CRIME & HUMAN BEHAVIOR
VOLUME 1, FALL 2017

CRIME & HUMAN BEHAVIOR

Volume 1	**Fall 2017**

ARTICLES

EDITORIAL POLICY: Crime & Human Behavior is a multidisciplinary, peer-reviewed outlet for original research concerning the relationship between human behavior and the criminal justice system. The journal publishes empirical, theoretical, policy-oriented, qualitative, and quantitative research, as well as book reviews, and encourages submissions from student lead authors. Coverage ranges from criminology, crime prevention, criminal justice, communications, forensic anthropology, psychology, economics, sociology, and political science, and other areas related to the criminal justice system.

MANUSCRIPTS: Typewritten, double-spaced manuscripts should be submitted to lasky@nsuok.edu. All manuscripts should follow the guidelines indicated in the Publications Manual of the American Psychological Association (6th Ed.). Each manuscript should begin with an abstract of 100-120 words, and should not exceed 30 types pages, excluding references, tables, and figures. Manuscripts must be written in English and include the title, the author's (and co-author's) full name, current position, affiliation, institutional address, email address, telephone, and fax numbers. In the manuscript has co-authors, please indicate the designated corresponding author. Manuscripts must include up to five key words as they would appear if published, and a short biographical note of each author.

ARE THE GENES RESPONSIBLE? COMMUNITY MEMBERS' PERCEPTIONS OF GENETIC EVIDENCE IN A RANDOMIZED EXPERIMENT*

MARGARET C. PATE[1] and ELISE T. COSTA[2]

ABSTRACT

An emerging area of research has begun to untangle the impact of genetic evidence in the courtroom. There is an overall fear that genetic evidence will too easily persuade jurors, yet research is still exploring jurors' complex use of this unique evidence. The current study extended previous research by examining the impact of genetic evidence on verdict and individuals' perceptions of the defendant when the evidence linked the gene to deviant behavior, among a sample of adults ($N = 230$). We found that gene-specific evidence led to more guilty verdicts for first-degree murder, and this relationship was mediated by jurors' fearfulness of the defendant. Implications from the research may aid to the growing understanding of how jurors evaluate gene-specific evidence.

KEYWORDS

biosocial, juries, courts, genetic evidence, DRD4

---

[1] Department of Criminal Justice, Radford University

[2] Department of Sociology and Criminology & Law, University of Florida

* **Corresponding Author:** Margaret C. Pate, Department of Criminal Justice, Radford University, CHBS Building, Rm 204, Radford, VA 24142 (e-mail: mpate1@radford.edu)

Traditionally, genetic evidence application in trial proceedings has focused on deoxyribonucleic acid (DNA) as a means of tying or exculpating a defendant to/from the scene of a crime. However, genetic evidence that is behavioral in nature has a different function and has been increasingly used in case proceedings (Denno, 2009; Denno, 2011; McSwiggan, Elger, & Appelbaum, 2017). This new application deals with the defendant's genetic make-up and its potential to explain antisocial behaviors, although research on the connection between genetic information and antisocial behavior is conducted at the aggregate level. Approximately 50 United States cases have been identified as attempting or successfully entering behavioral genetic information from a defendant (Denno, 2009; Denno, 2011). Generally, these submissions are used to establish issues, such as mental illness or alcohol related diseases. However, this research has also been used as a mitigating factor in murder cases to establish a gene-specific link to antisocial behavior (McSwiggan et al., 2017).

Research that has examined legal decisions when using genetic evidence of this nature has some consistent findings, as well as some contradictory findings, to the current research. This small body of research has examined legal decisions of judges (Aspinwall, Brown, & Tabery, 2012; Berryessa, 2016; Fuss, Dressing, & Briken, 2015) and mock jurors (Appelbaum & Scurich, 2014; Appelbaum, Scurich & Raad, 2015; Cheung & Heine, 2015; Costa, Pate & Gibson, forthcoming). Mock juror research in this area thus far has not observed a direct impact of genetic evidence on charge or sentencing outcomes (Appelbaum & Scurich, 2014; Appelbaum et al., 2015; Cheung & Heine, 2015; Costa, et al., forthcoming). However, mock jurors have reported being fearful of the defendant when genetic explanations for the criminal behavior are present (Appelbaum & Scurich, 2014; Cheung & Heine, 2015; Costa et al., forthcoming). One consideration for this finding is that the genetic evidence may cause jurors to be more fearful of

the defendant if they view the defendant's lack of control as incurable (Berryessa, 2014). While it has yet to be observed, it is possible that fearfulness may have an indirect effect on charge or sentencing through evidence type.

The present study contributes to this growing body of research by exploring whether gene-specific testimony impacts verdict decisions of community members, who serve as mock jurors. With the exception of Costa et al. (forthcoming), previous juror studies have used vague statements regarding the defendant's behavior and the link to genetic predispositions (Appelbaum & Scurich, 2014; Appelbaum et al., 2015; Cheung & Heine, 2015;). Costa et al. (forthcoming) used an experimental design in which they explored the potential impact of gene-specific evidence testimony that included a description of the risk alleles of DRD4 and 5HTTLPR, which have been linked to antisocial behavior, as well as violence (Ficks & Waldman, 2014). The present research is an extension and elaboration of Costa et al. (forthcoming), using a community sample ($N = 230$). This study uses four experimental conditions to determine whether gene-specific explanations, alone or in combination with environmental risk (child abuse), differentially impact verdict decisions compared to conditions without these factors. This community sample was collected online using Amazon's Mechanical Turk (MTurk).

Literature Review

Application of Genetic Evidence

Behavioral genetics has penetrated the legal system and legal scholars have begun to recognize its potential impact for the criminal justice system (Denno, 2009; Denno, 2011; Farahany, 2016). This evidence broadly falls into two categories: evidence that is used to establish inheritance of a behavior, such as alcoholism, through family history, and evidence that

is used to identify genes that may contribute to a behavior, through specific genetic testing of the defendant (Berryessa, 2016). The scope of this paper focuses on the latter type of behavioral genetic evidence submission, which we term as *gene-specific evidence*. While research has documented the frequency of behavioral genetic evidence submission, as of 2011 there were less than 100 cases that have been detailed (Denno, 2009; Denno, 2011). When narrowing the scope to gene-specific evidence submission, there have only been a handful of cases that have successfully submitted it globally (McSwiggan et al., 2017). The entry of this type of evidence occurs during various phases of a case.

As this is a newer form of evidence submission, considerations must be taken into account based on evidence submission standards. The first documented inquiry of gene-specific evidence occurred only one year after research on a Dutch family concluded that the family's abnormal behavior, including aggression, may be linked to the genomic abnormality of one gene, MAOA (Brunner et al., 1993). Following the publication of this study, the first case of gene-specific evidence submission was attempted in *Mobley v. State,* in 1994. However, the court denied this request on the grounds of insufficient scientific basis, which is understandable given there was only one research study at the time regarding MAOA.

Since 1994, research regarding how specific genes interact with the environment has greatly expanded. The seminal piece regarding a gene by environment interaction only occurred a decade and a half ago, in which researchers observed a significant interaction between MAOA and child maltreatment on antisocial behavior (Caspi et al., 2002). Considering the novelty of the science, it is not surprising that only a handful of cases have attempted to enter gene-specific evidence. Since 2014, there have been six cases using or attempting to use MAOA evidence, demonstrating an increased awareness and possibly a level of acceptance for gene-specific evidence (McSwiggan et al., 2017).

Of the 11 cases that have attempted to enter gene-specific evidence of the defendant since 1994, two were during the guilt phase, five were during the sentencing phase, and five were during the appellate phase[3] (McSwiggan et al., 2017). Nine of these cases occurred in the United States and two occurred in Italy[4]. The first and only successful attempt to enter this evidence during the guilt phase of a trial, which is applicable to the current study, was *State of Tennessee v. Waldroup* (2011). This case received national attention due to the novelty of this submission type. National Public Radio, NPR, even discussed details of the case in a special series titled, "Inside the Criminal Brain" and was featured in the episode titled, "Can Your Genes Make You Murder?" (Haggerty, 2010). The defendant was on trial for multiple crimes, but the main focus was on first-degree murder (a capital offense in Tennessee) and attempted murder. His first-degree murder was reduced to voluntary manslaughter by the jury, which has a maximum 6-year sentence. While the defendant was convicted, he ultimately received 32 years for all of his convictions. When NPR spoke with jurors from the case, one stated that the genetic evidence was just one piece of evidence and the jurors weighed it differently, but it was a major part of her decision. Another juror stated, "A diagnosis is a diagnosis, it's there" and, "A bad gene is a bad gene" (Haggerty, 2010). The two jurors that spoke to NPR for the segment seemed to indicate that the MAOA testimony did influence their respective decisions. In regards to submission in other parts of a case, the evidence often did not help the defendant. However, the focus of this paper is on the guilt phase.

