

How Disorder Onset Controllability Moderates the Impact of Biological Arguments on  
Judgments of Criminal Responsibility

by

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## ABSTRACT

In recent years, the use of biologically based (neurological, neuropsychological, genetic) evidence in criminal trials as support for claims of mental impairments among offenders has increased in popularity. However, research on how exposure to those arguments affects jury decision-making remains unclear. Specifically, arguments rooted in biology sometimes mitigate and sometimes aggravate judgments of criminal responsibility for mentally ill offenders, and this discrepancy seems to stem from the specific conditions by which that disorder was acquired. The following study's aim was to uncover the precise mechanism(s) behind this elusive effect. Utilizing a 2x2 between subjects experimental design, participants were presented with a hypothetical crime summary involving an offender with either an onset controllable or uncontrollable mental disorder. Ratings of criminal responsibility and other variables hypothesized to function as mediators were obtained after presentation of a prime supporting either a biologically deterministic or free will argument for human behavior in general. Results indicated that when the defendant's disorder was the result of the his own actions (onset controllable), a biological prime decreased judgments of criminal responsibility; however, when the disorder was caused by factors out of his control (onset uncontrollable), the prime increased judgments of criminal responsibility. An examination of several possible mechanisms finds the effect mediated by the perception of control the defendant could have had over his own actions at the time of the crime. These results suggest that perceptions of behavioral control are an important contributor to jurors' formation of criminal responsibility judgments when an offender possesses a mental illness; and arguments advocating a biological basis for human behavior reliably affect blame

attribution, suggesting that a societal shift in the perception of free will as a result of increased exposure to biology in general may alter the framework of criminal responsibility judgments.

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## **Introduction**

The use of various types of neuroscientific and biological evidence are gaining in popularity within the legal system. Advances in neuroscience, neuroimaging, neuropsychological testing and genetic research has allowed the fields of biology and psychology to intertwine and collaboratively present themselves as evidence during various stages within the legal system, most notably in criminal cases. Their specific uses vary across many contexts within criminal law, ranging from arguing competency, mental state, demonstrating brain damage, and propensities for mental illnesses. Many scholars argue that technologies such as neuroimaging or neuropsychological testing help to demonstrate the physical basis for certain impairments that until recently were classified as psychological in nature (Jones & Ginther, 2015), yet plenty others caution the use of such technology in criminal courts, claiming they have unfairly prejudicial effects on jurors or lack the relevant capabilities to address questions for which they claim to have answers.

Even still, the use of neuroscientific evidence, whether genetic, biological, neurological or neuropsychological in nature, is growing in the US and abroad. For instance, Farahany (2016) reported that the number of times such evidence was discussed by judges within the US criminal appeals courts almost tripled between 2005 and 2012. This increase in exposure to biologically based explanations for behavior is likely to affect how jurors and lay persons perceive the ability of humans to make autonomous decisions without the interference of factors beyond their control. For example, recent research suggests that knowledge of neuroscience can alter perceptions of free will and in turn affect punishment attribution (Shariff et al., 2014). The current study seeks to clarify

how more biologically deterministic arguments could affect responsibility attributions when a criminal offender is mentally ill—a common situation encountered by jurors in criminal court contexts—and how the details on the offender’s disorder onset alter these attributions.

### **Neuroimage Bias**

Typically in criminal proceedings, an expert witness is asked by either the prosecution or defense to present evidence to jurors that is meant to speak to the perceived guilt of the offender. Recently, advancements in neuroimaging technology have resulted in scientists presenting brain scans depicting neural anomalies as evidence of various neurological or psychological conditions. This influx of neuroscientific evidence created worry among legal scholars of its possible biasing nature and subsequent effects on juror decision-making, specifically in regards to brain imaging and the recent development of functional magnetic resonance imaging (fMRI). Compared to other images, fMRI scans are particularly bright and visually appealing, and these potentially dazzling effects resulted in what was referred to as the “Christmas Tree effect” (Gibbons, 2007; Dumit, 1999). This effect suggested that the visual allure of neuroimages would result in persuasion of jurors by any information provided to them alongside that image, despite the image’s relevance or accuracy (Feigenson, 2006; Weisberg et al., 2008; Weisberg et al., 2015). In other words, because of the lack of scientific knowledge most jurors possess and the fact that neuroscientific explanations *sound* credible and valid, some scholars worry that any sham argument could be veiled under a neuroscientific explanation and assumed to be true by jurors (Baker et al., 2015; Brown & Murphy, 2009; Choe, 2014).



As a result of these concerns, many scientists turned their attention to the implications of presenting neuroimages on juror decision-making, and evidence of a neuroimage bias did in fact emerge. For example, McCabe and Castel (2008) asked participants to rate the scientific validity of articles summarizing both phony and real scientific research findings, presented alongside either: a neuroimage, bar graph, topographical map, or no image. Across three studies, utilizing both between and within subjects designs, the authors found that participants rated research as more scientifically valid when it was accompanied by a brain image compared to when it was presented with no image, a bar graph, or a topographical map, regardless if the articles contained accurate scientific reasoning or not. Additionally, Weisberg et al. (2008) tested the effect of phony neuroscience explanations for both good and bad descriptions of psychological phenomena on participant ratings of satisfaction for each statement. The authors found that the inclusion of irrelevant neuroscience explanations encouraged participants to view poor descriptions more favorably than they did without neuroscience explanations. An explanation for these findings provided by both McCabe & Castel and Wesiberg et al. was that people may have a natural affinity for reductionist explanations for behavior or psychological phenomena; therefore, physical representations of such phenomena, i.e. neuroscientific explanations, are more satisfying than abstract representations for the same phenomenon.

Although researchers initially uncovered early evidence of a neuroimage bias, other more recent work struggles to identify such an effect (Schweitzer et al., 2013; West et al., 2014; Marshall et al., 2017). For example, in a series of five experiments,

Schweitzer et al. (2013) sought to replicate the findings that suggested a neuroimage bias, and identify the specific conditions most likely to elicit this bias. In their first study, participants were presented with one of three scenarios describing an alleged link between a particular mental condition and a resulting behavior: idiopathic brain defect, neurotoxin resulting in brain damage, or brain damage as a result of past drug use. In support of these assertions, the scenarios were presented alongside either a brain image or a graph. Ratings of argument believability indicated no differences between the brain image and the graph conditions. In the next three experiments, designed to more closely resemble McCabe and Castel's 2008 study, participants were presented with one of two fictitious scientific news articles accompanied by either a brain image or bar graph. Across all three studies, results revealed no differences in ratings of persuasion or credibility between the image and the graph conditions. In a final study, utilizing a within subjects design, Schweitzer et al. found that only when participants read both an article summary containing a neuroimage and one that did not contain an image did an effect of image presence emerge: the article containing an image was rated as more credible than the article without the image.

Despite multiple attempts to replicate the neuroimage bias uncovered by previous researchers, based on this study there may only be very specific instances that elicit such a bias, if it exists at all. Schweitzer et al. suggest that a possible explanation for their failure to replicate previous work that indicated a neuroimage bias is that in the five years following Weisberg et al. (2008) and McCabe and Castel's (2008) experiments, people

became more exposed to neuroscience, and thus the persuasion along with the novelty of such technology dulled.

Farah and Hook (2013) make note of flaws in McCabe and Castel's study design, noting that the authors compared fMRI images to a topographical graph and bar chart that were assumed to contain the same amount of relevant information, however they do not. Participants may have found fMRI images to be more persuasive and scientifically valid because they convey more meaningful information, not because they have more visual appeal. Michael et al. (2013) also offer evidence against a neuroimage bias, after attempting to replicate McCabe and Castel (2008) and Weisberg et al.'s (2008) studies across ten experiments and using almost 2000 participants. Michael et al. suggests that, in regards to McCabe and Castel's experiment, statistically the results do not support a neuroimage bias when closely observing effect size and confidence intervals, and note the original work was exaggerated by its authors and other scholars.

In another attempt to uncover a biasing effect of neuroscientific information, West et al. (2014) compared neuroscientific lie detection evidence (either in the form of brain waves, a brain map, or no image) to a behavioral lie detection method (the Reid technique) to explore any differences in participants' assigned verdicts. Participants who provided a guilty verdict rated the neuroscientific evidence more highly in questions regarding quality and influence of the expert compared to the behavioral expert. However, the author reported no difference in the proportion of guilty vs. not guilty verdicts assigned between participants who were given neuroscientific evidence versus behavioral evidence, nor was there a difference in the confidence ratings of assigned

verdicts. In a similar study, McCabe and Castel (2011) tested the effects of fMRI lie detection evidence on juror decision-making, manipulating whether participants were given a statement challenging the validity of fMRI or not. Results indicated that, compared to the polygraph and thermal imaging evidence, guilty verdicts were significantly more likely when fMRI evidence was presented. However, when the scientific validity of fMRI was questioned, the number of guilty verdicts assigned was no different than the control condition with no evidence presented. As the opposing counsel in an actual trial situation would most likely challenge the scientific validity of neuroimaging technology if it presented as evidence, these results may capture how jurors would respond to such evidence in criminal courts.

