this study is provided in audio format. You can listen to the audio by clicking the play button above. The following information is provided to help you to make an informed decision whether to participate. If you have any questions, please email Mr. Paul M. Hawkins at phawkins@iup.edu or Dr. Jen Roberts at jroberts@iup.edu.

The purpose of this study is to explore factors influencing death penalty decision-making. This includes participating in a simulated (pretend) death penalty trial. If you agree to participate, you will be asked to review information from a simulated death penalty case. The simulation will end with you making a decision for the death penalty or life in prison without the possibility of parole. After you review the information and make your death penalty decision, you will be given a survey with questions about different parts of the trial, your feelings about thinking and science, and additional demographics.

Since this is a simulation, your death penalty decision has no impact on any individual. Participating in this study harms no humans. Participation in the study will take at least 30 minutes. You will be compensated the amount you agreed upon before you entered into the survey. Your participation will help researchers better understand how people make death penalty decisions.

Your participation in this study is anonymous. All data gathered by the researcher will be analyzed as aggregate data. The results will be stored electronically on a flash drive and kept in a locked safe in the primary researcher's office for three years. Results from this study will be used for research purposes only. Your data will not be sold. Results may be presented at conferences and used for publishing research articles, but there will be no way anyone will be able to know that you participated.

Your participation in this study is voluntary. If you choose to participate, you can stop taking the survey and exit your browser at any time. Once you have submitted your answers there will be no way to withdraw your data because we will not be able to determine which responses belong to you. Completion of this survey implies your consent to participate.

If you have any questions about this research study, you can contact the investigator and/or the faculty sponsor using the email address listed below.

Paul M. Hawkins, M.A.
159
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Indiana University of Pennsylvania

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THIS PROJECT HAS BEEN APPROVED BY THE INDIANA UNIVERSITY OF PENNSYLVANIA INSTITUTIONAL REVIEW BOARD FOR THE PROTECTION OF HUMAN SUBJECTS (PHONE 724.357.7730).

Do you wish to participate in survey?

- I Accept and wish to continue with the study
- I Decline and choose not to continue with the study

Appendix B

Jury Eligibility Form

United States Juror Eligibility (USCourts.gov)

Thank you for electing to participate in this study. In this first part of this study, you'll be asked to pretend like you are a juror in a death penalty case. To serve as a United States juror, in a death penalty case, certain eligibility criteria must be met.

Please answer some questions about yourself so we can determine if you are eligible to serve as a U.S. juror in a death penalty case.

1. Are you a United States (U.S.) citizen?*
    a. Yes
    b. No
2. What is your age?*
    a. 18-75+ (Dropdown list)
3. Are you proficient in the English language?*
    a. Yes
    b. No
4. Have you ever been diagnosed with a serious mental illness?*
    a. Yes
    b. No
5. Have you ever been diagnosed with a serious physical disability?*
    a. Yes
    b. No
6. Have you ever been diagnosed with an intellectual disability?*
    a. Yes
    b. No
7. Have you ever been charged with a felony that is punishable by imprisonment for more than one year?*
    a. Yes
    b. No
8. Have you ever been convicted of a felony?*
    a. Yes
    b. No

*indicates forced response

Appendix C

Death Penalty Qualification (Greene & Cahill, 2012)

Please indicate which of the following statements most closely describes your feelings about the death penalty. Please make your selection and click "Next" to continue.

A. If a defendant was found guilty of a murder for which the law allowed a death sentence, I would sentence the defendant to death even if the case facts did not show that the defendant deserved a death sentence (Greene & Cahill, 2012).**
B. I am in favor of the death penalty but would not necessarily vote for it in every case where the law allowed it. I would consider the case facts that pertain to the death penalty and then decide whether to sentence the defendant to death (Greene & Cahill, 2012).
C. Although I have doubts about the death penalty, I would be able to find a defendant guilty and vote for a death sentence where the law allowed it, if the case facts showed that the defendant was guilty and should be given a death sentence (Greene & Cahill, 2012).
D. D. I have such strong doubts about the death penalty that I would be unable to find a defendant guilty and vote for a death sentence where the law allowed it, even if the case facts showed that the defendant was guilty and deserved a death sentence (Greene & Cahill, 2012).**

*indicates forced response
**indicates disqualification and end of participation

Appendix D

General Instructions

For this part of the study, please pretend like you have been asked to serve as a juror in a death penalty case. The defendant has already been found guilty of first-degree murder. Your job as a juror will be to decide if the defendant should be given the death penalty or life in prison without the possibility of parole.

In this part of the study, you will be given information about the case and the defendant just like you would if you served on a real jury.

To start, you will be given a general summary of the case, background information about the defendant, and instructions from the judge. The prosecuting attorney will then argue why the defendant should be sentenced to death. The defense attorney will argue why the defendant should be sentenced to life without the possibility of parole. The judge will give you final information about how to make your decision. Then, you will decide if the defendant should receive the death penalty or life in prison without the possibility of parole.

After you finish with this pretend case, you will be asked to complete a survey.

Please note, there is no time limit to complete the pretend case or survey portions of this study, although it may take at least 30 minutes. Please make sure your speakers or headphones are turned on. Find a place that is quiet and uninterrupted so that you can focus on the task at hand. Please keep in mind, there are no right or wrong answers to the questions you will be asked. You may stop participating at any time by simply closing your browser, however, you are strongly encouraged to complete the study in its entirety (that's the pretend case and the survey portions), so you can be compensated the amount you agreed upon before you began the survey.

Remember, your decision ultimately has no impact on the life or death of an actual defendant since this is just a pretend case.

Please click "Next" to continue.

IMPORTANT!

Please pay attention to the material given to you on each page. **There is no "Back" button in this survey.** On each page, click "Next" to continue only when you are ready to move forward in the study. Please do not take notes or record any of the materials. Thank you!

Appendix E

Case Summary & Background Information

Please read the following information that provides a summary of the current case and background information about the defendant.

Case Summary: U.S. v. Elliott Williams

On June 18, 2018, police responded to an incident after receiving calls from neighbors about a disturbance at the home of Elliott Williams. Police arrived at the scene and found Jordan Smith unconscious and bleeding due to multiple stab wounds and blunt force trauma. Smith was pronounced dead at the home. Despite a claim of self-defense, Williams was convicted of the first-degree murder of Jordan Smith. The issue to be determined by you, the juror, is whether Williams should be sentenced to death or to a life of imprisonment without the possibility of parole.

Defendant Background Information

The Department of Health records indicated that Elliott Williams' condition at birth was healthy. Williams was the middle child among three in the family. While teenagers, the Williams children were expected to take care of most of the work around the family-owned restaurant and bar. They were also expected to work nearly all day and were not encouraged by their parents to have outside friends or interests. As such, their school attendance was spotty.

Williams was a "B" student with the highest level of education completed being a high school diploma. Williams did enroll in a local community college to study culinary arts and business management but dropped out after one semester. Friends and family said that Williams was generous, welcoming, and often provided free food and drinks at the family-owned restaurant and bar. Williams worked at the family business until the first-degree murder charge. Williams is currently married and has two children, age two and four. Family members describe Williams as a loving and caring parent and spouse. However, due to years of Elliott's drinking and drug abuse, Elliott's spouse has left the marriage a few times.

Please note that Elliott has already been found guilty of first-degree murder. Your task will be to decide if the defendant should be given the death penalty or a sentence of life in prison without the possibility of parole.

Please click "Next" to get instructions from the judge.

Appendix F

Judicial Instructions I

Please review the following judicial instructions:

Members of the jury, the defendant has been found guilty of first-degree murder. The prosecutor and the defense attorney are going to present additional evidence and make further arguments to you. Then, you will decide whether to sentence the defendant to receive the death penalty or life imprisonment without the possibility of parole.

The decision you make will be based on aggravating or mitigating circumstances. Aggravating circumstances increase the wrongfulness of the crime and make a defendant more blameworthy. An example of an aggravating circumstance is if a defendant will be a continuing violent threat to society.