Empirical Studies

Considering the science is novel and the first successful entry of evidence occurred in 2011, the empirical research regarding genomic evidence submission in the American criminal

---

[3] One case was counted twice because MAOA evidence was entered at both the sentencing and the appellate phases.

[4] For a detailed review of the 11 cases, see McSwiggan, Elger, & Appelbaum, 2017.

justice system is small, but growing rapidly. Presently, there are seven known articles that deal specifically with perceptions of genetic evidence in the criminal justice system. Three of these studies focus on judges' views (Aspinwall et al. 2012; Berryessa, 2016; Fuss et al., 2015) and four focus on potential jurors' views (Appelbaum & Scurich, 2014; Appelbaum, et al., 2015; Cheung & Heine, 2015; Costa et al., forthcoming).

The seminal piece in this area of research was Aspinwall and colleagues (2012). In this study, state-level trial judges ($N = 181$) received an email with a hypothetical case that was loosely based on *Mobley v. State*. In this 2x2 experiment, judges received variations in the legal party presenting the case (prosecution/defense) and the presence or absence of expert testimony that discussed a biomechanism (MAOA) that may have contributed to the defendant's behavior. Of the 161 surveys with complete sentencing recommendations, judges significantly reduced the sentence by one year when the biomechanism was present, regardless of whether it was presented by prosecution as an aggravating factor or presented by defense as a mitigating factor.

The study by Aspinwall and colleagues (2012) was then replicated in a sample of German judges using the same 2x2 design, although minor edits were made to adapt to the German legal system (Fuss et al., 2015). Results from the German replication varied from the Aspinwall piece of United States judges. German judges reduced legal responsibility when the genetic evidence was presented; however, there was no impact on sentence length. Also, recommendations for involuntary civil commitment were increased, which raises questions regarding possibly increased detention when genetic evidence is introduced.

The final piece to consider judges' decisions was a qualitative exploration of judges' views on the submission of behavioral genetic evidence more generally in the United States legal system, specifically addressing genetic contributions to mental disorders (Berryessa, 2016).

Twenty-one state trial judges were interviewed over the phone regarding perceptions of: offenders with High-Functioning Autism, media portrayal of offenders with High-Functioning Autism, and use of behavioral genetic evidence for offenders with mental disorders that have genetic influences. The latter of the three types of questions is what applies within this research area regarding perception of behavioral genetic evidence. A majority of the judges believed that the behavioral genetic evidence could be beneficial for the offender, especially as a mitigating factor for sentencing.

The remaining four pieces focus on potential jurors' perceptions of behavioral genetic evidence. First, using a nationally representative sample of non-institutionalized individuals via a web survey, Appelbaum and Scurich (2014) used a 4(defense explanation) x 2(race) experimental vignette design to explore jurors' perceptions of criminal responsibility and punishment ($N = 250$). The four defense explanations included impulsivity, negative environment (child abuse), genetic predisposition, and both environment and genetics. The genetic predisposition did not directly affect participants' sentencing decisions; however, the genetic predisposition, in combination with a negative environment, did increase incarceration time imposed by the jurors. Further, those who received the combination condition were most fearful of the defendant.

In another web-based survey ($N = 960$), Appelbaum and colleagues (2015) explored public perceptions of criminal culpability and punishment using three hypothetical criminal case vignettes. This study incorporated genetic evidence and brain-imaging evidence; the researchers also manipulated previous criminal activity and heinousness of the crime. In all three cases, genetic evidence did not have a significant effect on decision-making in regards to length of incarceration, adjudication in an insanity defense, or imposition of a death sentence in a capital

murder case. Brain imaging had an inconsistent effect, while heinousness of crime and previous criminal activity had significant effects.

Cheung and Heine (2015) conducted three randomized experiments, one of which used a college student sample and the other two used Mechanical Turk (MTurk) workers, to examine the impact of genetic explanations on perceptions of the defendant, verdict, and sentencing ($N =$ 600). Across the three studies, there were no main effects for the genetic condition on sentence length or verdict. However, mediation analyses demonstrated that the genetic explanation led to lower perceptions of perceived control, which then predicted shorter sentences.

Finally, Costa and colleagues (forthcoming) used college students from two universities (N = 279) to examine potential jurors' perceptions of gene-specific evidence and its impact on charge and fearfulness of the defendant. This is the only potential juror study that used gene-specific evidence. The other juror pieces used vague statements regarding genetic evidence, but did not provide detail on the specific genes; thus, Costa et al. (forthcoming) is similar to the two pieces using judges as participants, which referenced a specific gene. Otherwise, this piece was intended to be a partial replication of Appelbaum and Scurich (2014) in regards to the format and questions posed. While originally eight vignettes, the analyses were run for four conditions: jealousy, negative environment (child abuse), genetic predisposition, and negative environment in combination with genetic risk. Once again, genetic risk did not significantly impact the criminal charge. However, individuals were more fearful of the defendant when genetic evidence was present (genetic evidence and genetic evidence plus a negative environment) (Costa et al., forthcoming).

These seven empirical studies have some common ground, but also provide us with mixed results. It is not terribly surprising that the seminal judges' piece and its German replication have inconsistent findings (Aspinwall et al., 2012; Fuss et al., 2015). The legal systems and cultures of

the United States and Germany vary. However, the potential juror pieces did have a consistent

finding that genetic evidence alone had no direct impact on decision-making (Appelbaum &

Scurich, 2014; Appelbaum et al., 2015; Cheung & Heine, 2015; Costa et al., forthcoming).

Further, studies found that when presented with evidence regarding a genetic predisposition

toward antisocial behavior, potential jurors were more fearful of the defendant (Appelbaum &

Scurich, 2014; Cheung & Heine, 2015; Costa et al., forthcoming). The current study aims to build

on this growing body of research.

Current Study

This study utilizes an experimental design to explore the effect of genetic evidence on

jurors' decision-making among a sample of community members. The study will expand on the

previous research that has been done on jurors' perceptions of genetic evidence by using

evidence that is gene-specific and scientific in nature (i.e. Appelbaum & Scurich, 2014;

Appelbaum et al., 2015; Cheung & Heine, 2015). Only one study to date has used gene-specific

evidence when exploring jurors' use of such evidence (Costa et al., forthcoming). Previously,

researchers used vague statements to explain that a defendant possessed a genetic predisposition

towards antisocial behavior. In real cases it is likely that the expert witness's testimony would be

complex and specific to the genes or genotype of the defendant. For instance, in *State v.*

Waldroup (2011), forensic psychiatrist Dr. Bernet testified that Waldroup possessed the variant of

the MAOA gene that has been linked to violent behavior (Haggerty, 2010). He also testified that

this genetic makeup, combined with Waldrop's history of child abuse, made the defendant

vulnerable to violent behavior. Dr. Bernet's testimony cited scientific studies finding that a

combination of these risk factors increases one's chances of becoming a violent offender, but he

also discussed research that had not found a connection between the gene and violence. In the

current study, we incorporated evidence that is more complex and scientific in nature, with research cited, to increase the ecological validity of the study. Also, past research shows jurors may be easily persuaded by highly complex, scientific evidence (Lieberman, Carrell, Miethe, & Krauss, 2008). Therefore, our study explores whether molecular genetic evidence is more persuasive to jurors than general statements of genetic predisposition. The genetic evidence presented in this study contains statements regarding a specific genetic allele, the systems involved (i.e. dopamine receptor), and research findings that link the allele to antisocial behaviors.