Scurich and Shniderman (2014) provide an explanation for why neuroscientific evidence may appear to be more persuasive in certain circumstances. The researchers presented participants with an argument either supporting or not supporting the use of the death penalty, which was accompanied by neuroscientific evidence supplementing that argument. Results indicated that participants rated the argument sound and the neuroscience persuasive only when the argument supported their prior beliefs on the topic, and returned negative evaluations when it frustrated their beliefs. The authors posit that when presented with scientific information, individuals employ motivated reasoning to evaluate credibility. This theory suggests that information is assimilated in a manner biased toward reaching a particular outcome or one that supports already held beliefs. Motivated reasoning may provide an explanation for a bias toward neuroscience information in scenarios when the participants have a priori motivations to reach a

particular outcome, such as in Scurich and Shniderman's study where the argument involved a loaded social issue: the death penalty. In this scenario, it is possible that participants judged the neuroscientific information in a manner that was consistent with these desired outcomes. However, in other scenarios where the arguments do not incite strongly held beliefs, such as scenarios presenting fictitious scientific methods or discoveries as observed in many previously discussed experiments, it is doubtful that participants use motivated reasoning in the manner Scurich and Shniderman suggest. It is likely then that motivated reasoning can only be appropriately used as an explanation for assessing argument credibility, neuroscience or not, when the argument is relevant enough to the observer to activate a priori motivations.

### **Mental illness and neuroscience**

As a common platform for admitting neuroscientific evidence in criminal cases is for the support of claims of neurological impairments that lead to the development of severe mental illness, it is intuitively utilized with the hopes of lessening the offender's criminal and moral responsibility for the crime and therefore reducing sentence severity. As such, research has suggested it has this intended effect (Aspinwall, 2012; Capestany & Harris, 2014; Farahany, 2016; Greene & Cahill, 2011; Gurley & Marcus, 2008; Schweitzer et al., 2013). In a sample of U.S. appellate court cases utilizing neuroscientific evidence between 2005-2012, Farahany (2016) reported that for 23% of capital cases, there was an at least partially positive outcome, defined as a reversal, remand, or modification to some component of the trial courts' decision in the defendant's favor. In general, the likelihood of such outcomes in capital appeals cases is about 19% overall,

suggesting a slight improvement in the current sample. For non-capital cases, positive outcomes occurred in 20% of the sample, compared to average success rates of about 10% in appeals cases overall. These comparisons demonstrate that the use of neuroscientific evidence offers an improvement on the likelihood of a positive appeals outcome, but even more so for non-capital cases.

Within the realm of experimental research, similar outcomes are observed. Gurley and Marcus (2008) found that presenting a neuroimage supporting a psychotic disorder diagnosis in the form of expert testimony significantly increased the odds of mock jurors finding the defendant Not Guilty by Reason of Insanity (NGRI), compared to testimony without a neuroimage. Greene and Cahill (2011) found that for defendants rated by participants as a high risk for future dangerousness, both neuropsychological test results and neuroimages supporting a diagnosis of psychosis mitigated sentencing recommendations compared to when no supporting information was provided. Similarly, a study by Aspinwall (2012) involved asking judges to assign punishment for a hypothetical assault case involving an offender who is diagnosed as psychopathic. In one condition, judges were presented with a biologically based explanation (biomechanism) for the defendant's mental illness, in this case a genetic variation of the MAOA gene that results in a propensity for developing psychopathy, while another condition had no biological explanation. The study found that presenting judges with a biomechanism supporting a diagnosis of psychopathy resulted in more lenient judgments of criminal responsibility compared to a psychopathy diagnosis presented without a biomechanism. The results also revealed that the number of judges who listed mitigating factors doubled

when the biomechanism was present. Examples of commonly reported mitigating factors included mentioning that “the defendant was mentally ill and lacked control over his actions, therefore was less legally culpable”, and the fact that just as some people are physically disabled, psychopaths may be morally disabled because of their neurological inability to feel empathy.

Other research suggests these effects are nuanced depending on the specific disorder possessed by the offender (Saks et al., 2014, Gurley and Marcus 2008). For example, Saks et al. (2014) conducted an experiment where mock jurors were presented with a fictitious case summary detailing a capital murder case for an offender either diagnosed with psychopathy, schizophrenia or normal. The type of evidence presented supporting the offender’s diagnosis varied (clinical, genetic, neurological with image, neurological without image), as well as offender dangerousness (high, low), and proponent of the expert evidence (prosecution, defense). The authors found that presenting a neuroimage resulted in fewer death penalty recommendations for psychopaths, but the effect was the opposite for schizophrenics, where the neuroimage resulted in an increase in death sentence recommendations. This effect was only present when the offender was classified as dangerous; when dangerousness was low the effect was not statistically significant. Similarly, Gurley and Marcus (2008) found that defendants diagnosed with a psychotic disorder were more likely to be found NGRI compared to those diagnosed with psychopathy. As indicated by these inconsistent results, there are clearly unanswered questions regarding how neuroscientific information affects legal decision making for mentally ill offenders.

Presenting evidence of a biological basis for mental disorders produces arguments designed to reduce criminal intent and responsibility, with the ultimate goal to reduce judgments of guilt or mitigate sentencing. However, that evidence also introduces questions of disorder stability, permanence, recidivism and future dangerousness, which are aggravating in nature. This combination of mitigating and aggravating factors as a result of presenting a biological explanation for a disorder (biomechanism) is known as the “double-edged sword phenomenon.” As an example of this phenomenon, Aspinwall’s 2012 study found that though the number of mitigating factors provided by judges increased after introduction to the disorder biomechanism (MAOA gene variation) so did mentions of balancing aggravating and mitigating factors. For example, judges may have mentioned that although the defendant was severely mentally ill, the presence of a biological basis for their illness suggests that they are not likely to recover and are also likely to reoffend in the future.

Cheung and Heine (2015) also provided research to support the double-edged sword phenomenon. After presenting participants with either a genetic or environmental explanation for criminal behavior, the authors utilized a path analysis to explore judgments of responsibility and predict sentencing outcomes. Results indicated that genetic explanations led to lower perceptions of conscious behavioral control, predicting reduced sentencing recommendations compared to the environmental explanations. However, the genetic arguments also resulted in greater expectations of reoffending, predicting increased sentencing recommendations. As suggested by the study’s results, Cheung and Heine discussed that genetic explanations for criminal behavior force people



to concurrently consider and reconcile both aggravating and mitigating arguments. Cheung and Heine note that these two opposing points may not neutralize each other, with one weighing more heavily than the other in certain circumstances that could perhaps revolve around one's own philosophical beliefs about retributivism vs. rehabilitative punishment, but that for now remain unclear.

### **Free will beliefs**

As neuroscientific and biological information has steadily increased in popularity among legal scholars and practitioners, so too has its familiarity to the general public. This augmented understanding and exposure of the biological bases of human behavior, by nature, challenges opinions about free will (Jones & Ginther, 2015). Therefore it is likely that, over time and by repeated exposure to these explanations, perceptions of the origin of human behavior may shift from oriented in free-will to more biologically deterministic in nature (Shariff et al., 2014). As these views evolve, there will likely be implications on juror decision-making when arguments of moral and criminal responsibility are called into question (Eggen & Laury, 2012; Jones & Ginther, 2015; Weisberg et al. 2015). Both Shariff et al. (2014) and Scurich & Appelbaum (2015) empirically linked less free will beliefs and greater genetic or neuroscientific knowledge to more lenient punishment attitudes. In Shariff et al.'s 2014 study, free will beliefs were manipulated across a series of experiments such that participants were presented with passages supporting a biologically based, mechanistic perspective on human behavior and subsequently asked to provide sentencing recommendations and criminal responsibility judgments for a hypothetical defendant involved in a criminal case. The

results indicated that not only did participants' innate beliefs about free will predict a propensity for retributive punishment, but exposing participants to anti-free will arguments also diminished inclinations for retributive punishment. Furthermore, using a paired-sample comparison among students enrolled in a neuroscience course versus a geography course, Shariff et al. found that students enrolled in the neuroscience course reported a decrease in prison sentence recommendations from the beginning of the course to the end, while the geography course reported no change in recommendations. This decrease in sentence length recommendations for the students in the neuroscience course was strongly correlated with an increase in the students' self-reported knowledge of the brain from the beginning of the course to the end. These results suggest that changes in philosophical beliefs about the origin of human behavior, and even learning about the brain, can initiate shifts in moral responsibility attitudes that can affect legal decision-making.