Mitigating circumstances while not justifications or excuses for the crime, provide information about a defendant's ability to appreciate the wrongfulness of their conduct. An example of a mitigating circumstance is that a defendant, due to psychological impairment and disturbance, does not have the capacity to appreciate the wrongfulness of their conduct.

Aggravating circumstances will be presented to you by the prosecutor. The defense attorney will present mitigating circumstances to you.

Please click "Next" to begin.

Appendix G

Simulation Conditions

Condition: A1B1

Please read the following case materials.

Prosecution Expert Testimony (Aggravating)

The prosecution calls Dr. Roberts, a clinical forensic psychologist, to present aggravating evidence. Dr. Roberts received a Ph.D. from the University of North Carolina, completed an internship at the Federal Correctional Complex in Butner, NC and is now employed in the Department of Forensic Services for Union County Circuit Court in Florida. Dr. Roberts interviewed and tested Elliott Williams on August 12 and 13, 2018. Dr. Roberts also interviewed people familiar with the defendant. The purpose of these interviews was to assess the likelihood that the defendant represents a continuing danger to society.

On direct examination by the prosecutor, Dr. Roberts testifies to the following:

Based on the extensive amounts of information Dr. Roberts reviewed (including the defendant's background, criminal history, psychological test results, past behavior, and information from the crime scene investigation), as well as from Dr. Robert's interview with the defendant and others who know the defendant, Dr. Roberts concludes that Elliott Williams has antisocial personality disorder and is judged to be at a "high risk" of being violent in the future. Dr. Roberts is quite confident of this opinion. In forming an opinion about the likelihood that the defendant represents a continuing danger to society, Dr. Roberts relied on the hypothesis that individuals suffering from antisocial personality disorder show a high probability of violence in all contexts and are generally thought to be dangerous.

On cross-examination by the defense, Dr. Roberts testifies to the following:

There is no research demonstrating that antisocial personality disorder is reliably associated with serious violence in American prisons. Rather than denoting a particularly violence-prone inmate, a diagnosis of antisocial personality disorder simply describes most inmates in correctional institutions in this country. Indeed, no personality disorder is reliably associated with higher long-term rates of prison violence. Further, past community violence is not strongly or consistently associated with prison violence. Current offense, prior convictions and escape history are only weakly associated with prison misconduct; and the severity of the offense is not a good predictor of prison adjustment. Overall, there is no consensus among mental health professionals on appropriate standards for assessing future dangerousness.

Please click "Next" to continue.

Defense Expert Testimony (Mitigating)

The defense calls Dr. Lewis to present mitigating evidence. Dr. Lewis received a Ph.D. in Clinical Neuropsychology from the University of Massachusetts and completed an internship at University of Pittsburgh Medical Center. Dr. Lewis is currently the Director of Neuropsychology and the Behavioral Brain Center at the University of Kentucky. Dr. Lewis conducted a psychological and neuropsychological evaluation of Elliott Williams on July 11, 2018. The evaluation's purpose was to determine whether Elliott Williams suffers from psychological or neuropsychological deficits due to a brain disorder and, if so, how these deficits may impact the defendant's thought processes and behavior in daily life.

Please click "Next" to continue.

On direct examination by the defense, Dr. Lewis testifies to the following:

Dr. Lewis interviewed Elliott Williams and people familiar with the defendant and conducted a social and psychological history. Elliott has a documented history of substance abuse including alcohol, marijuana and methamphetamines. Elliott also has a long history of mental illness documented by professionals: suffered from depression, anxiety, post-traumatic stress disorder, psychotic symptoms, and antisocial personality disorder. On a test designed to detect people who malinger, or fake their deficits, Elliott passed. Thus, this suggests that the defendant tried their best on the testing.

Please click "Next" to continue.

Furthermore, on the basis of the psychological testing, Dr. Lewis concluded that Elliott has a psychotic disorder (psychosis) because certain psychological traits and behaviors that are consistent with this diagnosis are present. More specifically, the defendant is characterized as having delusions and hallucinations, very disorganized thoughts and speech (for example, not being able to maintain a conversation with others), engaging in bizarre behaviors and mannerisms (for example, repeatedly making odd gestures with their hands), and displaying inappropriate emotions (for example, laughing when told something sad).

Dr. Lewis also administered a number of neuropsychological tests to further evaluate Elliott Williams' thought processes. Results showed that key deficits for Elliott are in attention and memory, lack of behavioral control, poor impulse inhibition, and deficient problem-solving. This pattern of findings indicates damage to the frontal lobes of the brain, presumably due to head injuries Elliott has experienced.

In conclusion, Dr. Lewis testifies that the present offense and Elliott's past criminal conduct may be related to these disorders, deficits, and injuries.

Please click "Next" to continue.

On cross-examination by the prosecutor, Dr. Lewis testifies to the following:

Although the prevalence rate of violence among those with psychoses and frontal lobe damage is ten percent higher than among the general population, most who suffer from such ailments are never criminally violent. It is not possible to say with scientific certainty that the defendant's impulsivity, impaired social judgements, and personality changes are related to or caused by psychoses or frontal lobe damage.

Please click "Next" to continue.

Condition A1B2

Prosecution Expert Testimony (Aggravating)

The prosecution calls Dr. Roberts, a clinical forensic psychologist, to aggravating evidence. Dr. Roberts received a Ph.D. from the University of North Carolina, completed an internship at the Federal Correctional Complex in Butner, NC and is now employed in the Department of Forensic Services for Union County Circuit Court in Florida. Dr. Roberts interviewed and tested Elliott Williams on August 12 and 13, 2018. Dr. Roberts also interviewed people familiar with the defendant. The purpose of these interviews was to assess the likelihood that the defendant represents a continuing danger to society.

Please click "Next" to continue.

On direct examination by the prosecutor, Dr. Roberts testifies to the following:

Based on the extensive amounts of information Dr. Roberts reviewed (including the defendant's background, criminal history, psychological test results, past behavior, and information from the crime scene investigation), as well as from Dr. Robert's interview with the defendant and others who know the defendant, Dr. Roberts concludes that Elliott Williams has antisocial personality disorder and is judged to be at a "high risk" of being violent in the future. Dr. Roberts is quite confident of this opinion. In forming an opinion about the likelihood that the defendant represents a continuing danger to society, Dr. Roberts relied on the hypothesis that individuals suffering from antisocial personality disorder show a high probability of violence in all contexts and are generally thought to be dangerous.

Please click "Next" to continue.

On cross-examination by the defense, Dr. Roberts testifies to the following:

There is no research demonstrating that antisocial personality disorder is reliably associated with serious violence in American prisons. Rather than denoting a particularly violence-prone inmate, a diagnosis of antisocial personality disorder simply describes most inmates in correctional institutions in this country. Indeed, no personality disorder is reliably associated with higher long-term rates of prison violence. Further, past community violence is not strongly or consistently associated with prison violence. Current offense, prior convictions and escape history are only weakly associated with prison misconduct; and the severity of the offense is not

a good predictor of prison adjustment. Overall, there is no consensus among mental health professionals on appropriate standards for assessing future dangerousness.

Please click “Next” to continue.

Defense Expert Testimony (Mitigating)

The defense calls Dr. Lewis to present mitigating evidence. Dr. Lewis received a Ph.D. in Clinical Neuropsychology from the University of Massachusetts and completed an internship at University of Pittsburgh Medical Center. Dr. Lewis is currently the Director of Neuropsychology and the Behavioral Brain Center at the University of Kentucky. Dr. Lewis conducted a psychological and neuropsychological evaluation of Elliott Williams on July 11, 2018. The evaluation’s purpose was to determine whether Elliott Williams suffers from psychological or neuropsychological deficits due to a brain disorder and, if so, how these deficits may impact the defendant’s thought processes and behavior in daily life.

Please click “Next” to continue.

On direct examination by the defense, Dr. Lewis testifies to the following:

Dr. Lewis interviewed Elliott Williams and people familiar with the defendant and conducted a social and psychological history. Elliott has a documented history of substance abuse including alcohol, marijuana and methamphetamines. Elliott also has a long history of mental illness documented by professionals: suffered from depression, anxiety, post-traumatic stress disorder, psychotic symptoms, and antisocial personality disorder. On a test designed to detect people who malinger, or fake their deficits, Elliott passed. Thus, this suggests that the defendant tried their best on the testing.