The current study examines the effect of one specific genetic polymorphism, DRD4 7 repeat (7R), presented as evidence by the defense to explain the defendant's criminal behavior. DRD4 is a dopamine receptor gene that is part of the dopaminergic system. Individuals who possess at least one allele with 7 repeats (a long allele) are more inclined to engage in sensation-seeking behaviors (Garcia et al., 2010). Specifically, research has linked the DRD4 7R polymorphism to aggressive behavior among children (Bakermans-Kranenburg & Van IJzendoorn, 2006), and sexual promiscuity and infidelity among young adults (Garcia et al., 2010). While the seminal piece of research in this area (Aspinwall et al., 2012) used MAOA evidence, we chose to use a genetic allele that is not as popular in the media as MAOA, yet has still been empirically linked to antisocial outcomes. MAOA has received media attention, being labeled the "warrior gene", and appearing in popular TV shows (i.e. The Blacklist, season 2, episode 4). We chose to use a genetic polymorphism that might not be as recognizable to the general public to potentially reduce the effects that their prior knowledge of the genetic information could have on their legal decision-making.

In this study we examine the question of whether gene-specific evidence influences jurors' legal decision-making. The research on this topic has found that genetic explanations for criminal behavior alone tend not to have a significant effect on jurors' legal decision-making (Appelbaum & Scurich, 2014; Appelbaum et al., 2015; Cheung & Heine, 2015; Costa et al., forthcoming). However, some studies have found that evidence of genetic predisposition influences jurors' perceptions of the defendant, leading individuals to feel more fearful of the defendant (Appelbaum & Scurich, 2014; Cheung & Heine, 2015) and believing the defendant lacked control over his behaviors (Cheung & Heine, 2015). The current study took an exploratory approach to determine whether differences would be observed in jurors' legal decision-making, as well as their perceptions of the defendant, when provided with gene-specific evidence as an explanation for a defendant's behavior versus other types of evidence.

Methods

Participants and Study Design

Participants from a convenience sample were recruited through Amazon's Mechanical Turk (MTurk). MTurk is an online marketplace run by Amazon that has nearly 100,000 users from over 100 countries (Pontin, 2007). It is a useful resource for collecting research participants that are more diverse than typical Internet or college student samples (Buhrmester, Kwang, & Gosling, 2011). Another benefit of recruiting participants through MTurk is that the participants recruited produce data that is reliable and consistent (Buhrmester et al., 2011; Holden, Dennie, & Hicks, 2013). The use of Internet surveys is often criticized due to their lack of consistency. However, Holden and colleagues (2003) found that MTurk users have a high degree of reliability when completing simple tasks and longer surveys.

For the current study, participants were given $0.75 for completion of the survey. However, this compensation amount should not have any effect on data quality; MTurk workers are typically intrinsically motivated and low compensation has not been found to decrease data quality (Buhrmester et al., 2011). All participants were also required to live in the United States and be at least 18-years-old in order to participate, which are some minimum requirements of jurors in the United States. Through the use of MTurk, the study collected responses from 272 participants. The survey included a manipulation check question asking participants to identify the reason the defense lawyer argued that the defendant's sentence should be reduced. Individuals not answering this question correctly were excluded from the analysis sample. After removing individuals that failed the manipulation check, the sample was reduced to 230 participants (84.56%).

The study implemented an experimental design, randomly assigning participants to one of four conditions. From MTurk, all participants clicked a link to an online survey in Qualtrics. Participant responses were confidential and recorded through Qualtrics. Once in Qualtrics, participants were presented with an informed consent that provided a brief description of the study. After providing consent, participants were then randomly assigned to view one of four vignettes. The four vignettes included the same case summary describing the crime that took place. However, the vignettes varied in the explanations given for the defendant's behavior. The vignettes were created to be similar to the vignettes used in previous studies on jurors' perceptions of genetic evidence in a criminal trial (Appelbaum & Scurich, 2014; Costa et al., forthcoming).

The explanations offered in the vignettes were as follows: jealousy (comparison condition), child abuse (defendant was a victim of child abuse), genetic predisposition (DRD4

7R as the specific genetic evidence), or child abuse and genetic predisposition (defendant was a victim of child abuse and possesses DRD4 7R). For each condition, it was stated that the defendant's lawyer made the argument provided in the vignette. For the vignettes that included evidence of a genetic predisposition, it was stated that, in addition, an expert witness testified regarding the risk allele, DRD4 7R, and the behaviors often seen among individuals who possess this risk allele.

After reading the vignettes, participants were asked to give a verdict for the charge of first-degree murder. Individuals were given a definition of first-degree murder based upon Florida state law; the definition referenced the Florida statute that describes the conditions for first-degree murder. Display logic was utilized within Qualtrics. If participants selected "guilty" for the charge of first-degree murder, they moved on to the sentencing question. If participants selected "not guilty" as a verdict for the first-degree murder charge, they were asked to give a verdict for the charge of second-degree murder. Again, individuals were given a definition of second-degree murder based upon Florida state law, which referenced the Florida statute that describes the conditions for second-degree murder. Display logic was again utilized; if participants selected "guilty" for the charge of second-degree murder, they were shown the sentencing question next. If participants selected "not guilty" as a verdict for the second-degree murder charge, they were given the definition of manslaughter based upon Florida state law, as well as the Florida statute, and asked to give a verdict for the lesser charge of manslaughter. Table 1 displays the frequency of selected verdicts across charges.

Variables

Verdict. Participants were asked to give a verdict for the charge of first-degree murder, defined as an intentional killing that was deliberate and planned. Approximately half of the

sample chose to give a guilty verdict for first-degree murder (Table 1). Verdict was a dichotomous measure; participants either selected "guilty" or "not guilty" when prompted. Given that first-degree murder was the most punitive charge, we chose first-degree murder verdict as the main dependent variable.

Criminal responsibility. Participants were asked to rate their perception of the defendant's level of criminal responsibility for the murders. Specifically, they were asked, "please indicate on the scale below how criminally responsible you felt that Michael is for the deaths of the two victims on a scale from 1-10, with 1 being not at all criminally responsible and 10 being completely criminally responsible."

Fear of the defendant. Participants were asked to rate their level of agreement with two statements measuring their fear of the defendant. The statements read, "I would be afraid if I knew the defendant was walking on the streets" and, "I think that it is likely that someone will be a victim of this defendant if he is released." Response options to the fear statements were on a 5-point Likert scale ranging from 1 "strongly disagree" to 5 "strongly agree." The two variables were significantly and positively correlated ($r = 0.774$, $p = 0.000$). Scores were averaged across the two statements for each participant to create an average item response, with higher scores indicating more fear of the defendant.

Experimental conditions. As previously stated, participants were randomized into one of four conditions. The conditions varied by the explanations given for the defendant's behavior by the defense. The four conditions included: jealousy, child abuse, genetic risk, and child abuse *and* genetic risk. Jealousy as an explanation for the defendant's behavior was only presented in one vignette. For analysis purposes these conditions were recoded as dummy variables and the jealousy condition served as the reference category in the regression models.

Control variables. Three control variables were included in the analyses: *race*, *sex*, and *age*. *Race* was a dichotomous variable coded 0 (non-white) or 1 (white). *Sex* was a dichotomous variable coded 0 (female) or 1 (male). Age was measured with an open-ended question that asked, "How old are you?" and the study participants filled in a numerical value in years. Of the 230 participants included in the analysis sample, approximately half were female 50.87% ($n = 117$). As for race, 77.39% of the sample was white ($n = 178$) and 22.61% ($n = 52$) was non-white. The participants ranged in age from 18 to 74 years, and the average was 39 years of age (See Table 2).

Analytic Strategy

Our analysis examined whether different types of evidence provided by the defense as an explanation for the defendant's behavior (i.e., child abuse, genetic risk, or child abuse and genetic risk) would influence potential jurors' decisions regarding verdict, criminal responsibility of the defendant, and fear of the defendant. First, a logistic regression was estimated to determine whether the evidence presented was associated with participants' verdict decision for first-degree murder. Next, two Ordinary Least Squares (OLS) regressions were estimated to determine whether the evidence presented was associated with jurors' perceptions of the defendant's level of criminal responsibility and jurors' fearfulness of the defendant. In all regression models, dummy variables for the experimental conditions were included as predictors, and the jealousy condition was the reference group. Finally, a mediation analysis was estimated to determine whether an association between evidence manipulation and first-degree murder verdict was mediated by participants' perceptions of the defendant.