Similarly, Appelbaum and Scurich (2016) tested whether there were differences in the outcomes of criminal cases of different crime severity types when presenting participants with varying types of evidence supporting a mental illness (impulsivity/non-scientific, genetic, neuroimage, or both neuroimage and genetic), while also measuring participants' free will beliefs, knowledge of genetic information, and measures of the offender's behavioral controllability. Across several studies, the authors found free will beliefs to be associated with harsher sentencing recommendations, while greater genetic knowledge generally produced more lenient sentencing outcomes. The authors go on to suggest that it was participants' allegiance to beliefs about the controllability of criminal

behavior that had a greater effect on case outcomes than did the presentation of neuroscientific evidence.

### **Controllability**

Researchers in legal decision-making platforms have measured behavior controllability as a contributor to judgments of criminal responsibility, but it is rarely a main topic of analysis (Appelbaum & Scurich, 2016; Cheung & Heine, 2015; Greene & Cahill, 2011; Schweitzer et al., 2013). This may stem from the fact that most research on mock-juror decision-making focuses on sentencing recommendations or judgments of responsibility, while controllability is typically viewed as an intermediate variable that is a contributor to those outcomes, but not of direct interest. As the introduction of neuroscientific information may meaningfully influence opinions about the genesis of human behavior, it therefore calls into question behavioral controllability that can be applied to criminal cases. For example, Greene and Cahill (2011) found the use of neuropsychological evidence most significantly contributed to participants' opinions of behavioral controllability compared to neuroimaging or diagnosis only evidence, which in turn had a significant influence on sentencing recommendations. Schweitzer et al. (2011) cited exposure to neuroimage evidence supporting mental illness led to reduced judgments of behavioral control compared to psychological evidence supporting the same illness. Applebaum and Scurich (2016) noted that participant's beliefs about controllability of criminal behavior were the most significant contributor to the sentencing outcomes of mock criminal cases. Cheung & Heine (2015) found in one study that genetic explanations for criminal behavior led to lower perceptions of the offender's

conscious behavioral control, ultimately predicting more lenient sentencing recommendations. These studies demonstrate the importance of behavioral control as a contributor to sentencing outcomes and judgments of criminal responsibility. In addition to behavioral controllability as an instrumental intermediate measure in the case of mentally ill offenders, jurors may also look beyond the specific criminal act to the controllability of the illness origin itself. This process introduces an entirely new set of schemes aimed at conceptualizing blame attribution, which are discussed below.

### **Attribution Theory**

Because a number of individuals on trial for criminal activity possess mental defects as a result of both biological and behavioral anomalies with varying onset origins, discussion of the implications of those specific scenarios has resulted in a fair amount of discussion and related research. Attribution theory (Weiner, 2006) states that effort-related causes for an indiscretion are viewed as more punishable than ability-related causes. Furthermore, it states that any stigmatizing condition with a behaviorally based origin is generally seen as more controllable by the individual who possesses the condition, and therefore are blamed more harshly for it, as opposed to a condition that is biologically based and seen as uncontrollable, resulting in less blame (Weiner, 2006). In fact, research suggests that physical and mental disorder onset controllability even affects helping behaviors and feelings of sympathy (Corrigan et al., 2003).

Disorder onset controllability as a contributor to judgments of wrongdoers is a theory that has been empirically supported on numerous occasions (Corrigan et al., 2003;

Weiner, Perry & Magnusson, 1998; Reisenzein, 1986). For example, Weiner, Perry and Magnusson (1998) examined the extent to which the perceived controllability of the onset of a physical or mental disorder influenced judgments of an afflicted person. The authors found that those with defects that were considered onset-controllable, or self-inflicted, were judged more harshly than individuals with onset-uncontrollable defects. Similarly, a study by Corrigan et al. (2003) found that for individuals with an onset-controllable mental disorder, participants were more likely to withhold help and endorse coercive treatment compared to someone with the same mental disorder with an uncontrollable onset. Attribution Theory also makes note of disorder stability contributing to harsher judgments of blame, which in legal contexts is addressed by questions of likelihood to reoffend, dangerousness, and treatability. In sum, Attribution Theory reliably provides a framework upon which to analyze the process of attributing blame in general and legal circumstances, and the current study seeks to understand how it is implicated in situations where biologically based information is presented in cases of mentally ill criminal offenders.

**Preliminary Studies** The discussed research demonstrates the importance of the perception of both behavioral control and disorder onset control in shaping judgments of criminal responsibility, and how those judgments are implicated by arguments advocating a biological basis for human behavior. However, there has been no study to date that attempts to uncover the precise mechanisms behind specifically how these circumstances interact and shape judgments. Before describing the analyses that serve as the topic of this paper, a series of precursory experiments were conducted that deserve explanation as

they served as stepping-stones that led to the current study. Those experiments are described below.

Based on previous literature indicating free will beliefs implicate the attribution of blame in criminal contexts, the first preliminary study aimed to uncover how these beliefs shape judgments of offenders with various mental deficits. Rather than measuring free will beliefs, a scale measuring beliefs in scientific determinism—or the belief that human behavior, attitudes, traits and behavior are caused and controlled by biologically based factors and prior environmental exposure—was utilized in an attempt to more accurately mirror the effects of how presenting biologically based information as evidence may shape these beliefs over time. Scientific determinism beliefs were measured using the FAD SD Subscale (from Paulhas & Margesson 1994), and judgments of criminal responsibility were obtained for an offender with one of four brain disorders: 1) Brain damage as a result of past drugs abuse, 2) Brain damage as a result of an automobile accident 3) Down’s Syndrome, 4) Parkinson’s Disease. From a sample of 815 community members, results indicated that those with lower SD scores endorsed more strict punishment for the drug abuse, or onset controllable condition, while higher SD scores endorsed more punishment for Parkinson’s and Down’s syndrome, or onset uncontrollable disorders.

In that same study, participants were also asked to provide judgments about 21 different mental disorders or social conditions along two dimensions: first, how much each of the disorders/conditions might be the result of factors that are within a person’s control (Controllability); and second the extent to which each disorder/condition would

lessen a hypothetical offender's responsibility for committing a crime (Responsibility). Disorders were chosen so that they would represent a wide range of onset controllability and were conditions/situations that may be used as mitigating circumstances in legal proceedings. Results indicated that for disorders that could be considered controllable, high SD scores predicted more leniency in judgments of Responsibility than low SD scores. Unexpectedly, for uncontrollable disorders, high SD scores predicted harsher judgments of Responsibility and those participants judged the onset of the disorder as more controllable than those with low SD scores. These results suggest that the aspect of the disorder that produces this paradoxical interaction is the extent to which the onset of the disorder is believed to be within the person's control.

In light of the perplexing results of the first study, a second study attempted to replicate and experimentally manipulate deterministic views. Utilizing a 2x2 between-subjects design, participants were presented with a one-sentence prime, which suggested that the origin of human behavior is either A) biologically predetermined (Bio Prime) or B) based in free will (Non Bio Prime). Participants were provided a summary of a hypothetical criminal case describing an offender who possessed either A) an onset - uncontrollable disorder (congenial brain damage) or B) an onset-controllable disorder (paranoid delusions as a result of previous drug use), and prior to offering their judgments presented with one of the two aforementioned Primes. A sample of 413 participants revealed the same backfire effect from Study 1: When the disorder was onset-controllable, the Bio Prime provided more lenient judgments of responsibility, but resulted in harsher judgments for the onset-uncontrollable disorder.

The third study attempted to uncover whether the biological explanations would produce the same backfire effect when provided as an explanation for a mental disorder (Biomechanism), in addition to a biological explanation for human behavior in general, as was observed in the previous studies. Utilizing a 4 (Disorder Onset: Brain Damage as a result of self-starvation behavior or drug abuse [Fault disorders] versus brain damage as a result of parental neglect or congenial birth defect [Not at Fault disorders]) x 2 (Disorder Biomechanism: Bio versus Non Bio) x 2 (Human Nature Prime: Bio versus Non Bio) between-subjects design, ratings of Dangerousness, Likelihood of Reoffending and Sentence Recommendations were obtained for an offender who committed a hypothetical crime. This study again found the elusive backfire interaction effect, but only between the Human Nature Prime and Disorder Onset on Likelihood of Reoffending and Sentence Recommendations: The Human Nature Prime mitigated sentence recommendations and produced lower ratings of Likelihood of Reoffending for the At Fault disorders, but produced the opposite effect for Not at Fault disorders.