Please click “Next” to continue.

On the basis of the psychological testing, Dr. Lewis concluded that Elliott has a psychotic disorder (psychosis) because certain psychological traits and behaviors that are consistent with this diagnosis are present. More specifically, the defendant is characterized as having delusions and hallucinations, very disorganized thoughts and speech (for example, not being able to maintain a conversation with others), engaging in bizarre behaviors and mannerisms (for example, repeatedly making odd gestures with their hands), and displaying inappropriate emotions (for example, laughing when told something sad).

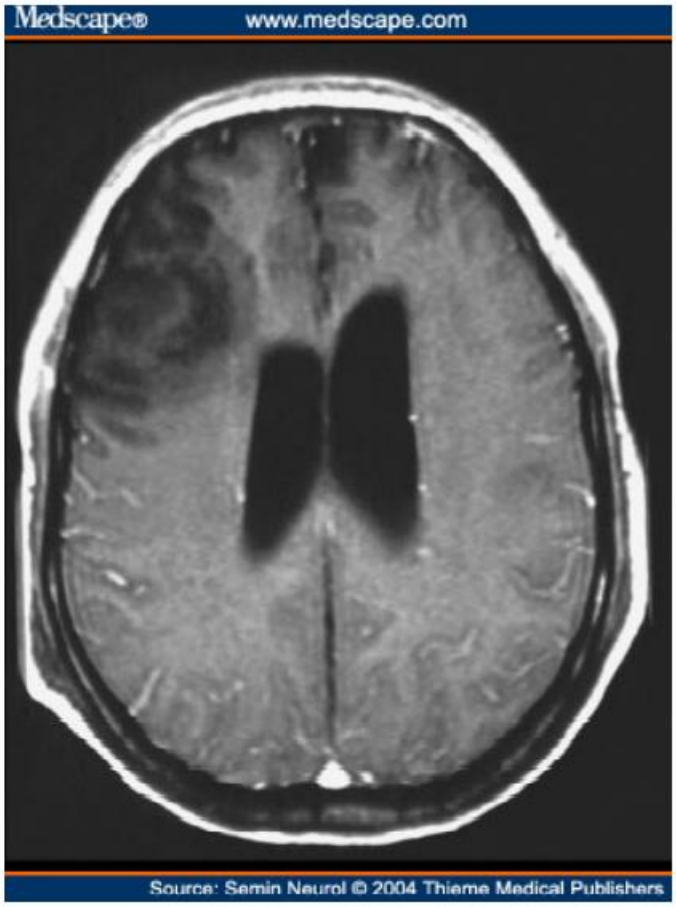
Dr. Lewis also administered a number of neuropsychological tests to further evaluate Elliott Williams’ thought processes. Results showed that key deficits for Elliott are in attention and memory, lack of behavioral control, poor impulse inhibition, and deficient problem-solving. This pattern of findings indicates damage to the frontal lobes of the brain, presumably due to head injuries Elliott has experienced.

In conclusion, Dr. Lewis testifies that the present offense and Elliott’s past criminal conduct may be related to these disorders, deficits, and injuries.

Please click “Next” to continue.

Brain Imaging Tests

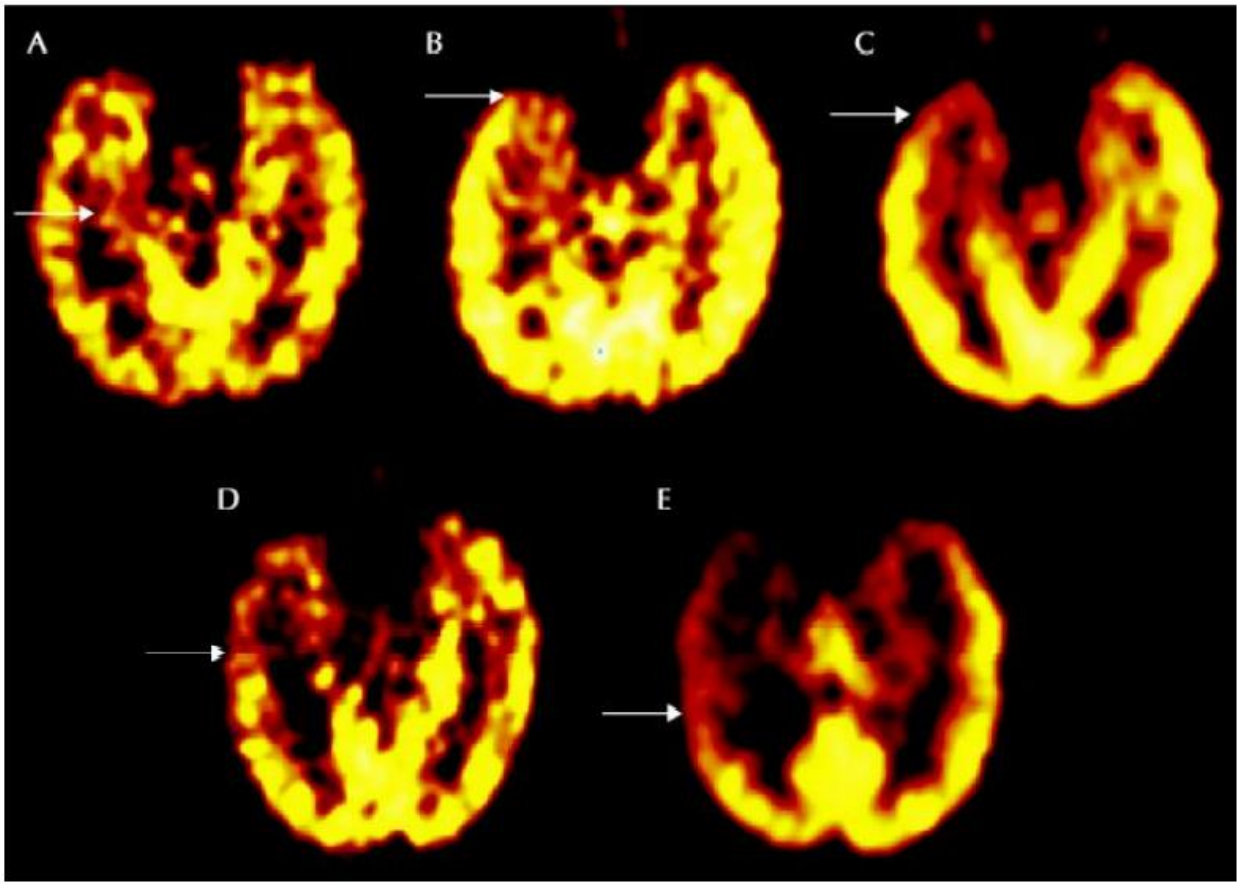
Furthermore, Dr. Lewis was also able to obtain neuroimages of Elliott Williams’ brain. A neuroimage encompasses a computer-generated representation of the brain’s structure and function; this technology allows one to look at, and into, the brain using functional and structural imaging techniques. Structural neuroimages can be created using magnetic resonance imaging (“MRI”) in which the body is placed in a strong magnetic field of the MRI scanner. Images are constructed from the electromagnetic signals that are emitted by nuclei of hydrogen atoms, found predominantly in tissue water.



This is an MRI scan of Elliott’s brain. MRI scans provide a picture of the internal structure of the brain. This scan shows damage to the left frontal part of Elliott’s brain (top left). The black space represents the absence of brain tissue. In Elliott’s case, this represents damage caused by head injury. Damage to this part of the brain would be expected to result in intensified aggressive urges, impaired ability to control emotions, and problems with attention, memory, and planning.

Please click “Next” to continue.

A second type of neuroimage, a PET (positron emission tomography) scan, can depict the brain in action. In a PET scan, radioisotopes are used to “label” molecules of water or glucose in the bloodstream, a scanner detects the distributions of these isotopes throughout the brain, and a computer determines the relative differences in metabolic rates across brain structures. These differences are depicted by variations in color patterns in computer-generated images of the brain.