Results

Table 3 shows odds ratios from the logistic regression predicting participants' selection of verdict for first-degree murder. The model was statistically significant (Chi-square $=37.366$, $p <$

0.001). Fear of the defendant had a significant effect on verdict (OR = 1.557, p = 0.002). As individuals' ratings of fearfulness of the defendant increased, the more likely they were to give a guilty verdict. Age also had a near significant, positive effect on verdict (OR = 0.977, p = 0.054). As age increased, individuals were more likely to give a guilty verdict. None of the experimental conditions had a significant effect on participants' selection of verdict as compared to the reference group jealousy. However, in a simple Chi-square analysis, there was a significant interaction between evidence manipulation and first-degree murder verdict (χ^2 (3, N = 230) = 13.303, p = 0.004). Individuals that were given evidence of a genetic predisposition were more likely to give a guilty verdict than individuals in the jealousy condition (Table 4).

Table 5 shows results from an OLS regression examining the effect of the evidence manipulation on perceived level of criminal responsibility. The model was statistically significant (F = 7.158, $p < 0.001$) and explained 15.8 percent of the variance in criminal responsibility ratings. Genetic predisposition had a significant effect on perceived criminal responsibility (b = -0.865, p = 0.002). Individuals in the genetic predisposition condition perceived the defendant as less criminally responsible than individuals in the jealousy condition. Fear of the defendant was also significantly associated with criminal responsibility (b = 0.483, $p < 0.001$). As individuals' ratings of fearfulness increased, so did their perceptions of the defendant's criminal responsibility. For demographic variables, both race and age were significant predictors of criminal responsibility (b = 0.534, p = 0.022; b = 0.021, p = 0.007, respectively). White individuals believed the defendant was more criminally responsible than non-white individuals. Also, as participants' age increased, their perceptions of the defendant's criminal responsibility increased.

Finally, Table 6 shows results from an OLS regression examining the effect of the evidence manipulation on fear of the defendant. The model predicting fear of the defendant was significant ($F = 8.376$, $p < 0.001$) and explained 18.4 percent of the variance in fear ratings. Two of the evidence manipulation conditions were significant in predicting fear: genetic predisposition alone ($b = 0.943$, $p = 0.000$) and the condition combining child abuse *and* a genetic predisposition ($b = 0.430$, $p = 0.032$). Participants in both conditions were more fearful of the defendant than individuals in the jealously condition. Figure 1 displays the mean fearfulness ratings across condition. Age was also a significant predictor of fearfulness ratings ($b = -0.021$, $p < 0.001$). As age of the participant increased, fear of the defendant decreased. Overall, the genetic predisposition condition was the most important predictor for fear of the defendant ($\beta = 0.377$).

Mediation Analysis

Interestingly, there was a significant interaction between evidence manipulation and verdict for first-degree murder using a Chi-square analysis, yet none of the evidence manipulation dummy variables significantly predicted verdict in the logistic regression. Also, a previous regression model found that genetic predisposition, alone and in combination with child abuse, was significantly related to higher fearfulness ratings ($b = 0.943$, $p = 0.000$, $b = 0.430$, $p = 0.032$, respectively). This led us to conduct an exploratory mediation analysis (figure 2) to determine whether the evidence manipulations influenced first-degree verdicts through participants' fearfulness.

First, we ran a series of simple regressions, without control variables, to determine whether the evidence manipulations predicted fear of the defendant (path a) and first-degree verdict (path c), and to determine whether fear of the defendant predicted verdict on its own (path b). The OLS

regression predicting fear (to test path a) was significant ($F = 4.852$, $p = 0.003$). Again, both genetic predisposition and genetic predisposition in combination with child abuse led to greater fear of the defendant ($b = 0.755$, $p = 0.000$, $b = 0.424$, $p = 0.050$, respectively). The logistic regression predicting first-degree verdict (to test path c) was also significant (Chi-square = 13.466, $p = 0.004$). Evidence of a genetic predisposition led to more guilty verdicts for first-degree murder as compared to evidence of jealousy (OR = 2.323, $p = 0.023$). Finally, the second logistic regression predicting first-degree verdict (to test path b) was also significant (Chi-square = 19.446, $p < 0.001$). As fear of defendant increased, individuals were more likely to give a guilty verdict for the first-degree murder charge (OR = 1.706, $p < 0.001$).

Next, we created bias-corrected 95% confidence intervals via bootstrapping with 10,000 resamples using the PROCESS procedure for SPSS (Hayes, 2013). This analysis allowed us to determine whether fear of the defendant mediated the relationship between evidence of a genetic predisposition and first-degree murder verdict. The analysis indicated that the indirect effect coefficient was significant, $b = 0.2550$, SE = 0.1032, $p = 0.016$, 95% CI = 0.963, 0.5114, which supported the assumption that evidence of genetic predisposition and verdict is mediated by fear of the defendant.

Discussion

The current study used a randomized experiment to determine whether differences would be observed in jurors' legal decision-making, as well as their perceptions of the defendant, when provided with gene-specific evidence as an explanation for a defendant's behavior versus other explanations without gene-specific evidence. We found that evidence of a specific genetic predisposition alone led to the greatest proportion of guilty verdicts for the charge of first-degree

murder. Gene-specific evidence alone was the only evidence condition that significantly predicted first-degree murder verdict. This is the first study on jurors' perceptions of gene-specific evidence to find a significant effect of such evidence on verdict. This new finding may be due to the increased ecological validity of the stimulus materials (as compared to Appelbaum & Scurich, 2014; Appelbaum et al., 2015; Cheung & Heine, 2015) combined with the use of a community sample (as compared to Costa et al., forthcoming).

Further, this study found that evidence of a specific genetic predisposition, alone or in combination with childhood abuse, had statistically significant effects on participants' fear of the defendant. Gene-specific evidence alone was the most significant predictor of fearfulness; individuals given gene-specific evidence were more fearful of the defendant. This finding is consistent with past research, which shows that genetic explanations are associated with increased fear of the defendant (Appelbaum & Scurich, 2014; Cheung & Heine, 2015).

The most profound finding is the relationship between evidence of a specific genetic predisposition, fear of the defendant, and first-degree murder verdict. A mediation analysis found that the relationship between genetic predisposition and verdict was mediated by fear of the defendant. For the current study, the evidence of a genetic predisposition increased fearfulness of the defendant and, in turn, individuals' perceptions of the defendant (fearfulness) matched individuals' legal decision-making (verdict). These findings are consistent with past research, which has found that a genetic predisposition may cause an individual to fear the defendant because such evidence implies that the defendant lacks control of his behavior (Berryessa, 2014). Likewise, Pescosolido and colleagues (2010) found that individuals are more likely to perceive persons with a genetic predisposition for mental disorders to be more dangerous. Typically, perceptions of future dangerousness are aggravating in nature, leading to more punitive legal

outcomes (Garvey, 1988; Shapiro, 2008; White, 1987). Previous research has found that while individuals may be more fearful or apprehensive of a defendant with a genetic predisposition towards deviant behavior, genetic predisposition alone does not tend to increase punitive outcomes (Appelbaum & Scurich, 2014; Appelbaum et al., 2015; Cheung & Heine, 2015; Costa et al., forthcoming). However, Cheung and Heine (2015) have found through mediation analyses that genetic predisposition does lead to more internal attributions of the defendant's behavior, which in turn lead to lengthier sentences. Our exploratory study stands out by revealing a consistent effect of the specific genetic predisposition as aggravating in nature, through fear of the defendant, at the guilt phase of a trial.

Limitations

Despite the current study's findings, there are several limitations that must be noted. One limitation of this study is the use of electronic surveys with a convenience sample of community members from Amazon's Mechanical Turk (MTurk). Past research has confirmed that traditional survey methods and electronic survey methods produce comparable results (Gosling, Vazire, Srivastava, & John, 2004). However, we should still proceed with caution when interpreting results from web-based surveys because it is difficult for researchers to know whether individuals carefully responded to the questions. Like those completing web-based surveys, one could argue that MTurk members will not carefully respond to the survey questions in order to simply receive their incentive. To combat this argument, past research has found that participants recruited via MTurk produce data that is reliable and consistent, regardless of the length of the task (Buhrmester et al., 2011; Holden et al., 2013). In order to minimize the concern of careless responding overall, we removed any individual ($n = 42$) who failed to correctly answer a manipulation check question that was intentionally added to our survey instrument.