The results of the preliminary studies demonstrate the persistent findings of a perplexing interaction between disorder onset and an argument supporting biological basis for human behavior on judgments of criminal responsibility. It seems that, across several studies, a statement supporting biologically deterministic beliefs results in more lenient judgments of responsibility when an offender's mental disability has a self-inflicted origin, and harsher when it has an uncontrollable origin. As a potential explanation to how recurrent exposure to information grounded in biological principles alters the attribution of criminal responsibility, sometimes backfiring and producing



negative evaluations, the current study sought to uncover mediators to account for these interactions found in the preliminary studies. This study's aim was therefore to explore how measured perceptions of offender dangerousness, likelihood to reoffend, treatability, and behavior controllability account for the interaction between disorder onset controllability and a biologically based explanation for human behavior on judgments of criminal responsibility and sentence recommendations.

## **Methodology**

### **Participants**

Two hundred forty-six U.S. participants completed the study online via Amazon's Mechanical Turk. Prior to beginning our analyses we took a series of steps to validate the data by removing any participants who scored below a 75% on our attention check questions. After eliminating nineteen participants by those standards, the final sample included two hundred twenty-seven people (59% male; mean age = 34 years; 71% Caucasian; 40% held at least four-year college degree).

### **Materials/Procedure**

A 2 (Prime: Bio versus Non Bio) x 2 (Disorder onset: Fault versus No Fault) between subjects experimental design was utilized, where participants were first told they would be presented with a case summary detailing a crime and then asked to provide their judgments about the case (See Appendix for full survey with case summaries). The summary described an incident that took place in a grocery store where, as recorded by surveillance video, the defendant violently assaulted another man after being accidentally bumped with the man's cart. The scenario went on to explain that during the offender's

trial, an expert witness for the defense testified that the offender possessed a brain deficit (named “LPFC Deficit”), which can cause individuals to act irrationally and diminishes one’s ability to control his/her behavior. The disorder was ambiguously named the LPFC deficit as to avoid any stigma or preconceptions associated with well-known disorders that may be considered by the participants and affect judgments.

The participants were then informed that the offender’s disorder was caused by one of two randomly assigned Disorder Onset conditions: either malnourishment as a result of the defendant engaging in severe starvation behaviors to make weight in his high school wrestling competitions, coded the “Fault” condition, or malnourishment as a result of parental negligence during early childhood, coded the “No Fault” condition. Lastly, the participants are presented with a statement designed to either advocate biological determinism, or a biological basis for human behavior in general (Bio Prime), or advocating for non-biological factors/free will as the basis for human behavior (Non Bio Prime). These statements were described to participants as testimony by an expert witness reminding them that either: “human behavior is entirely based in biology” (Bio Prime) or “entirely *not* based in biology and within your own control” (Non Bio Prime).

After reading the case summary and Prime, participants were asked to provide ratings on a 10-point Likert scale ranging from “not at all” to “completely” on several randomized questions about the defendant’s culpability and perceived behavior controllability (1 = not at all...10 = completely). For example, one question reads: “Please rate the extent to which you agree with the following statement: ‘The defendant could have controlled his behavior at the time of the crime’.” Our primary outcome measure was the amount of Criminal Responsibility that should be attributed to the

offender, while other measures intended to function as potential mediators included: the amount of control the defendant could have had over his behavior at the time of the crime (Could Control), Likelihood of Reoffending, offender Treatability and Dangerousness. These questions were followed by a sentencing recommendation as to how long (in months and years), if any, the offender should be incarcerated. Included in the measures was also a manipulation check question to ensure that the Disorder Onset manipulation was successful in that the disorder intended to be viewed as the defendant's fault was actually viewed that way by participants. This question asked, "Based on what you know about the defendant's disorder, do you believe the defendant was in a any way at fault for getting his disorder in the first place?" Following these questions we collected demographic information and thanked participants for their completion of the study (See Appendix B for complete survey).

## **Results**

### **Manipulation Check**

Between-subjects analysis of variance on Disorder Onset determined that the disorder that was meant to be viewed as the offender's Fault ( $M = 6.68$ ) was viewed that way by participants, compared to the No Fault ( $M = 3.16$ ) condition (0 ratings = completely not at fault, 10 = completely at fault):  $F(1, 224) = 93.94, p < .001, \eta^2 = .295$ .

### **Criminal Responsibility**

For the primary outcome measure, Criminal Responsibility, a significant main effect of Disorder Onset emerged,  $F(1, 223) = 5.03, p < .03, \eta^2 = .02$ , where ratings of Criminal Responsibility were higher overall in the Fault condition compared to the No Fault condition. The main effect of Prime on Criminal Responsibility was non-

significant,  $F(1, 223) = .36, p = .55, \eta^2 = .002$ . Simple effects tests revealed that when the Non Bio Prime was presented, there was a significant difference between Disorder Onset conditions,  $F(1, 115) = 12.46, p < .001, \eta^2 = .10$ , however there were no differences across Disorder Onset conditions when the Bio Prime was presented,  $F(1, 108) = .10, p = .75, \eta^2 = .001$ . There was a significant interaction between Prime and Disorder Onset,  $F(1, 223) = 7.26, p = .01, \eta^2 = .03$ , as expected (See Figure 1). This interaction reveals that presentation of the Bio Prime resulted in lower ratings of Criminal Responsibility for the Fault condition (non-significant),  $F(1, 111) = 2.09, p = .15, \eta^2 = .02$ , but higher ratings in the No Fault condition,  $F(1, 112) = 5.71, p = .02, \eta^2 = .05$ , consistent with the interactions observed in the preliminary studies. (See Table 1 for mean scores and standard deviations).

Table 1. Mean ratings of Criminal Responsibility across Prime and Disorder Onset conditions.

| Prime         | Fault Condition |           | No Fault Condition |           |
|---------------|-----------------|-----------|--------------------|-----------|
|               | <i>M</i>        | <i>SD</i> | <i>M</i>           | <i>SD</i> |
| Non Bio Prime | 8.88            | 1.67      | 7.59               | 2.20      |
| Bio Prime     | 8.02            | 2.12      | 8.13               | 1.73      |
| Total         | 8.44            | 2.00      | 7.84               | 2.00      |

### Main effects of mediators

Prior to conducting mediation analyses, we ran a series of 2x2 ANOVAs between our IVs— Prime and Disorder Onset—on each of the mediator variables. A marginally significant interaction emerged between Prime and Onset Condition on ratings of

offender Treatability,  $F(1, 223) = 3.40, p = .07, \eta^2 = .02$ , displaying the same pattern as observed in the main interaction: in the No Fault condition, presentation of the Bio Prime elicited higher ratings of Criminal Responsibility compared to when the Non Bio Prime was presented; while in the Fault condition the Bio Prime resulted in lower ratings compared to the Non Bio Prime. No significant main effects for Treatability ratings emerged (all  $p$ 's  $> .50$ ). For ratings of offender Dangerousness, results revealed a significant main effect of Prime,  $F(1, 223) = 3.79, p = .05, \eta^2 = .02$ , where the Bio Prime produced the highest ratings across all conditions. Dangerousness produced no significant main effect of Onset Condition ( $p = .80$ ), nor was there a significant interaction effect ( $p = .40$ ). For Likelihood to Reoffend, there was a marginally significant main effect of Prime,  $F(1, 223) = 2.50, p = .12, \eta^2 = .00$ , indicating higher ratings of Likelihood to Reoffend overall when the Bio Prime was presented, highest in No Fault condition. The interaction between Prime and Onset Condition was non-significant ( $p = .67$ ), and the main effect of Onset Condition was non-significant ( $p = .38$ ). For ratings of how much the offender could have controlled his behavior at the time of the crime (Could Control), results revealed a marginally significant main effect of Prime,  $F(1, 223) = 3.26, p = .07, \eta^2 = .014$ , and a significant interaction between Prime and Disorder Onset,  $F(1, 223) = 3.97, p = .05, \eta^2 = .02$ . The main effect of Disorder Onset was non-significant ( $p = .58$ ). Because these mediator variables may have all tapped into similar feelings regarding the participants' judgments about disorder stability and the offender's future behavior, a series of correlations were conducted between the variables, listed below (see Table 2). The correlation analyses revealed the variable Could Control was significantly positively correlated with all of the other mediator variables: Treatability ( $r = .36$ ), Dangerousness