This is a PET scan of Elliott's brain. The colored areas of the brain indicate different rates of metabolism and hence, different rates of brain activity. The yellow areas have the highest rates of metabolism and thus, the most brain activity. Black areas on the other hand, show the least amount of metabolism, and thus the least amount of activity. This scan shows a lack of activity in the left frontal part of Elliott's brain. This part of the brain is involved in handling emotions and regulating one's behavior. These results are consistent with the MRI findings of reduced volume in this region and most likely relate to scraping of the brain against the skull associated with a closed head injury.

In conclusion, Dr. Lewis testifies that the present offense and Elliott's past criminal conduct may be related to these deficiencies and damage.

Please click "Next" to continue.

On cross-examination by the prosecutor, Dr. Lewis testifies to the following:

Although the prevalence rate of violence among those with psychoses and frontal lobe damage is ten percent higher than among the general population, most who suffer from such ailments are never criminally violent. It is not possible to say with scientific certainty that the defendant's impulsivity, impaired social judgements, and personality changes are related to or caused by psychoses or frontal lobe damage.

Furthermore, there are no precise criteria for differentiating normal from abnormal imaging results, nor for quantifying the extent of frontal lobe damage. This means that although the defendant shows some evidence of frontal lobe damage, it is not possible to quantify the damage. Although attempts have been made to link particular PET scan patterns to criminal behavior, researchers have not established that PET scans have the sensitivity to predict any neurological or psychiatric deficit or criminality. Thus, mental health professionals are incapable of reliably assessing the capacity for impulse control, particularly in relation to criminal behavior, using PET scans.

Please click "Next" to continue.

Condition: A2B1

Prosecution Expert Testimony (Aggravating)

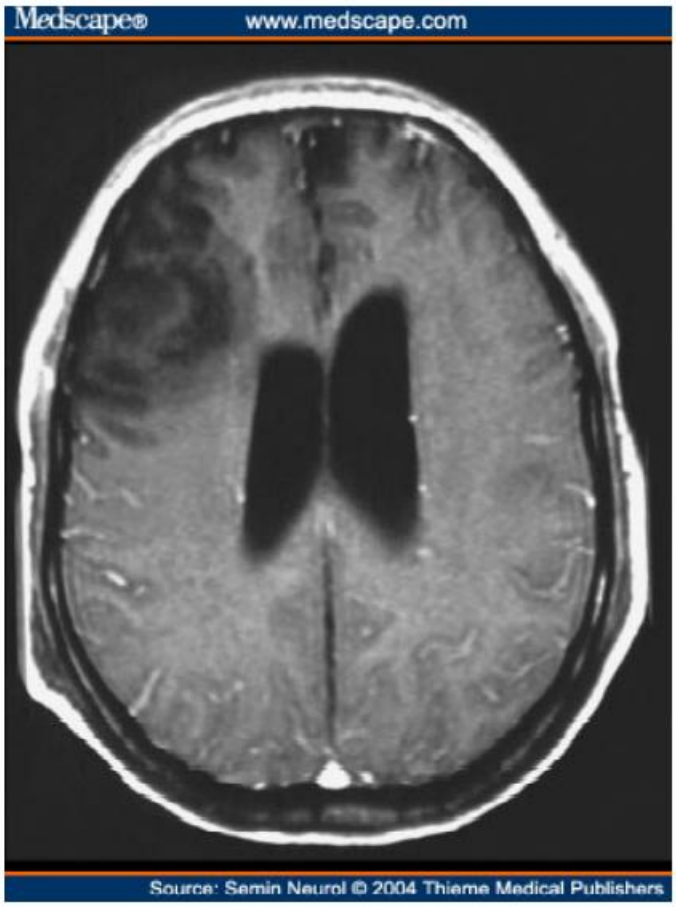
The prosecution calls Dr. Roberts, a clinical forensic psychologist, to present aggravating evidence. Dr. Roberts received a Ph.D. from the University of North Carolina, completed an internship at the Federal Correctional Complex in Butner, NC and is now employed in the Department of Forensic Services for Union County Circuit Court in Florida. Dr. Roberts interviewed and tested Elliott Williams on August 12 and 13, 2018. Dr. Roberts also interviewed people familiar with the defendant. The purpose of these interviews was to assess the likelihood that the defendant represents a continuing danger to society.

Please click "Next" to continue.

On direct examination by the prosecutor, Dr. Roberts testifies to the following:

Brain Imaging Tests

Dr. Roberts was able to obtain neuroimages of Elliott Williams' brain. A neuroimage encompasses a computer-generated representation of the brain's structure and function; this technology allows one to look at, and into, the brain using functional and structural imaging techniques. Structural neuroimages can be created using magnetic resonance imaging ("MRI") in which the body is placed in a strong magnetic field of the MRI scanner. Images are constructed from the electromagnetic signals that are emitted by nuclei of hydrogen atoms, found predominantly in tissue water.



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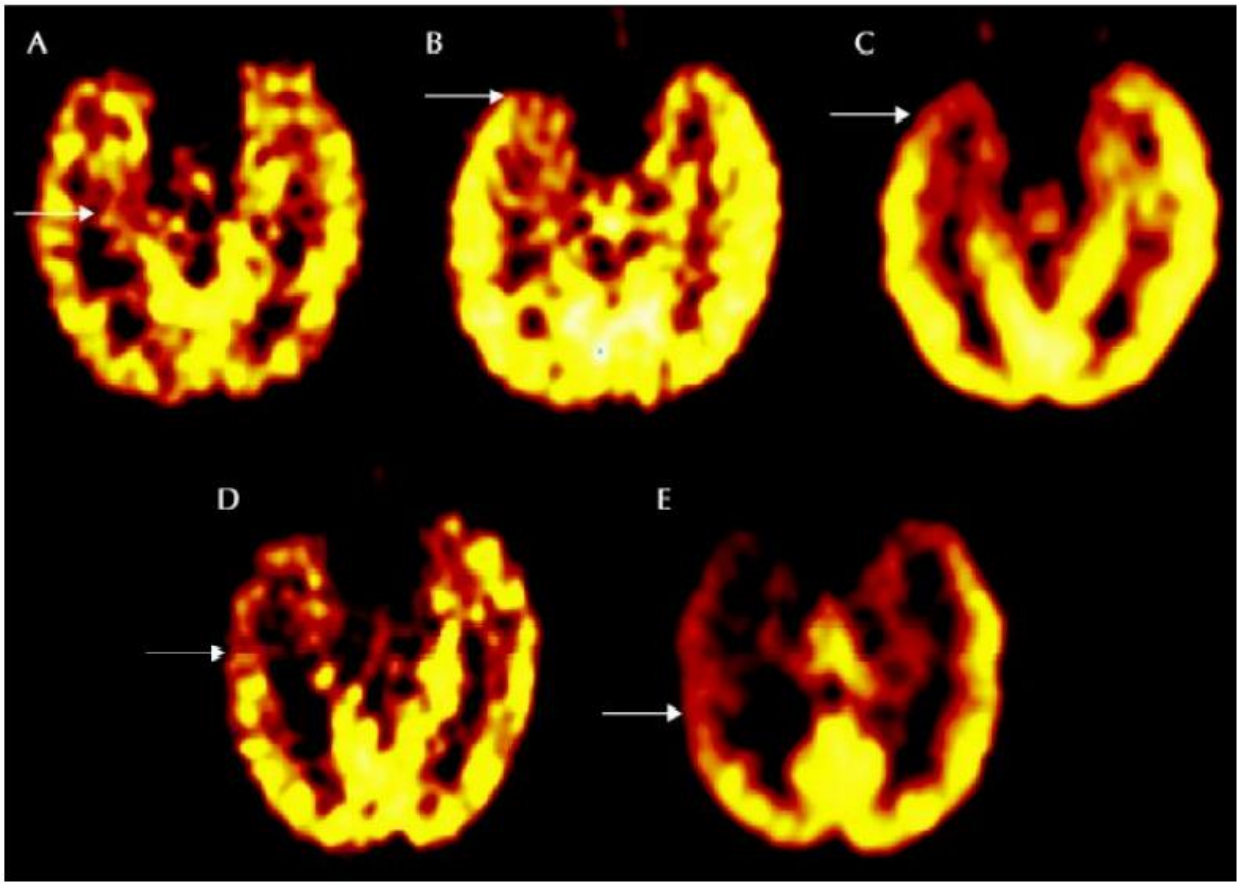

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Please click "Next" to continue.