Another limitation of the MTurk sample is the potential lack of representativeness. However, Berinsky, Huber, and Lenz (2012) found that samples drawn from MTurk are more representative than in-person convenience samples. Likewise, Buhrmester and colleagues (2011) found that MTurk samples are more representative of non-college populations than typical Internet samples. While an MTurk sample is less representative than a national probability sample, it is an efficient mechanism for sample recruitment when other resources are not readily available.

Despite attempts to increase the ecological validity of our stimulus materials, ecological validity is another limitation to acknowledge. The experimental materials provided were fairly short written descriptions of a trial and the evidence embedded within that trial, as compared to the lengthy, in-person, oral presentations that jurors would receive in a real criminal trial. It is difficult to determine whether the results would have changed had the case materials been presented in a different manner. However, research has revealed that there are very little differences in outcomes when using different trial media (Bornstein, 1999; Pezdek, Avila-Mora, & Sperry, 2010).

The results of the current study add to the literature, finding, unlike previous research, that evidence of a genetic predisposition does increase perceptions of a defendant's degree of culpability, particularly when that evidence is gene-specific. Given the relationship between gene-specific evidence and verdict in our study, it appears that more research needs to be conducted on the influence of gene-specific evidence on juror decision-making and jurors' comprehension of such evidence. To date, research has concluded that the legal system should not be concerned about genetic evidence being overly persuasive to jurors because the few published studies to date have shown that genetic evidence does not directly effect jurors' legal

decisions (Appelbaum & Scurich, 2014; Appelbaum et al., 2015; Cheung & Heine, 2015).

However, this could potentially change as this area of research starts to evolve.

The use of behavioral genetic evidence in the courtroom has increased in the United

States legal system (McSwiggan et al., 2017). It is likely that this trend will continue to grow as

new scientific studies on behavioral genetic evidence are developed (Gonzalez-Tapia & Obsuth,

2015). Traditionally, neuroscience evidence has been admitted during the sentencing phase of

trial in order to mitigate the punishment received by the defendant (Denno, 2015; Treadway &

Buckholtz, 2011). However, throughout the 11 cases cited by McSwiggan and her colleagues

(2017), gene-specific evidence, specifically MAOA evidence, was introduced at the guilt,

sentencing, and appellate phases. There is the potential for gene-specific evidence, when

introduced at the guilt phase, to persuade jurors to acquit a defendant or find him guilty of lesser-

included offenses that carry lower sentences. Only one case, *State v. Waldroup* (2011), provides

an example of the successful use of gene-specific evidence during the guilt phase of the trial. The

jurors in Waldroup's case found him guilty of voluntary manslaughter, rather than first-degree

murder, and attempted second-degree murder, sparing the defendant the death penalty. It is

unclear whether this decision was due to the genetic evidence specifically. Given the trend in the

use of gene-specific evidence in the courtroom, particularly in the guilt phase, it is important to

understand the effect of this evidence on potential jurors and the implications for the legal

system.

Much of the research on the effects of genetic evidence on the legal decision making of

jurors introduces the evidence at the beginning of the procedure, prior to asking questions about

verdict, charge, fearfulness, or responsibility (Appelbaum & Scurich, 2014; Appelbaum et al.,

2015; Cheung & Heine, 2015; Costa et al., forthcoming). Case examples provide some evidence

that regardless of which phase the gene-specific evidence is entered in, when such evidence is entered some defendants do receive a conviction for lesser offenses or reduced sentences (McSwiggan et al., 2017). While the direct effect of the gene-specific evidence on legal decisions in these cases cannot be determined, research studies allow for carefully controlled conditions giving the opportunity to determine whether gene-specific evidence might have a mitigating or aggravating effect at the guilt, sentencing, or appellate phase or no influence at all. In real cases scholars must be cautious in assuming the genetic evidence has no influence at all. It is difficult to tell in these real world examples when the genomic evidence, even when presented by the defense, may actually be considered an aggravating factor, leading jurors to impose long sentences or even the death penalty. For instance, in *State v. Driskill* (2015), at the sentencing phase a forensic psychiatrist testified that the defendant had a history of abuse as a child, he possessed the low activity MAOA genotype, and the combination of the two increased the odds of the defendant committing violent acts. Regardless of this testimony, the jury decided upon the death penalty. In the absence of a follow up with the jurors, it is difficult to determine whether the evidence had no influence at all or if it was viewed as an aggravating factor. Given the history of gene-specific evidence being admitted at different phases of a trial, future research should focus on determining the effects of gene-specific evidence at each phase of the trial process using carefully controlled conditions.

We can also look at the examples discussed by McSwiggan and her colleagues (2017) to understand how genetic evidence is typically presented in the trial. For instance, in *State v. Waldroup* (2011) two forensic psychiatrists testified, one provided by the defense and the other by the prosecution (as cited by Haggerty, 2010). The prosecution's expert testified that it is too early to use this type of research in court. Likewise, researchers have discussed the limitations of

using gene-specific evidence in forensic settings because the presence of a genotype does not necessarily predict psychopathy or violent behaviors (Treadway & Buckholtz, 2011). Researchers studying the effect of genetic evidence on jurors' decision-making can use these case examples as sources for increasing the ecological validity of their stimulus materials by providing detailed descriptions of the genetic evidence and research that has been conducted on the associations between such evidence and behavior, as well as limitations of genetic evidence.

Finally, informing jurors about research on genetic evidence, while also explaining the limitations of the influence of genetics on behavior in ways that are accurate, but easily understood, may be difficult to do (Cooper, Bennett, & Sukel, 1996). However, providing all of this information could help to alleviate concerns regarding the potential for genetic evidence to be misused in legal settings. It will be important for researchers to measure jurors' comprehension of the evidence provided to them as such evidence becomes more complex and multi-faceted. Much research has uncovered jurors' difficulties in comprehending pattern jury instructions (Dumas, 2000) given the complex sentence structure and legal jargon that the average individual does not come into contact with on a daily basis. Likewise, research has found that jurors also have difficulty comprehending complex expert testimony and tend to use heuristic cues, such as expert credentials, to make decisions about the evidence instead (Cooper et al., 1996). Given the research on jurors' comprehension of jury instructions and complex expert testimony, it seems fitting that we also explore juror comprehension of the genetic evidence presented to them during a trial.

As genetic evidence has become more accepted as admissible evidence in the U.S. court system, there must be continued discussions about how genetic evidence is used by lawyers, communicated in court by expert witnesses, and perceived by judges and jurors. We encourage

this on-going dialogue among researchers across the fields of biosocial criminology, forensic

psychiatry, and social psychology. It will also be imperative that researchers and legal actors

work together to bridge the gap between the research on genetic evidence in the courtroom and

the actual use of such evidence.