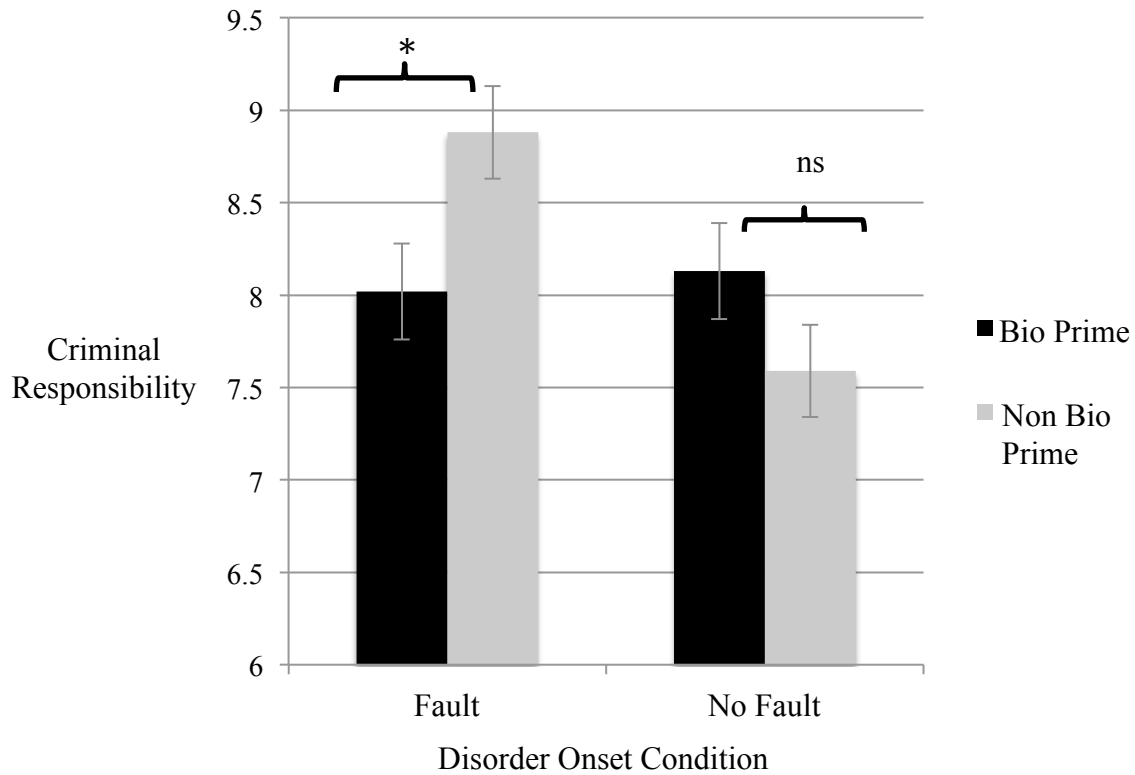
( $r = .19$ ), and Likelihood to Reoffend ( $r = .21$ ) (all  $p$ 's  $< .01$ ). Dangerousness was also highly positively correlated with Likelihood to Reoffend ( $r = .66, p < .01$ ).

Table 2. Correlations between Mediator variables

|               |             | Treatability | Dangerousness | Reoffend | Could Control |
|---------------|-------------|--------------|---------------|----------|---------------|
| Treatability  | Correlation | 1            | -.078         | -.018    | .362**        |
|               | Sig.        |              | .243          | .788     | .000          |
|               | N           | 227          | 227           | 227      | 227           |
| Dangerousness | Correlation | -.078        | 1             | .661**   | .193**        |
|               | Sig.        | .243         |               | .000     | .004          |
|               | N           | 227          | 227           | 227      | 227           |
| Reoffend      | Correlation | -.018        | .661**        | 1        | .211**        |
|               | Sig.        | .788         | .000          |          | .001          |
|               | N           | 227          | 227           | 227      | 227           |
| Could Control | Correlation | .362**       | .193**        | .211**   | 1             |
|               | Sig.        | .000         | .004          | .001     |               |
|               | N           | 227          | 227           | 227      | 227           |

\*\*  $p < .01$

Figure 1. Displays Prime x Disorder Onset Interaction on Criminal Responsibility Ratings  $*p < .05$



### Indirect Effects Analysis

To try and elucidate the interaction between Disorder Onset and Prime on Criminal Responsibility ratings, indirect effects analyses were conducted (Hayes, 2013). The variables predicted to mediate this interaction—Treatability, Dangerousness, Likelihood to Reoffend, and Could Control—were individually tested as mediators in the model. Neither Treatability ( $ab = .28$ , 95% CI:  $[-.002, .72]$ ), Dangerousness ( $ab = .14$ , 95% CI:  $[-.17, .48]$ ) or Likelihood to Reoffend ( $ab = -.04$ , 95% CI:  $[-.23, .14]$ ) returned significant indirect effects when used as mediators in moderated mediation analyses (Model 8). Could Control was the only variable to successfully account for the interaction

effect between Prime and Disorder Onset on Criminal Responsibility:  $ab = .59$ , 95% CI: [.03, 1.24] (See Figure 2). Pathway A in the mediation produced a significant interaction between Prime and Disorder Onset ( $a = 1.25$ , 95% CI: [.01, 2.49]) on Could Control, a significant negative effect of Prime on Could Control ( $a = -1.19$ , 95% CI: [-2.06, -.32]), and a significant negative effect of Disorder Onset ( $a = -.80$ , 95% CI: [.01, 2.5]).

Conditional indirect effects indicate a negative indirect effect of Prime on Criminal Responsibility through Could Control in the Fault condition ( $ab = -.57$ , 95% CI: [-1.06, -.19]), while in the No Fault condition, no significant indirect effect emerged ( $ab = .03$ , 95% CI: [-.41, .46]). These mediation effects are consistent with the effects observed in the initial 2x2 ANOVA performed on the data, but establish perceived behavioral control as an indirect pathway accounting for how Criminal Responsibility is attributed at both levels of the Disorder Onset conditions.

### **Sentence Length**

Analysis of recommended Sentence Length revealed that across the entire sample, the mean recommended sentence was 37.11 months (median = 18 months, mode = 24 months), with those who recommended zero months included in the analysis. Not including those participants who recommended zero months of punishment, the overall mean was 41.61 months. The No Fault condition returned overall lower sentence length recommendations ( $M = 34.92$ ,  $SE = 10.22$ ) compared to the Fault condition ( $M = 48.30$ ,  $SE = 10.02$ ), however this difference was not statistically significant,  $F(1, 198) = .87$ ,  $p = .35$ ,  $\eta^2 = .000$ . There was not a significant effect of Prime on Sentence Length,  $F(1, 198) = .001$ ,  $p = .98$ ,  $\eta^2 = .004$ , or a significant interaction between Prime and Disorder Onset  $F(1, 198) = .35$ ,  $p = .55$ ,  $\eta^2 = .002$ .



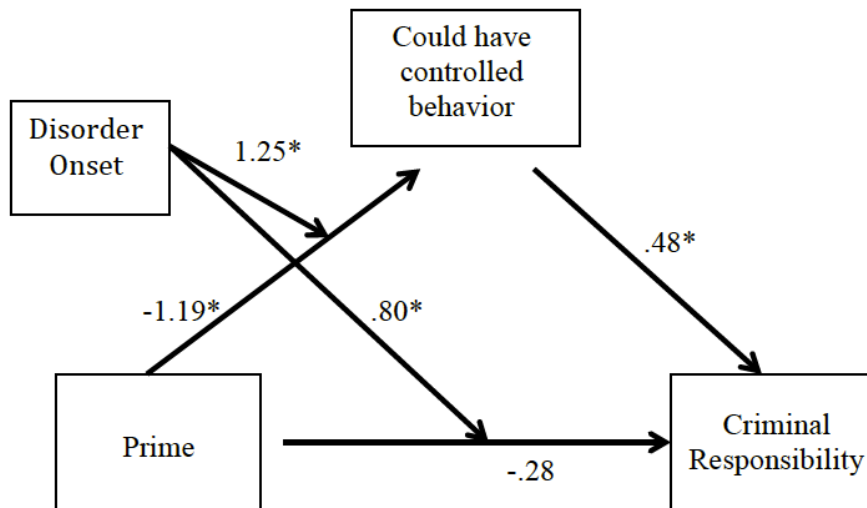


Figure 2. The Moderated Mediation Analysis  
 Coding: Non Bio Prime = 0, Bio Prime = 1  
 \* $p < .05$

### Emotion-eliciting variables

In addition to analysis of possible mediators for the interaction between the Prime and Disorder Onset on ratings of Criminal Responsibility, the study also obtained measures designed to analyze the participants' feelings of anger, sadness, fear and disgust as a result of the defendant's behavior. These variables were measured on a scale ranging from 1-5, with higher scores indicating stronger feelings of that emotion. Although none of these variables produced significant main effects when tested against Prime and Disorder Onset (all  $p$ 's  $> .40$ ; see Table 3), their mean scores across conditions indicated that presentation of the Bio Prime returned slightly higher ratings overall compared to the Non Bio Prime for variables indicating the offender's behavior made participants feel Sad, Angry, and Fearful.