Based on the extensive amounts of information Dr. Roberts reviewed (including the defendant's background, criminal history, brain imaging results, past behavior, and information from the crime scene investigation), as well as from Dr. Robert's interview with the defendant and others who know the defendant, Dr. Roberts conclude that Elliott Williams has brain damage in areas associated with emotional and behavioral regulation. Dr. Roberts also concludes that Elliott Williams has antisocial personality disorder.

Therefore, Dr. Roberts judges that Elliott is at a “high risk” of being violent in the future. Dr. Roberts is quite confident of this opinion. In forming an opinion about the likelihood that the defendant represents a continuing danger to society, Dr. Roberts relied on the hypothesis that individuals suffering from antisocial personality disorder show a high probability of violence in all contexts and are generally thought to be dangerous.

Please click “Next” to continue.

On cross-examination by the defense, Dr. Roberts testifies to the following:

There are no precise criteria for differentiating normal from abnormal imaging results, nor for quantifying the extent of frontal lobe damage. This means that although the defendant shows some evidence of frontal lobe damage, it is not possible to quantify the damage. Although attempts have been made to link particular PET scan patterns to criminal behavior, researchers have not established that PET scans have the sensitivity to predict any neurological or psychiatric deficit or criminality. Thus, mental health professionals are incapable of reliably assessing the capacity for impulse control, particularly in relation to criminal behavior, using PET scans. Overall, there is no consensus among mental health professionals on appropriate standards for assessing future dangerousness.

There is no research demonstrating that antisocial personality disorder is reliably associated with serious violence in American prisons. Rather than denoting a particularly violence-prone inmate, a diagnosis of antisocial personality disorder simply describes most inmates in correctional institutions in this country. Indeed, no personality disorder is reliably associated with higher long-term rates of prison violence. Further, past community violence is not strongly or consistently associated with prison violence. Current offense, past convictions, and escape history are only weakly associated with prison misconduct; and the severity of the offense is not a good predictor of prison adjustment.

Please click “Next” to continue.

Defense Expert Testimony (Mitigating)

The defense calls Dr. Lewis to present mitigating evidence. Dr. Lewis received a Ph.D. in Clinical Neuropsychology from the University of Massachusetts and completed an internship at University of Pittsburgh Medical Center. Dr. Lewis is currently the Director of Neuropsychology and the Behavioral Brain Center at the University of Kentucky. Dr. Lewis conducted a psychological and neuropsychological evaluation of Elliott Williams on July 11, 2018. The evaluation’s purpose was to determine whether Elliott Williams suffers from psychological or neuropsychological deficits due to a brain disorder and, if so, how these deficits may impact the defendant’s thought processes and behavior in daily life.

Please click “Next” to continue.

On direct examination by the defense, Dr. Lewis testifies to the following:

Dr. Lewis interviewed Elliott Williams and people familiar with the defendant and conducted a social and psychological history. Elliott has a documented history of substance abuse including alcohol, marijuana and methamphetamines. Elliott also has a long history of mental illness documented by professionals: suffered from depression, anxiety, post-traumatic stress disorder (as a result of the loss of a daughter), psychotic symptoms, and antisocial personality disorder. On a test designed to detect people who malinger, or fake their deficits, Elliott passed. Thus, this suggests that the defendant tried their best on the testing.

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On the basis of the psychological testing, Dr. Lewis concluded that Elliott has a psychotic disorder (psychosis) because certain psychological traits and behaviors that are consistent with this diagnosis are present. More specifically, the defendant is characterized as having delusions and hallucinations, very disorganized thoughts and speech (for example, not being able to maintain a conversation with others), engaging in bizarre behaviors and mannerisms (for example, repeatedly making odd gestures with their hands), and displaying inappropriate emotions (for example, laughing when told something sad).

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In conclusion, Dr. Lewis testifies that the present offense and Elliott's past criminal conduct may be related to these disorders, deficits, and injuries.

Please click "Next" to continue.

On cross-examination by the prosecutor, Dr. Lewis testifies to the following:

Although the prevalence rate of violence among those with psychoses and frontal lobedamage is ten percent higher than among the general population, most who suffer from such ailments are never criminally violent. It is not possible to say with scientific certainty that the defendant's impulsivity, impaired social judgments, and personality changes are related to or caused by psychoses or frontal lobe damage.

Please click "Next" to continue.

Condition: A2B2

Prosecution Expert Testimony (Aggravating)

The prosecution calls Dr. Roberts, a clinical forensic psychologist, to present aggravating evidence. Dr. Roberts received a Ph.D. from the University of North Carolina, completed an internship at the Federal Correctional Complex in Butner, NC and is now employed in the

Department of Forensic Services for Union County Circuit Court in Florida. Dr. Roberts interviewed and tested Elliott Williams on August 12 and 13, 2018. Dr. Roberts also interviewed people familiar with the defendant. The purpose of these interviews was to assess the likelihood that the defendant represents a continuing danger to society.

Please click "Next" to continue.