Table 1. *Frequency of Verdict Across Charge*

Charge	Verdict n (%)	
	Guilty	Not Guilty
First Degree Murder	124 (53.9)	106 (46.1)
Second Degree Murder	91 (85.8)	15 (14.2)
Manslaughter	12 (80.0)	3 (20.0)

Table 2. *Descriptive Statistics*

	Analysis Sample (N=230) n (%) or Mean (SD)
Vignettes	
Jealousy	57 (24.8)
Child abuse	54 (23.5)
Genetic predisposition	68 (29.6)
Child abuse + genetic predisposition	51 (22.2)
Dependent Measures	
First-degree guilty verdict	124 (53.9)
Criminal responsibility	9.1 (1.6)
Fear of defendant	3.5 (1.1)
Demographics	
White	178 (77.4)
Male	113 (49.1)
Age	38.8 (12.6)

Table 3. *Logistic Regression Predicting Verdict*

	OR	SE	*p-value*
Condition			
Child abuse	0.534	0.419	0.134
Genetic predisposition	1.727	0.418	0.191
Child abuse + genetic predisposition	1.488	0.415	0.338
Controls			
Age	0.977*	0.012	0.054
Sex (1=male)	1.081	0.293	0.790
Race (1=white)	0.516	0.370	0.074
Criminal responsibility	1.102	0.103	0.348

Fear of the defendant	1.557**	0.144	0.002
Constant	0.373		

Model Fit
Log Likelihood	280.071	
Pseudo R-Squared	0.150	
LR Chi-square (df)	37.366***	
N	230	

Notes. p < .05*, p < .01**, p < .001***

Table 4. *Frequency of First Degree Verdict Decisions Across Evidence Condition*

		Verdict for First Degree Murder Charge, n (%)	
Evidence	n	Guilty	Not Guilty
Jealousy	57	27 (47.4)	30 (52.6)
Child Abuse	54	20 (37.0)	34 (63.0)
Genetic Predisposition	68	46 (67.6)	22 (32.4)
Child Abuse + Genetic Predisposition	51	31 (60.8)	20 (39.2)
Total	230	124 (53.9)	106 (46.1)

Table 5. *OLS Regression Predicting Criminal Responsibility*

	b	SE	β	p-value
Condition				
Child abuse	-0.164	0.273	-0.045	0.550
Genetic predisposition	-0.865**	0.271	-0.255	0.002
Child abuse + genetic predisposition	-0.202	0.278	-0.054	0.468
Controls				
Age	0.021**	0.008	0.172	0.007
Sex (1=male)	-0.029	0.191	-0.009	0.880
Race (1=white)	0.534*	0.231	0.144	0.022

Fear of the defendant	0.483***	0.087	0.356	0.000

R^2	0.184	
Adjusted R^2	0.158	
F	7.158***	

Notes. $p < .05^*$, $p < .01^{**}$, $p < .001^{***}$

Table 6. *OLS Regression Predicting Fear of the Defendant*

	b	SE	β	p-value
Condition				
Child abuse	0.360	0.197	0.134	0.069
Genetic predisposition	0.943***	0.191	0.377	0.000
Child abuse + genetic predisposition	0.430*	0.200	0.157	0.032
Controls				
Age	-0.021***	0.006	-0.226	0.000
Sex (1=male)	-0.093	0.139	-0.041	0.504
Race (1=white)	-0.026	0.169	-0.009	0.881
Criminal responsibility	0.255***	0.046	0.345	0.000

R^2	0.209	
Adjusted R^2	0.184	
F	8.376***	

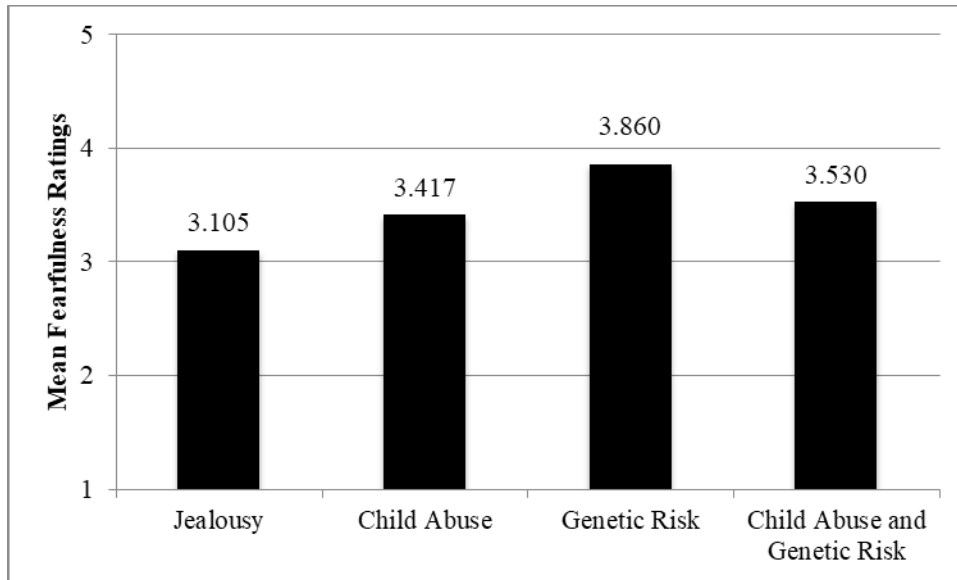*Notes. $p < .05^*$, $p < .01^{**}$, $p < .001^{***}$*

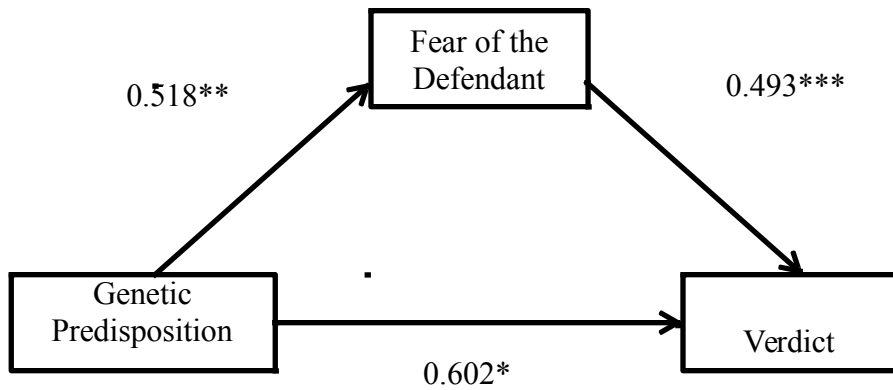Figure 1. *Mean Scores of Fearfulness of the Defendant by Evidence Condition*

Figure 2. *Mediation Between Evidence of a Genetic Predisposition and Verdict by Fear of the Defendant*

Notes. p < .05*, p < .01**, p < .001***

References

Appelbaum, P. S., & Scurich, N. (2014). Impact of behavioral genetic evidence on the

adjudication of criminal behavior. *Journal of the American Academy of Psychiatry and*

the Law, *42*(1), 91-100.

Appelbaum, P. S., Scurich, N., & Raad, R. (2015). Effects of behavioral genetic evidence on

perceptions of criminal responsibility and appropriate punishment. *Psychology, Public*

Policy, and Law, 21(2), 134-144.

Aspinwall, L. G., Brown, T. R., & Tabery, J. (2012). The double-edged sword: Does

biomechanism increase or decrease judges' sentencing of psychopaths? *Science*,

337(6096), 846-849. doi: 10.1126/science.1219569

Bakermans-Kranenburg, M. J., & Van IJzendoorn, M. H. (2006). Gene-environment interaction

of the dopamine D4 receptor (DRD4) and observed maternal insensitivity predicting

externalizing behavior in preschoolers. *Developmental Psychobiology*, *48*(5), 406-409.

doi: 10.1002/dev.20152

Berinsky, A. J., Huber, G. A., & Lenz, G. S. (2012). Evaluating online labor markets for

experimental research: Amazon.com's Mechanical Turk. *Political Analysis, 20*(3), 351-

386. doi: 10.1093/pan/mpr057

Berryessa, C. M. (2014). Potential implications of research on genetic or heritable contributions

to pedophilia for the objectives of criminal law. *Recent Advances in DNA Gene*

Sequences, 8(2), 65-77. doi: 10.2174/2352092209666141211233857

Berryessa, C. M. (2016). Judges' views on evidence of genetic contributions to mental disorders

in court. *The Journal of Forensic Psychiatry & Psychology, 27*(4), 586-600. doi:

10.1080/14789949.2016.1173718

Bornstein, B. (1999). The ecological validity of jury simulations: Is the jury still out? *Law and Human Behavior, 23*(1), 75-91.

Brunner, H. G., Nelen, M. R., Van Zandvoort, P., Abeling, N. G., Van Gennip, A. H., Wolters, E. C., Kuiper, M .A., Ropers, H. H., & Van Oost, B. A. (1993). X-linked borderline mental retardation with prominent behavioral disturbance: Phenotype, genetic localization, and evidence for disturbed monoamine metabolism. *American Journal of Human Genetics*, *52*(6), 1032-1039.

Buhrmester, M., Kwang, T. & Gosling, S. D. (2011). Amazon's Mechanical Turk: A new source of inexpensive, yet high quality, data? *Perspectives on Psychological Science, 6*(1), 3-5.