Table 3. Mean Scores for Emotion Eliciting Variables  
Scale 1-5, higher scores indicate greater experience of that emotion

| The defendant's behavior makes me feel... | Mean score Prime |                | Main effect Prime | Mean Score Disorder Onset |              | Main effect Disorder Onset |
|---|------------------|----------------|-------------------|---------------------------|--------------|----------------------------|
|   | <i>Bio Prime</i> | <i>Non Bio</i> |                   | <i>No Fault</i>           | <i>Fault</i> |                            |
| Sad                                       | 3.6              | 3.4            | $p = .40$         | 3.6                       | 3.4          | $p = .33$                  |
| Angry                                     | 3.6              | 3.5            | $p = .42$         | 3.6                       | 3.5          | $p = .68$                  |
| Disgusted                                 | 3.4              | 3.5            | $p = .82$         | 3.4                       | 3.4          | $p = .99$                  |
| Fearful                                   | 3.4              | 3.2            | $p = .52$         | 3.3                       | 3.3          | $p = .65$                  |

### Discussion

The current study explored the effects of presenting an argument supporting a biological basis for human behavior on judgments of criminal responsibility for an offender with a mental disorder with varying onset conditions. As expected, based on our preliminary studies, the presentation of the biologically based prime resulted in decreased judgments of criminal responsibility in the Fault condition, when the disorder's onset was controllable, and had the opposite effect in the No Fault condition, when the onset was uncontrollable. An exploration of possible mediators for this effect revealed that the perception of control the offender could have had over his behavior at the time of the crime accounted for the relationship described above. These results suggest that both disorder onset controllability and behavior controllability contribute to judgments of criminal responsibility for mentally ill offenders, and biologically based arguments affect those perceptions of control differently.

When attempting to explain this effect, Weiner's Attribution Theory (2006) provides a partial explanation for the results. Attribution Theory states that effort-related causes for failure are viewed as more punishable than ability-related causes, and disorders with a behaviorally based origin are seen as more controllable and result in more blame attribution than a biologically based disorder (Weiner, 2006). The fact that the criminal responsibility ratings were higher overall for the Fault disorder is consistent with Attribution Theory—onset controllable disorders were viewed as behaviorally based and effort related, therefore eliciting greater blame attribution for the indiscretion. However, presenting a biologically deterministic prime for that same disorder appears to have changed the blame attribution from behaviorally based and effort related, to biologically based and ability related, therefore decreasing criminal responsibility ratings. This change resulted in a shift in the perception of control the offender had over both the acquisition of his disorder and his behavior at the time of the crime—explained by the variable Could Control mediating the relationship between Disorder Onset, the Biological Prime, and Criminal Responsibility.

The mediating variable, Could Control, was significantly correlated with all other hypothesized mediator variables: Dangerousness, Likelihood to Reoffend, and Treatability. This suggests that although Could Control was the only variable to statistically account for the relationship between Prime and Disorder Onset on ratings of Criminal Responsibility, it is likely that the other variables were similarly affected by our manipulation and may have contributed to responsibility judgments to a lesser degree. It is also possible that because the crime scenario provided to participants was a very brief description of an assault case, the lack of detail and emotional arousal failed to elicit

stronger opinions about Reoffending, Treatability, and Dangerousness. A future study that provided more comprehensive information to participants about the offender and possibly a more emotionally salient crime may more significantly provoke those opinions.

Attribution Theory also asserts that behavior stability is a contributing element to judgments of wrongdoers in all contexts. The current study provides support for this idea, as two variables that measured behavior stability were highly correlated: Dangerousness and Likelihood to Reoffend. Although neither variable significantly affected Criminal Responsibility ratings, both produced significant main effects in response to the Prime: presenting the Biological Prime resulted in higher ratings of Dangerousness *and* Likelihood to Reoffend, suggesting that a biological explanation for human behavior in general results in increased perceptions of behavior stability. These results support the notion that behavior stability is comparably utilized in criminal contexts, and an argument supporting biological determinism can alter those judgments in a way not beneficial to the offender. It's possible then that individuals who advocate a more deterministic world-view are more prone to seeing behavior as stable compared to those with perspectives rooted in free will.

Although the emotion eliciting variables did not significantly predict sentencing or responsibility judgments, a pattern was present that indicates the presence of the Biological Prime resulted in more fear, sadness, and anger in response to the offender's behavior. It is possible that the presentation of a biologically deterministic argument triggers those emotions and contributes to the increase in Criminal Responsibility judgments for an offender with an onset controllable (Fault) disorder. As these variables

were non-significantly affected by the manipulation of the study, only speculative judgments can be made. However, it seems likely that had the crime scenario been more emotionally salient, it may have produced stronger emotional responses from the participants, potentially returning significant effects. Future studies should attempt to address this concern in a similar context.

It is also worth noting the finding that there were no differences in sentencing recommendations across the conditions. This finding, consistent with much research in mock juror decision-making in general, represents the attitudes addressed by the precise manipulation of conditions and the use of survey data in general. It seems that, by focusing on criminal responsibility as a primary measure that does not directly correspond with differences in sentencing recommendations, we are instead addressing intermediate attitudes that may contribute to bigger-picture judgments like sentencing, but in conjunction with various other factors and attitudes.

Though Attribution Theory provides an intuitive framework to explain the results of one side of our experiment, there is still a piece of this puzzle missing. When the offender's disorder was onset uncontrollable, according to Attribution Theory and our expected interpretation, the biological prime should result in ability related attribution and therefore lower responsibility ratings. However, it does just the opposite. It is still unclear why, for disorders with an uncontrollable origin, the biological prime essentially backfires and produces greater attributions of criminal responsibility. It is possible that the use of biological explanations in criminal contexts only go so far. Perhaps for onset uncontrollable, ability-related conditions, information that reiterates its biologically based nature could serve as a harsh reminder of the permanence of such a condition, implicitly

eliciting fear and leading to harsher responsibility ratings. Another potential explanation for these unclear findings is that Attribution Theory does not support a more biologically deterministic perspective on human behavior, elicited by presentation of the biologically based argument, in the context of blame attribution for criminal offenders. This philosophical perspective could require the agency of factors not represented by Attribution Theory. Therefore, whether this theory can be applied to the specific circumstances elicited in the current study is still unknown and should be the focus of future analyses.

Thus far in the interpretation of the results obtained in this study, the focus has been on the differential effect presenting the Prime had on Criminal Responsibility ratings across Disorder Onset conditions. Specifically, that the Prime resulted in more harsh responsibility judgments in the No Fault condition, and less harsh in the Fault condition compared to when the Non Bio Prime was presented. However, it may be beneficial to shift the perception of this interaction: There is a statistical difference in Criminal Responsibility attributions between Disorder Onset conditions when the Non Bio Prime advocating free will is presented—the Fault disorder is attributed more responsibility than the No Fault disorder. However, when the Bio Prime advocating biological determinism is presented, that difference across conditions disappears. This may suggest that for individuals whose beliefs are more deterministic in nature, criminal responsibility attributions may remain constant regardless of the details of a disorder's onset controllability. On the other hand, for those who advocate free will, onset controllability is a sensitive piece of information that alters responsibility attribution. Overall, the details of this study support the concept that an individual's philosophical

beliefs about the origin of human behavior affect how one uses the details of a criminal offender to produce responsibility attributions.

There are limitations of this study that should be addressed. First, some suggest internet-based mock-juror research may lack ecological validity and therefore should be considered with caution when applying it to juror decision-making in real trial scenarios. However, recent research demonstrated the use of mock-juror data across both student and non-student sample returned consistent sentencing and responsibility judgments across over fifty experiments, demonstrating mock-jury research platforms to be a reliable method of data collection (Bornstein et al. 2017). Second, though Amazon Mechanical Turk (MTurk) provides a statistically representative sample of the general US population, it is not a truly random sample. However, recent studies assert that MTurk provides an acceptable alternative to in-person experimental designs, many times with a more nationally representative sample and lower likelihood of experimenter biases (Berinsky, Huber & Lenz 2012; Paolacci, Chandler & Ipeirotis 2010).