Brain Imaging Tests

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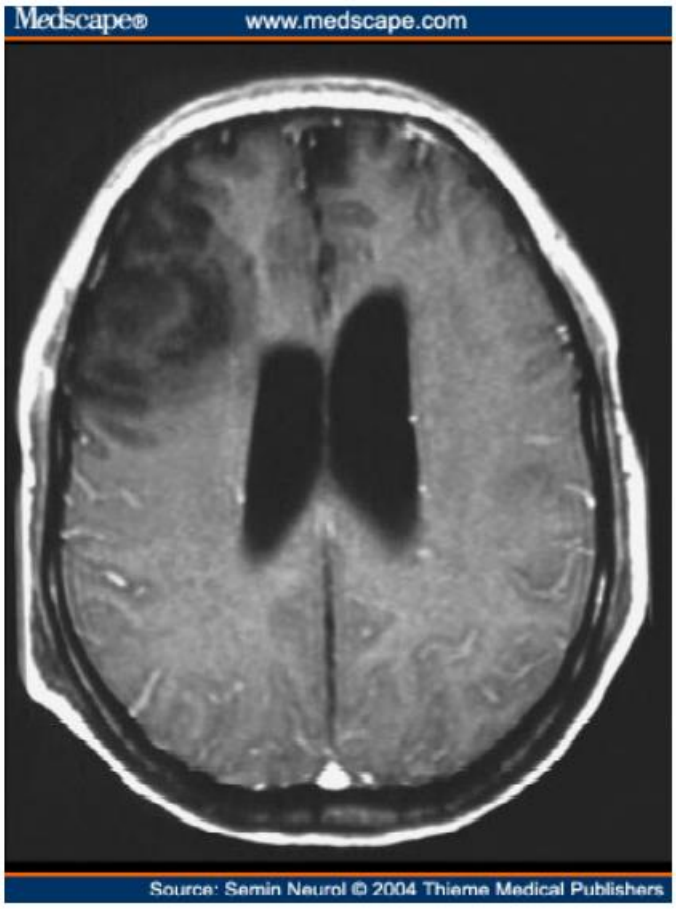
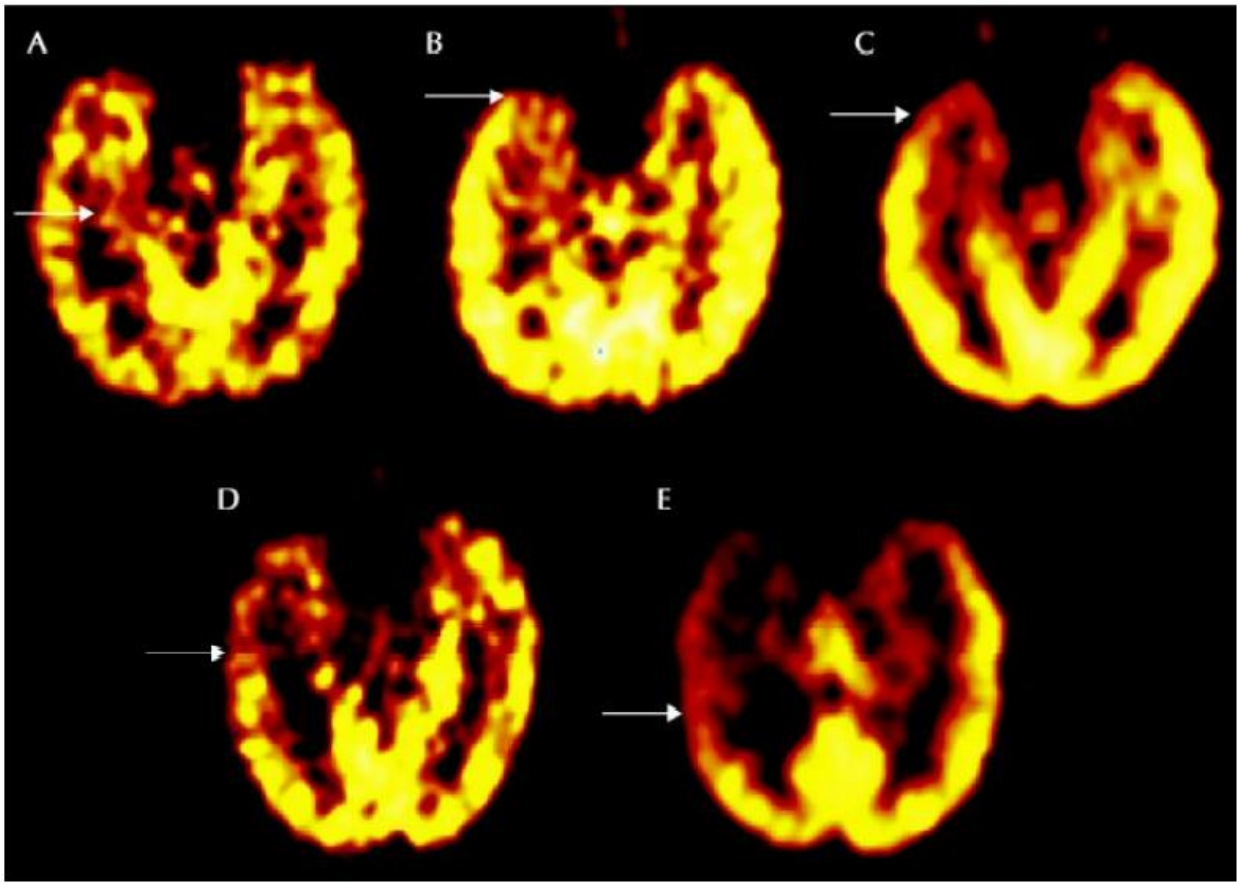
Dr. Roberts was able to obtain neuroimages of Elliott Williams' brain. A neuroimage encompasses a computer-generated representation of the brain's structure and function; this technology allows one to look at, and into, the brain using functional and structural imaging techniques. Structural neuroimages can be created using magnetic resonance imaging ("MRI") in which the body is placed in a strong magnetic field of the MRI scanner. Images are constructed from the electromagnetic signals that are emitted by nuclei of hydrogen atoms, found predominantly in tissue water.



This is an MRI scan of Elliott's brain. MRI scans provide a picture of the internal structure of the brain. This scan shows damage to the left frontal part of Elliott's brain (top left). The black space represents the absence of brain tissue. In Elliott's case, this represents damage caused by head injury. Damage to this part of the brain would be expected to result in intensified aggressive urges, impaired ability to control emotions, and problems with attention, memory, and planning.

Please click "Next" to continue.
A second type of neuroimage, a PET (positron emission tomography) scan, can depict

the brain in action. In a PET scan, radioisotopes are used to "label" molecules of water or glucose in the bloodstream, a scanner detects the distributions of these isotopes throughout the brain, and a computer determines the relative differences in metabolic rates across brain structures. These differences are depicted by variations in color patterns in computer-generated images of the brain.



This is a PET scan of Elliott's brain. The colored areas of the brain indicate different rates of metabolism and hence, different rates of brain activity. The yellow areas have the highest rates of metabolism and thus, the most brain activity. Black areas on the other hand, show the least amount of metabolism, and thus the least amount of activity. This scan shows a lack of activity in the left frontal part of Elliott's brain. This part of the brain is involved in handling emotions and regulating one's behavior. These results are consistent with the MRI findings of reduced volume in this region and most likely relate to scraping of the brain against the skull associated with a closed head injury.

Please click "Next" to continue.

Based on the extensive amounts of information Dr. Roberts reviewed (including the defendant's background, criminal history, brain imaging results, past behavior, and information from the crime scene investigation), as well as from Dr. Robert's interview with the defendant and others who know the defendant, Dr. Roberts conclude that Elliott Williams has brain damage in areas associated with emotional and behavioral regulation. Dr. Roberts also concludes that Elliott Williams has antisocial personality disorder.

Therefore, Dr. Roberts judges that Elliott is at a "high risk" of being violent in the future. Dr. Roberts is quite confident of this opinion. In forming an opinion about the likelihood that the defendant represents a continuing danger to society, Dr. Roberts relied on the hypothesis that individuals suffering from antisocial personality disorder show a high probability of violence in all contexts and are generally thought to be dangerous.

Please click "Next" to continue.

On cross-examination by the defense, Dr. Roberts testifies to the following:

There are no precise criteria for differentiating normal from abnormal imaging results, nor for quantifying the extent of frontal lobe damage. This means that although the defendant shows some evidence of frontal lobe damage, it is not possible to quantify the damage. Although attempts have been made to link particular PET scan patterns to criminal behavior, researchers have not established that PET scans have the sensitivity to predict any neurological or psychiatric deficit or criminality. Thus, mental health professionals are incapable of reliably assessing the capacity for impulse control, particularly in relation to criminal behavior, using PET scans. Overall, there is no consensus among mental health professionals on appropriate standards for assessing future dangerousness.

There is no research demonstrating that antisocial personality disorder is reliably associated with serious violence in American prisons. Rather than denoting a particularly violence-prone inmate, a diagnosis of antisocial personality disorder simply describes most inmates in correctional institutions in this country. Indeed, no personality disorder is reliably associated with higher long-term rates of prison violence. Further, past community violence is not strongly or consistently associated with prison violence. Current offense, past convictions, and escape history are only weakly associated with prison misconduct; and the severity of the offense is not a good predictor of prison adjustment.

Please click "Next" to continue.

Defense Expert Testimony (Mitigating)

The defense calls Dr. Lewis to present mitigating evidence. Dr. Lewis received a Ph.D. in Clinical Neuropsychology from the University of Massachusetts and completed an internship at University of Pittsburgh Medical Center. Dr. Lewis is currently the Director of Neuropsychology and the Behavioral Brain Center at the University of Kentucky. Dr. Lewis conducted a psychological and neuropsychological evaluation of Elliott Williams on July 11, 2018. The evaluation's purpose was to determine whether Elliott Williams suffers from psychological or

neuropsychological deficits due to a brain disorder and, if so, how these deficits may impact the defendant's thought processes and behavior in daily life.

Please click "Next" to continue.

On direct examination by the defense, Dr. Lewis testifies to the following:

Dr. Lewis interviewed Elliott Williams and people familiar with the defendant and conducted a social and psychological history. Elliott has a documented history of substance abuse including alcohol, marijuana and methamphetamines. Elliott also has a long history of mental illness documented by professionals: suffered from depression, anxiety, post-traumatic stress disorder, psychotic symptoms, and antisocial personality disorder. On a test designed to detect people who malinger, or fake their deficits, Elliott passed. Thus, this suggests that the defendant tried their best on the testing.

Please click "Next" to continue.