Caspi, A., McClay, J., Moffitt, T. E., Mill, J., Martin, J., Craig, I. W., Taylor, A., & Poulton, R. (2002). Role of genotype in the cycle of violence in maltreated children. *Science*, *297*(5582), 851-854. doi: 10.1126/science.1072290

Costa, E., Pate, M., & Gibson, C. (forthcoming). Can molecular genetic evidence influence jurors' perceptions of a defendant? Results from a randomized experiment. *Criminal Justice and Behavior.*

Cooper, J., Bennett, E. A., & Sukel, H. L. (1996). Complex scientific testimony: How do jurors make decisions? *Law and Human Behavior, 20*(4), 379-394. doi: 10.1007/BF01498976

Cheung, B. Y. & Heine, S. J. (2015). The double-edged sword of genetic accounts of criminality: Causal attributions from genetic ascriptions affect legal decision making. *Personality and Social Psychology Bulletin, 41*(12), 1723-1738.

Denno, D. W. (2009). Behavioral genetics evidence in criminal cases: 1994-2007. In N. A. Farahany (Ed.), *The impact of behavioral sciences on criminal law* (pp. 317-354). Oxford University Press.

Denno, D. W. (2011). Courts' increasing consideration of behavioral genetics evidence in

    criminal cases: Results of a longitudinal study. *Michigan State Law Review*, *2011*, 967-

    1047.

Denno, D. W. (2015). The myth of the double-edged sword: An empirical study of neuroscience

    evidence in criminal cases. *Boston College Law Review, 56,* 493-551.

Dumas, B. (2000). Jury trials: Lay jurors, pattern jury instructions, and comprehension issues.

    Tennessee Law Review, 67(3)*,* 701-742.

Farahany, N. A. (2016). Neuroscience and behavioral genetics in US criminal law: An empirical

    analysis. *Journal of Law and the Biosciences*, *2*(3), 485-509. doi: 10.1093/jlb/lsv059

Ficks, C.A., & Waldman, I.D. (2014). Candidate genes for aggression and antisocial behavior: A

    meta-analysis of association studies of the 5HTTLPR and MAOA-*u*VNTR. *Behavior

    Genetic*s, *44* (5), 427-444. doi: 10.1007/s10519-014-9661-y

Fuss, J., Dressing, H., & Briken, P. (2015). Neurogenetic evidence in the courtroom: A

    randomised controlled trial with German judges. *Journal of Medical Genetics*, *52*(11),

    730-737. doi: 10.1136/jmedgenet-2015-103284

Garcia, J. R., MacKillop, J., Aller, E. L., Merriwether, A. M., Wilson, D. S., & Lum, J. K. (2010).

    Associations between dopamine D4 receptor gene variation with both infidelity and

    sexual promiscuity. *PLoS One*, *5*(11), 1-6. doi: 10.1371/journal.pone.0014162

Garvey, S. P. (1998). Aggravation and mitigation in capital cases: What do jurors think?

    Columbia Law Review, 98(6)*,* 1538-1576. doi: 10.2307/1123305

Gonzalez-Tapia, M. & Obsuth, I. (2015). "Bad genes" & criminal responsibility. *International

    Journal of Law and Psychiatry, 39,* 60-71. doi: 10.1016/j.ijlp.2015.01.022

Gosling, S. D., Vazire, S., Srivastava, S., & John, O. P. (2004). Should we trust web-based

studies? A comparative analysis of six preconceptions about Internet questionnaires. *American Psychologist, 59*(2), 93-104.

Haggerty, B. B. (2010, July 1). Can your genes make you murder? *National Public Radio.* Retrieved from http://www.npr.org/templates/story/story.php?storyId=128043329

Hayes, A. F. (2013). *Methodology in the social sciences: Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York, NY: The Guilford Press.

Holden, C. J., Dennie, T., & Dicks, A. D. (2013). Assessing the reliability of the M5-120 on Amazon's Mechanical Turk." *Computers in Human Behavior, 29*(4), 1749-1754.

Lieberman, J. D., Carrell, C. A., Miethe, T. D., & Krauss, D. A. (2008). Gold versus platinum: Do jurors recognize the superiority and limitations of DNA evidence compared to other types of forensic evidence. *Psychology, Public Policy, and Law, 14*(1), 27-62. doi: 10.1037/1076-8971.14.1.27

McSwiggan, S., Elger, B., & Appelbaum, P. S. (2017). The forensic use of behavioral genetics in criminal proceedings: Case of the MAOA-L genotype. *International Journal of Law and Psychiatry, 50*, 17-23. doi: 10.1016/j.ijlp.2016.09.005

Mobley v. State, 265 Ga. 292, 455 S.E.2d 61 (Ga. Sup. Ct. March 17, 1995).

Pescosolido, B. A., Martin, J. K., Long, J. S., Medina, T. R., Phelan, J. C., & Link, B. G. (2010). "A disease like any other"? A decade of change in public reactions to schizophrenia, depression, and alcohol dependence. *American Journal of Psychiatry, 167*(11), 1321-1330. doi: 10.1176/appi.ajp.2010.09121743

Pezdek, K., Avila-Mora, E., & Sperry, K. (2010). Does trial presentation medium matter in jury

    simulation research? Evaluating the effectiveness of eyewitness expert testimony.

    Applied Cognitive Psychology, 24(5)*,* 673-690. doi: 10.1002/acp.1578

Pontin, J. (2007, March 25). Artificial intelligence: With help from the humans. *The New York*

    Times. Retrieved from

    http://www.nytimes.com/2007/03/25/business/yourmoney/25Stream.html

Shapiro, M. (2008). An overdose of dangerousness: How 'future dangerousness' catches the

    least culpable capital defendants and undermines the rationale for the executions it

    supports. *American Journal of Law, 35*, 145-200. doi: 10.2139/ssrn.1402362

State v. Waldroup, No. E2010-01906-CCA-R3-CD, 2011 WL 5051677 (Tenn. Crim. App. Mar.

    29, 2011).

State v. Driskill, 459 S.W.3d 412 (Mo. 2015).

Treadway, M. T. & Buckholtz, J. W. (2011). On the use and misuse of genomic and

    neuroimaging science in forensic psychiatry: Current roles and future directions. *Child*

    and Adolescent Psychiatric Clinics of North America, 20(3), 533-546. doi:

    10.1016/j.chc.2011.03.012

White, L. (1987). Juror decision making in the capital penalty trial. *Law and Human Behavior,*

    11(2), 113-130. doi: 10.1007/BF01040445

EXAMINING EXPERIENCES OF VICTIMIZATION AND CONFIDENCE IN THE CRIMINAL JUSTICE SYSTEM*

SRIRAM CHINTAKRINDI, ABU MBOKA, PHYLLIS GERSTENFELD, and CHAU-PU CHIANG[5]

ABSTRACT

In this study, using a multinational sample (N = 1471), we analyze the relationship between self-reported experiences of victimization and confidence in the criminal justice system. According to Tyler's (2003) theory of procedural justice, individuals evaluate the fairness of the criminal justice system based on their personal and observed experiences with administrators and practitioners of justice (e.g. law-enforcement, correctional officers, prosecutors, and judges). Individual and collective judgments about the criminal justice system range from beliefs that the criminal justice system is a legitimate authority and institution that society should be compliant towards or an illegitimate authority that should be disregarded and defied (Tyler, 2003). For this study, we hypothesize that increased experiences of victimization are negatively associated with confidence in the criminal justice system. The results from our study generally support our hypothesis that increased experiences of victimization are negatively associated with confidence in the criminal justice system. However, we also find that socio-demographic characteristics, included as control variables in our statistical model, influence confidence in the criminal justice system.

KEYWORDS

victimization, punishment, policy, procedural justice, confidence

[5] Department of Criminal Justice, California State University, Stanislaus

* **Corresponding Author:** Sriram Chintakrindi, Department of Criminal Justice, California State University, Stanislaus, Bizzini Hall C125, Turlock, CA 95382 (e-mail: schintakrindi@csustan.edu)

The conceptualization and measurement of perceptions of fairness and confidence in the criminal justice system, from a policy perspective, are important to consider for both scholars and practitioners of criminal justice, because they are important latent indicators about the efficacy of the criminal justice system in maintaining public safety, holding offenders accountable, and offering justice for victims of crime. Examining perceptions of fairness and confidence in the administration of justice allows scholars to understand the various sociological, psychological, and criminological factors and variables that influence micro- and macro- level evaluations of the criminal justice system.