Implications of this research include informing attorneys and other legal decision makers the possible effect presenting biologically based evidence may have on their client's case. It is important for the legal community to be aware of the possible negative outcomes that may arise as a result of introducing such evidence in cases of mentally ill offenders. Specifically, the presentation of biologically based evidence utilized with the hopes of mitigating sentencing or judgments of guilt may, in certain circumstances, produce the opposite effect. Precisely when these arguments are beneficial or not may involve perceptions of the offender's behavioral control, however this theory would benefit from further exploration. This research also demonstrates that exposure to

biologically deterministic arguments have the ability to affect perceptions of responsibility for crimes committed by a mentally ill offender. This may represent a societal shift in the perception of free will as a result of increased exposure to and awareness of biology in general. In the future, the paradoxical backfire effect present in this study should be explored to further solidify why and when presenting biologically based evidence is beneficial, and when it is detrimental in legal cases.



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APPENDIX A

INSTITUTIONAL REVIEW BOARD (IRB) HUMAN SUBJECTS APPROVAL



EXEMPTION GRANTED

Nicholas Schweitzer  
Social and Behavioral Sciences, School of  
-  
njs@asu.edu

Dear Nicholas Schweitzer:

On 7/9/2015 the ASU IRB reviewed the following protocol:

|                     |  |
|---------------------|--|
| Type of Review:     | Initial Study  |
| Title:              | Impressions of Neuroimage Evidence   |
| Investigator:       | Nicholas Schweitzer  |
| IRB ID:             | STUDY00002865  |
| Funding:            | None   |
| Grant Title:        | None   |
| Grant ID:           | None   |
| Documents Reviewed: | <ul style="list-style-type: none"><li>• Schweitzer IRB Template 3.docx, Category: IRB Protocol;</li><li>• Mechanical Turk Recruitment #2, Category: Recruitment Materials;</li><li>• Consent Survey, Category: Consent Form;</li></ul> |

The IRB determined that the protocol is considered exempt pursuant to Federal Regulations 45CFR46 (2) Tests, surveys, interviews, or observation on 7/9/2015.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

IRB Administrator

APPENDIX B

SURVEY

Hello,

We are researchers at Arizona State University, and we would like to invite you to participate in a short study on how jurors evaluate evidence in a legal case. This will involve reading a short description of a potentially criminal act, and then answering questions about your opinions. You will not be able to refer back to the description once you're finished with that page. There is no time limit, so please take your time and carefully review the information presented.

Your participation in this study is voluntary. You have the right not to answer any questions, and to stop participating at any time. If you choose not to participate or to withdraw from the study at any time, there will be no penalty.

If you decide to participate, we expect the study to take you about 10-12 minutes. Although there may be no direct benefits to you, the possible benefits of your participation in the research include the opportunity to be involved in and learn about research. There are no foreseeable risks or discomforts to your participation. You must be 18 or older to participate in the study.

All information obtained in this study is strictly confidential and your responses will be anonymous. The anonymous data are stored on a password protected computer hard disk in a secure location so that only the principle investigator and research assistants will have access to it. The results of this research may be used in reports, presentations, and publications, but the researchers will not identify you.

If you have any questions concerning this study, please contact the research team via email at [laclab@asu.edu](mailto:laclab@asu.edu). If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Human Subjects Institutional Review Board through the ASU Office of Research Integrity and Assurance, at (480) 965-6788.

By advancing to the next page, you are consenting to participate in the study. Please click the "NEXT" button to proceed with the survey.

Thank you for agreeing to participate. We very much appreciate your help.

We'd like you to read a brief summary of an actual criminal court case. Although it will give you only a very superficial idea of what happened in this trial, we will be asking you to then provide your impressions and judgments about the case.

We ask that you please take your time and carefully read the summary and the questions that follow.

When you are ready, click the NEXT button below to view the Case Summary.

Condition: No Fault + Bio Prime

### Case Summary

This case is about a 35-year-old male who was arrested for assault.

Background: The victim and the defendant were both shopping at a local grocery store that was quite busy. The victim, a 38-year-old male, was walking down the grocery aisle when he accidentally bumped into the defendant with his shopping cart. The defendant turned to the victim and shouted angrily, "Watch where you are going!" A few minutes later, the victim accidentally bumped into the defendant again. This time, the defendant turned toward the victim and, without saying anything, began to punch the victim repeatedly until bystanders stepped in and stopped the assault. The grocery store had surveillance cameras that caught the entire incident on tape. There were also many eyewitnesses including those who stopped the assault. The surveillance recording showed that the victim laid motionless for roughly 30 seconds. The emergency room physician who treated the victim stated that he had been rendered unconscious due to repeated blows to the head and that he also suffered additional minor injuries when he fell to the ground. The victim has now fully recovered from all of his injuries.

Defense Evidence: During the trial, a medical expert testified that, upon extensive examination, the defendant was found to have a neurological (brain) disorder called an LPFC Deficit. This disorder can cause individuals to act irrationally and diminishes a person's ability to control his or her behavior. After extensive review of the defendant's past medical records the expert found that the defendant suffered from extreme malnutrition during his early childhood. From the time he was born until he was five years old the defendant's mother severely neglected him and did not feed him or care for him properly. The expert testified that this malnutrition is likely what led to the defendant's LPFC deficit.

Expert Evidence: A scientific expert in human behavior was assigned to the case and explained that, to truly understand human behavior, it is necessary to remember the critical role played by biological factors. Extensive research has found that there are unique genes and biological processes involved in the development of all mental disorders. Other research has shown that humans possess genes, chemical markers, and brain structures that account for behaviors such as impulsivity, aggression, and risk-taking. The expert advised the jury to keep in mind that it is these types of biological factors that ultimately cause a person's choices and actions, both good and bad.



Condition: No Fault + Non Bio Prime

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Expert Evidence: A scientific expert in human behavior was assigned to the case and explained that, to truly understand human behavior, it is necessary to remember the critical role played by an individual's choices and desires. We all have our own experiences, perceptions, and emotions that shape our beliefs and contribute to our behavior. Extensive research has shown that mental disorders, temperaments and personality types are often not caused by genetics or biology; rather it is our own actions and experiences that cause us to be who we are. The expert advised the jury to keep in mind that it is a person's own choices that govern their behavior, and biological factors are not the ultimate cause of a person's choices and actions, good or bad.

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Questions:

**Thank you.**

**Before getting to your decisions about the case, we would first like to ask you a few questions about the defendant. There are no right or wrong answers; we are simply interested in your "gut reaction."**

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On a scale of 1 - 10, please indicate to what extent you feel that the defendant should be held responsible for his actions.

|                             | Not at all Responsible |                       |                       |                       |                       |                       |                       | Fully Responsible     |                       |                       |
|-----------------------------|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                             | 1                      | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     | 8                     | 9                     | 10                    |
| How Criminally Responsible? | <input type="radio"/>  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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On a scale of 1 - 10, please indicate to what extent you feel that the defendant was in control of his actions at the time of the attack.

|                 | Not at all in control |                       |                       |                       |                       |                       |                       | Fully in control      |                       |                       |
|-----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                 | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     | 8                     | 9                     | 10                    |
| How In Control? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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On a scale of 1 - 10, please indicate to what extent you feel that the defendant **could have** controlled his actions at the time of the attack.

|                     | Could not have        |                       |                       |                       |                       |                       |                       | Completely could have |                       |                       |
|---------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                     | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     | 8                     | 9                     | 10                    |
| Could have control? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

How likely do you feel the defendant is to re-offend, or to commit a crime again?

|          | Very Unlikely         | Unlikely              | Somewhat Unlikely     | Somewhat Likely       | Likely                | Very Likely           |
|----------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Reoffend | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

To what extent do you believe the defendant is a danger to society?

|               | Not at all dangerous  |                       |                       |                       |                       | Very dangerous        |                       |
|---------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|               | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |
| Dangerousness | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Without knowing the specifics of the defendant's disorder, how treatable do you think the disorder is?

|              | Not at all treatable<br>(Can't be cured or managed) |                       |                       |                       |                       |                       |                       | Completely treatable<br>(Can be completely cured) |                       |                       |
|--------------|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---|-----------------------|-----------------------|
|              | 1   | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     | 8   | 9                     | 10                    |
| Treatability | <input type="radio"/>                               | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>                             | <input type="radio"/> | <input type="radio"/> |

Given what you were told about the defendant's disorder, do you believe that the defendant is in any way at fault for getting his disorder in the first place?

|                              | The disorder is not at all the defendant's fault |                       |                       |                       |                       |                       |                       | The disorder is completely the defendant's fault |                       |                       |
|------------------------------|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|--|-----------------------|-----------------------|
|                              | 1  | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     | 8  | 9                     | 10                    |
| Whose fault is the disorder? | <input type="radio"/>                            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>                            | <input type="radio"/> | <input type="radio"/> |

To what extent do you believe the defendant is generally a responsible person?