On the basis of the psychological testing, Dr. Lewis concluded that Elliott has a psychotic disorder (psychosis) because certain psychological traits and behaviors that are consistent with this diagnosis are present. More specifically, the defendant is characterized as having delusions and hallucinations, very disorganized thoughts and speech (for example, not being able to maintain a conversation with others), engaging in bizarre behaviors and mannerisms (for example, repeatedly making odd gestures with their hands), and displaying inappropriate emotions (for example, laughing when told something sad).

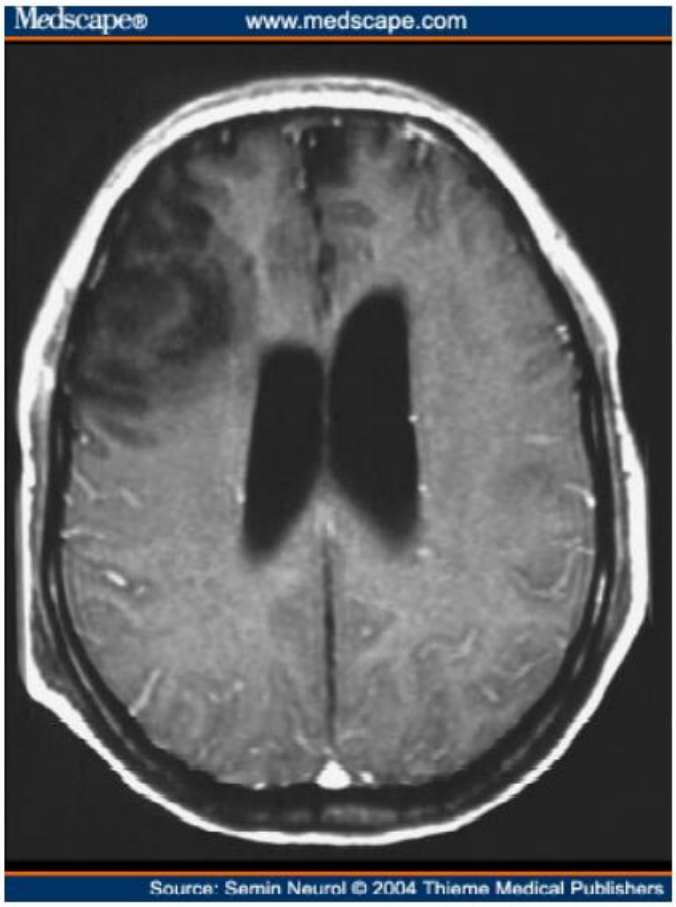
Dr. Lewis also administered a number of neuropsychological tests to further evaluate Elliott Williams' thought processes. Results showed that key deficits for Elliott are in attention and memory, lack of behavioral control, poor impulse inhibition, and deficient problem-solving. This pattern of findings indicates damage to the frontal lobes of the brain, presumably due to the head injuries Elliott has experienced.

In conclusion, Dr. Lewis testifies that the present offense and Elliott's past criminal conduct may be related to these disorders, deficits, and injuries.

Please click "Next" to continue.

Brain Imaging Tests

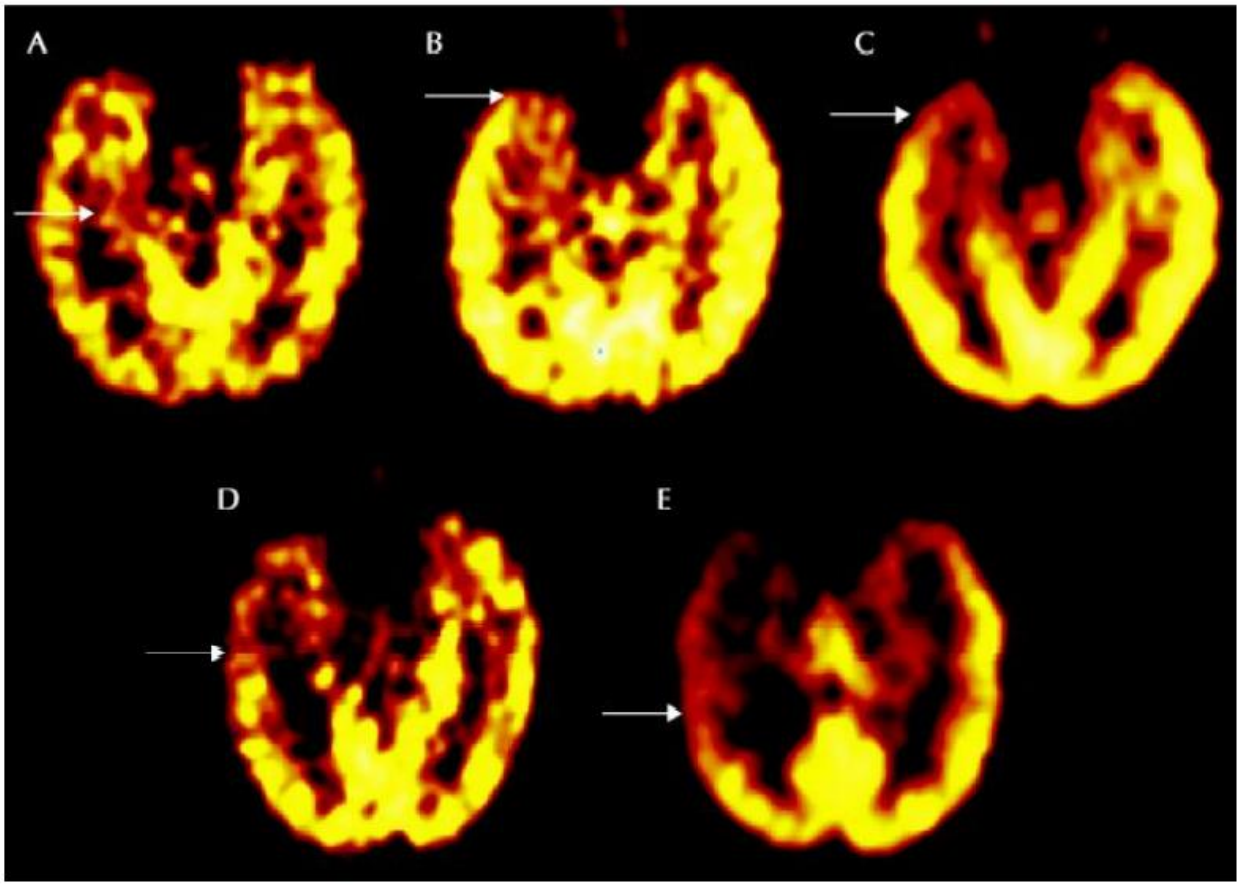
Dr. Lewis was also able to obtain neuroimages of Elliott Williams' brain. First, this is an MRI scan of Elliott's brain.



This is an MRI scan of Elliott's brain. MRI scans provide a picture of the internal structure of the brain. This scan shows damage to the left frontal part of Elliott's brain (top left). The black space represents the absence of brain tissue. In Elliott's case, this represents damage caused by head injury. Damage to this part of the brain would be expected to result in intensified aggressive urges, impaired ability to control emotions, and problems with attention, memory, and planning.

Please click "Next" to continue.

This is a PET scan of Elliott's brain.



As Dr. Roberts testified, the colored areas of the brain indicate different rates of metabolism and hence, different rates of brain activity. This scan shows a lack of activity in the left frontal part of Elliott's brain. This part of the brain is involved in handling emotions and regulating one's behavior. These results are consistent with the MRI findings of reduced volume in this region and most likely relate to scraping of the brain against the skull associated with a closed head injury.

In conclusion, Dr. Lewis testifies that the present offense and Elliott's past criminal conduct may be related to these deficiencies and damage.

Please click "Next" to continue.

On cross-examination by the prosecutor, Dr. Lewis testifies to the following:

As Dr. Roberts testified, although the prevalence rate of violence among those with psychoses and frontal lobe damage is ten percent higher than among the general population, most who suffer from such ailments are never criminally violent. It is not possible to say with scientific

certainty that the defendant's impulsivity, impaired social judgements, and personality changes are related to or caused by psychoses or frontal lobe damage.