|                  | Not at all responsible |                       |                       |                       |                       |                       |                       | Extremely responsible |                       |                       |
|------------------|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                  | 1                      | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     | 8                     | 9                     | 10                    |
| How responsible? | <input type="radio"/>  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Based on what you know about the Defendant's prior history, how much do you sympathize with him?

|          | No Sympathy           |                       |                       |                       |                       | Completely Sympathize |                       |                       |                       |                       |
|----------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|          | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     | 8                     | 9                     | 10                    |
| Sympathy | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

To what extent do you agree with this statement: "The defendant should have learned to live with his disorder by now."

|                             | Strongly disagree     | Disagree              | Somewhat disagree     | Neither agree nor disagree | Somewhat agree        | Agree                 | Strongly agree        |
|-----------------------------|-----------------------|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|-----------------------|
| Learn to live with disorder | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

On a scale of 1-10, how self-sufficient do you believe the defendant to be?

|                 | Not at all self-sufficient |                       |                       |                       |                       | Extremely self-sufficient |                       |                       |                       |                       |
|-----------------|----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                 | 1                          | 2                     | 3                     | 4                     | 5                     | 6                         | 7                     | 8                     | 9                     | 10                    |
| Self-sufficient | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Do you believe the defendant's condition places a financial burden on society?

|                  | Definitely no         | Probably no           | Maybe or maybe not    | Probably yes          | Definitely yes        |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Financial burden | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Do you believe the defendant's condition places a psychological burden on society?

|                      | Definitely not        | Probably not          | Might or might not    | Probably yes          | Definitely yes        |
|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Psychological burden | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

How predictable do you view the behavior of the defendant to be?

|                | Extrememly Unpredictable |                       |                       |                       |                       | Extremly Predictable  |                       |                       |                       |                       |
|----------------|--------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                | 1                        | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     | 8                     | 9                     | 10                    |
| Predictability | <input type="radio"/>    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

In your opinion, would you qualify the defendant as being "mentally ill?"

| He is Definitely Not Mentally Ill | He is Probably Not Mentally Ill | It is Unclear Whether he is Mentally Ill | He is Probably Mentally Ill | He is Absolutely Mentally Ill |
|-----------------------------------|---------------------------------|--|-----------------------------|-------------------------------|
| <input type="radio"/>             | <input type="radio"/>           | <input type="radio"/>                    | <input type="radio"/>       | <input type="radio"/>         |

Based on what you read about the defendant's history and how he developed his disorder, to what extent do you agree with the following statements about the defendant's condition:

|   | Strongly disagree     | Somewhat disagree     | Neither agree nor disagree | Somewhat agree        | Strongly agree        |
|---|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|
| I could see this happening to someone I know                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |
| Society shares some of the blame for the defendant's disorder | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |
| I can relate to the defendant                                 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |
| This could have been me                                       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |
| I can understand why the defendant behaved the way he did     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |

How much do you agree with the following statements?

|   | Strongly disagree     | Somewhat disagree     | Neither agree nor disagree | Somewhat agree        | Strongly agree        |
|---|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|
| Mentally ill individuals are dependent on society for help managing their illnesses           | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |
| Your genes determine your future  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |
| Science has shown how your past environment created your current intelligence and personality | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |
| People can overcome obstacles if they truly want to   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |
| People have complete control over decisions they make   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |
| I feel morally outraged by what the defendant did   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |
| The defendant is a bad person   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |
| The defendant committed the crime because he has bad character                                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |
| The defendant committed the crime because he is mentally ill                                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |
| The defendant committed the crime because he has a brain defect                               | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |
| The cause of the defendant's behavior was biological  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |
| The defendant's behavior makes me feel angry  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |
| The defendant's behavior makes me feel sad  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |
| The defendant's behavior makes me feel fearful  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |
| The defendant's behavior makes me feel disgusted  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |



To what extent do you agree that mentally ill individuals should receive support from society to help them manage their illness?

|                      | Strongly disagree     | Somewhat disagree     | Neither agree nor disagree | Somewhat agree        | Strongly agree        |
|----------------------|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|
| Support from society | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |

**Now for your decisions about the case.**

**In the case that you just read, the video evidence clearly demonstrated that the defendant assaulted the victim. So, instead of asking you about whether the defendant is guilty or not guilty, we'd like to ask you about how the defendant should be punished.**

**As with the previous questions, there are no right or wrong answers here; we are just looking for your gut reaction.**

On a scale of 1 - 10, please indicate how severely you believe the defendant should be punished?

|                         | Not at all punished   |                       |                       |                       |                       | Punished as much as possible |                       |                       |                       |                       |
|-------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                         | 1                     | 2                     | 3                     | 4                     | 5                     | 6                            | 7                     | 8                     | 9                     | 10                    |
| Severity of Punishment? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

If you were asked, as a juror, to recommend a sentence / punishment for this defendant, what type of punishment do you think the defendant should receive? You will then be asked about how long you think that the sentence should last.

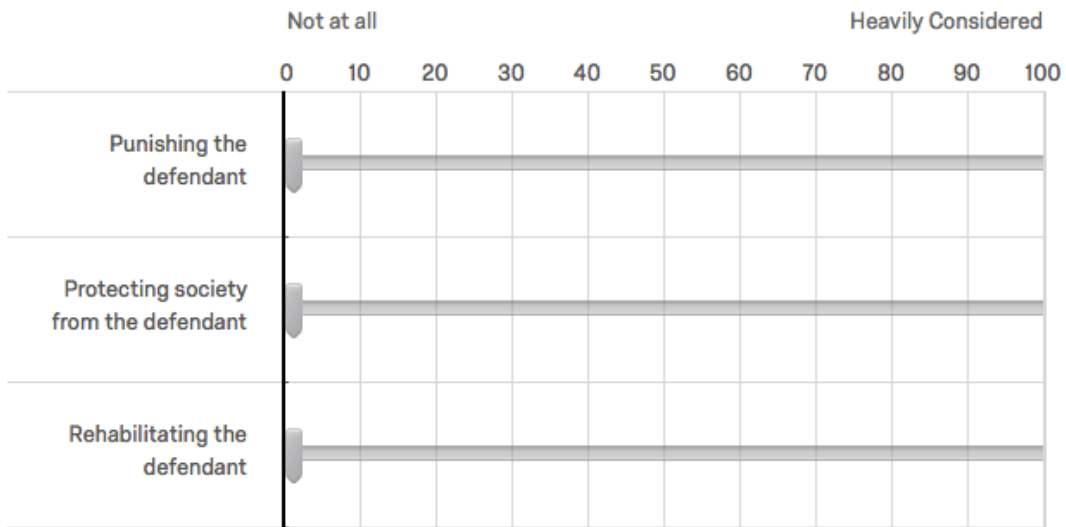
- INCARCERATION:** Defendant would be completely restricted to either a jail or prison facility.
- PROBATION:** Defendant would be released with conditions that restrict some of his behaviors, and he would be required to regularly check in with a probation officer
- MENTAL HEALTH FACILITY:** Defendant would be restricted to a mental health facility and be required to receive mental health treatment while there.
- NO PUNISHMENT:** Defendant should not receive any punishment at all.

For how long (in years and/or months) should the defendant's sentence (whether incarceration, probation, or a mental health facility) be?

Years

Months

How much did you consider the following when making your punishment decisions?



Now we'd like you to answer the following questions about the case you read earlier. YOU WILL BE PAID REGARDLESS OF HOW YOU RESPOND TO THESE ITEMS.

However, we would simply like to know how well you remember these items. Please do your best and click NEXT when you're finished.

The defendant was accused of committing what crime?

- Assault
- Murder
- Armed robbery
- Trespassing

Where did the crime take place?

- A grocery store
- A movie theater
- A shopping mall
- A restaurant

What was the name of the defendant's disorder?

- LPFC Deficit
  - ADHD Disorder
  - Psychopathy
  - FMRI Test Disorder
- 

How did the defendant develop his disorder?

- He was born with the disorder
- He got it because he was neglected as a child
- He got it because he starved himself as a teenager
- He got it because of past drug use

What is your gender?

- Male
  - Female
- 

What is your age?

Which ethnicity best describes you?

- Hispanic / Latino/ Central/South American
- White / Caucasian
- Black / African American
- Middle East / North African
- Asian / Pacific Islander
- Other

In which state do you currently reside?

Alabama

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What is your highest level of education?

- Less than High School
- High School Graduate
- Some College
- Associate's Degree
- Bachelor's Degree
- Master's Degree

Generally speaking, which of the following most closely describes your political views?

- Very Conservative
- Somewhat Conservative
- Moderate, Leaning Conservative
- Moderate
- Moderate, Leaning Liberal
- Somewhat Liberal
- Very Liberal