Furthermore, and as Dr. Roberts testified, there are no precise criteria for differentiating normal from abnormal imaging results, nor for quantifying the extent of frontal lobe damage. This means that although the defendant shows some evidence of frontal lobe damage, it is not possible to quantify the damage. Although attempts have been made to link particular PET scan patterns to criminal behavior, researchers have not established that PET scans have the sensitivity to predict any neurological or psychiatric deficit or criminality. Thus, mental health professionals are incapable of reliably assessing the capacity for impulse control, particularly in relation to criminal behavior, using PET scans.

Please click "Next" to continue.

Appendix H

Judicial Instructions II

Please review the final judicial instructions.

Members of the jury, you must now decide what sentence to impose upon the defendant. Your sentence will depend upon your interpretation of aggravating and mitigating circumstances. Your verdict must be a sentence of death if and only if at least one aggravating and no mitigating circumstances are present, or, you find one or more aggravating circumstances that outweigh all mitigating circumstances. If neither happens, then the only verdict that you must return is a sentence of life in imprisonment without the possibility of parole.

Understand that in making decisions of importance in our own lives, we can never act with mathematical certainty. Also, we must recognize that sometimes simply out of fear of making those important decisions, we may imagine doubts that are based on virtually anything. It is important that we make sure that doubts that we allow to affect our decisions are only those that are based upon facts and reason. The same considerations apply here.

Now, you must decide, be fair, and do not let yourself be influenced by passion or prejudice. The sentence you impose must be in accordance with the law as I have instructed you, and not based on sympathy, prejudice, emotion, or public opinion. You may not avoid the imposition of a death sentence through the exercise of unbridled discretion to grant mercy or lenience. In making the decision whether or not to impose the death penalty, it is entirely proper for you to consider sympathy or mercy as a reason to impose a life sentence. However, any sympathy or mercy that you may wish to show must be founded upon mitigating circumstances.

Please click “Next” to make your decision.

Appendix I

Sentencing Recommendation

Please select your final verdict for the defendant.

1. _____ Death _____ Life in prison without the possibility of parole

Please indicate how confident you are in your decision (0-100%).

2. Percent confidence in my decision (sliding scale)

Please click “Next” to continue.

Appendix J

Control Measures

A. Knowledge, Understanding, and Application of Death Penalty Law

Please indicate how much you agree or disagree with the following statements about the judicial instructions.

Scale: 1= Strongly Agree; 2 = Agree; 3 = Neutral; 4 = Disagree; 5 = Strongly Disagree

1. The death penalty is mandatory for murder.
2. If the defendant is found guilty of murder, they must be given the death penalty.
3. The death penalty is mandatory for vicious and heinous murders.
4. I knew what sentence I would give the defendant before reading the evidence.
5. The law in this case requires a death penalty sentence.

B. Juror Script

Please answer the following questions about the details of the case.

1. What is the age of the defendant? (open ended)

2. What is the gender of the defendant?
    A. Male
    B. Female
    C. Don't know
3. What is the gender of the victim?
    A. Male
    B. Female
    C. Don't know
4. What is the race/ethnicity of the defendant?
    A. White
    B. Black
    C. Hispanic
    D. Other (please specify)
    E. Don't know
5. What is the race/ethnicity of the victim?
    A. White
    B. Black
    C. Hispanic
    D. Don't know

C. Perceptions of the Defendant

Please indicate how much you agree or disagree with the following statements about the defendant.

Scale: 1= Strongly Agree; 2 = Agree; 3 = Neutral; 4 = Disagree; 5 = Strongly Disagree

1. The defendant poses a future danger to society (Greene and Cahill, 2012).
2. The defendant's actions were heinous and vicious (Greene and Cahill, 2012).
3. The defendant was remorseful (Greene and Cahill, 2012).
4. The defendant accepts responsibility for the murder (Greene and Cahill, 2012).
5. The defendant is evil (Greene and Cahill, 2012).
6. The defendant is subhuman (Greene and Cahill, 2012).
7. The defendant will most likely kill again (Greene and Cahill, 2012).

D. Assigned Responsibility

On a scale from 0 to 100%, please indicate how responsible you believe the defendant is for the murder. (Sliding Scale)

E. Evidence Preference

Please indicate how much you agree or disagree with the following statements about the expert witnesses and evidence.

Scale: 1= Strongly Agree; 2 = Agree; 3 = Neutral; 4 = Disagree; 5 = Strongly Disagree

1. I relied more on Dr. Lewis' (defense's expert witness) testimony than Dr. Robert's (prosecutor's expert witness) testimony to make.

2. I relied on mitigating circumstances (presented by the defense) more than aggravating circumstances (provided by the prosecutor) to make my sentencing decision.

Please click "Next" to continue.

Appendix K

Demographics

Prior Jury Service

Please provide responses to the following two questions regarding your previous jury service.

1. Have you ever have served on a jury?
    A. Yes
    B. No
2. Have you ever served on a death penalty jury?
    A. Yes
    B. No

Demographic Questions

Please provide responses to the following demographic questions.

1. Which sex do you most identify with?
    A. male
    B. female
    C. nonbinary
2. What is your current age (Gendall and Healey, 2008)? (open text)

3. Which category best describes you (Pew Research Center, 2015)? Check all that apply.
    A. White (for example, German, Irish, English Polish, French, etc.)
    B. Hispanic, Latino, or Spanish origin (for example, Mexican or Mexican American, Puerto Rican, Cuban, Salvadoran, Dominican, Columbian, etc.)
    C. Black or African American (for example, African American, Jamaican, Haitian, Nigerian, Ethiopian, Somalian, etc.)
    D. Asian (for example, Chinese, Filipino, Asian Indian, Vietnamese, Korean, Japanese, etc.)
    E. American Indian or Alaska Native (for example, Navajo Nation, Blackfeet Tribe, Mayan, Aztec, Native Village of Barrow Inupiat Traditional Government, Nome Eskimo Community, etc.)
    F. Middle Eastern or North African (for example, Lebanese, Iranian, Egyptian, Syrian, Moroccan, Algerian, etc.
    G. Native Hawaiian or Other Pacific Islander (for example, Native Hawaiian, Samoan, Chamorro, Tongan, Fijian, Marshallese, etc.)
    H. Prefer not to answer
    I. Some other race, ethnicity, or origin (please specify)

4. What is your religious affiliation? (open text)

5. On a scale of 0 to 5 where 0 = not religious at all and 5 = extremely religious, how would you rate your religiosity? (0-5 sliding scale)
6. Which category best describes your political affiliation?
    A. Democrat
    B. Independent
    C. Republican
7. Which category best describes your political ideology?
    A. Very Conservative
    B. Conservative
    C. Moderate
    D. Liberal
    E. Very Liberal
8. What is your annual household income (US Dollars)?
    A. 20,000 or less
    B. 20,001– 40,000
    C. 40,001– 60,000
    D. 60,001– 80,000
    E.80,001–100,000
    F.100,001–125,000
    G. More than 125,000
9. What is the highest level of school you completed or the highest degree you have received?
    A. Some High school or less
    B. High school graduate or GED (includes technical/vocational training that doesn't count towards college credit)
    C. Some college
    D. Associate's Degree and/or trade School
    E. Four-year college degree/bachelor's degree
    F. Postgraduate or professional degree, including master's, doctorate, medical or law degree
10. Have you ever been a victim of a non-violent crime?
    A. Yes
    B. No
11. Has a close family member ever been a victim of a violent crime?
    A. Yes
    B. No
12. Do you believe the U.S. legal system is fair and just?
    A. Yes.
    B. No
13. Which category best describes where you live?
    A. Urban
    B. Suburban
    C. Rural

Please click "Submit" to record your responses.

Appendix L

Debriefing

Thank you for participating in this study. Your response will be recorded by clicking “Submit” below.

Please remember that your death penalty decision has no impact on an actual individual. Your participation in this study harmed no humans.

If you have any questions or concerns, you may contact the researcher at phawkins@iup.edu