This study uses self-report data from a multinational sample (N = 1471) of survey respondents to decompose the relationship between experiences of victimization and confidence in the criminal justice system. We hypothesize that there is a strong relationship between individuals who have experiences with being victimized and having a low confidence in the criminal justice system. Using survey data collected from a Comparative Study of Student Attitudes towards Punitiveness and Gay and Lesbian Issues (Gerstenfeld et al., 2015), we examine respondents' experiences of victimization and perceptions of confidence in the criminal justice system.

First, we examine whether respondents experienced victimization. Based on the findings, from the extant literature, we seek to replicate whether respondents who have experienced victimization will report lower levels of confidence in the criminal justice system (Roberts, 2007; Bradford, 2011). We theorize that victims generalize their experiences and assume that the criminal justice system is ineffective at protecting them or others (Cao, Frank, and Cullen, 1996; Roberts, 2007).

Literature Review

Examining Procedural Justice Theory and Its Relationship to Perceptions of Fairness

The procedural justice model posits that the perceptions of fairness held by individuals, regarding their treatment and interactions with the authorities impacts their overall confidence in the criminal justice system. Tyler (2003) developed the process-based model of regulation to demonstrate how the police and courts gain the long-term compliance and obedience of the public through their interactions, investigations, and treatment of individuals in the community. The process-based model is concerned with how the legal system functions through the use of policies and the enforcement of laws to gain compliance and authoritative control of the public. Public cooperation plays an integral and essential role in permitting the criminal justice system to enforce and uphold the laws of society. Therefore, if the justice system fails to garner the support, trust, and compliance of the public, then the public will perceive it as an illegitimate authority.

Recent U.S. history has repeatedly demonstrated that perceptions of unfairness, public distrust, suspicion of the authorities, and low confidence in the criminal justice system erodes public safety and creates the conditions for civil unrest and disobedience towards the authorities (Kochel, 2015; Kochel, 2016). Perceptions of illegitimacy regarding the criminal justice system escalates rapidly when members of the public believe that the perpetrators of victimization are either members of the general public who are provided with immunity or acquitted of charges by the justice system in the face of overwhelming evidence indicting the perpetrator(s) of violence. Alternatively, members of the public may hold the view that the perpetrator(s) of victimization and violence are in fact agents of the criminal justice system themselves, such as, law enforcement or correctional officers, who engage in behavior that is perceived as violent,

disproportionate, unjust, and unconstitutional.

Mack and Roberts-Lewis (2016) discuss how the case of the extrajudicial killing of an unarmed African-American teen, Trayvon Martin, by an armed private security guard, George Zimmerman, on February 26, 2012, signifies and captures the social and judicial cost of ignoring the plight of victims of violence. This case highlights how immunities granted to perpetrators of violence, through the invocation of the Stand Your Ground law sparked outrage, protests, and civil unrest among the African American community who perceived that the case outcome is another piece of evidence that the justice system is an enabler of racial profiling and violence in minority and African-American communities and that the justice system is not acting as an agent of public safety to hold offenders accountable.

Kochel (2015) surveyed a sample (N=389) of residents in St. Louis County, MO following the alleged police shooting of Michael Brown in Ferguson, MO on August 9, 2014 and found that African American respondents reported a nearly 15% decrease in perceptions of procedural justice and trust in the criminal justice system over a two year period from May 2012 (60%) to October 2014 (45%). Additionally, 24% of respondents reported law enforcement used excessive force to suppress protests and civil unrest following the shooting in Ferguson. Perceptions of police legitimacy decreased by nearly 7% from May 2012 (68%) to October 2014 (61%) following the shooting. Collectively, these findings reflect the detrimental impact that publicized instances of victimization perpetrated allegedly by the police can have on the general consensus and confidence that the community has in the criminal justice system for maintaining public safety, enforcing the law, and maintaining order.

The process-based model argues that the publics' subjective evaluation of the fairness of legal procedures determines whether the public will have confidence and trust in the criminal

justice system, which ultimately influences citizens' compliance with laws and their obedience to authority. The decision to comply with the law is argued to be linked to evaluations of procedural justice and perceptions of fairness (Tyler, 2003). Therefore, victims of crime and violence should theoretically perceive that either the justice system is not doing enough to protect the community or that the justice system is not doing enough to hold offenders accountable, which then impacts overall sentiment, trust, and confidence in the criminal justice system.

An individual's legal orientation, perceptions of legitimacy, or legal cynicism towards the justice system is linked to their deep-rooted psychological evaluations of treatment by administrators and practitioners representing the criminal justice system. Tyler (2003) discusses how the legal orientation of an individual is the strongest predictor of offending behavior. Individuals' with cynicism and anger towards the authorities have a higher likelihood of offending compared to individuals who perceive the authorities as legitimate agents of justice. Also, procedural justice theory assumes that perceptions of failure on the part of the criminal justice system to serve and protect victims of crime maybe linked to low confidence in the criminal justice system (Tyler, 2003). Therefore, understanding the relationship between experiences of victimization and confidence in the criminal justice is essential for designing and implementing policies that promote public safety, justice for crime victims, and holding offenders accountable for their actions.

The Supreme Court of the United States ruled in *Payne v. Tennessee*, 501 U.S. 808 (1991), that victim impact statements and testimony is admissible and does not violate the U.S. Constitution's eighth amendment prohibition against cruel and unusual punishment, if the evidence is admitted during the sentencing phase of a trial in death penalty cases (Fahey, 1992). This case overturned the ruling in two prior cases: *Booth v. Maryland* (1987) and *South Carolina*

v. Gathers (1989), in which the courts ruled in favor of the defendants' right against victim

impact statements and family member testimony being presented to the jury.

This decision by the Supreme Court was applauded and hailed by crime victims, their

families, and victim advocates as a coup de grâce against what is perceived as an often

impersonal, sterile, or bureaucratic criminal justice system that fails to acknowledge or account

for individual experiences of victimization. Arguably, no other case in the U.S. Court System has

improved confidence in the criminal justice system for crime victims to the degree in which

Payne v. Tennessee (1991) has had an impact on criminal procedure across the U.S., due to the

introduction of victim impact statements increasing the likelihood of capital punishment

sentencing for offenders (Aguirre, Davin, Baker, Lee, 1999).

**Examining the Factors that Influence Victim Trust and Confidence in the Criminal Justice
System**

Research conducted by Cao, Frank, and Cullen (1996) examined how race and

community context impacts confidence in police. They tested the relationship between fear of

crime and being a victim of crime as contextual factors in their models when examining the

relationship between race and confidence in the police. The authors argue that increased

experiences of victimization are often times positively correlated with increased negative

perceptions towards the police. Cao et al. (1996) also looked at ideology and its indirect effects

on the relationship between race and confidence in the police, and concluded that support for the

police is positively correlated with support for the conservative ideology.

Cao et al. (1996) looked at a third contextual factor by analyzing perceptions of

"incivility" in the community. Incivility refers to social disorder (e.g. noisy neighbors,

unsupervised teenagers) and physical disorder (e.g. graffiti, poorly maintained property). The

assumption is that increased levels of incivility in a community are a strong indicator of lack of police control within the community. Cao et al. (1996) also examined "informal collective security" – whether community residents support or protect one another can be linked to two competing hypotheses. The first hypothesis being that increased and effective "informal collective security" can lead to confidence in the police, if the activities that the community is engaged in are sanctioned by the police. However, their second hypothesis states that communities that feel abandoned by the police may turn to "collective informal security" as a means of providing safety and security for another. Communities that feel abandoned by the police may turn to "collective informal security" as a means of providing safety and security for one another (Cao et al., 1996). Findings from their study show that increased perception of incivility were negatively associated with confidence in the police. However, increased confidence in informal collective security was positively associated with confidence in the police.

Cao et al. (1996) argue community conditions are salient, because beliefs about collective efficacy are constantly being "cognitively accessed" by residents within neighborhoods and communities. Residents' cognitive assessment and evaluation of collective efficacy influences their attitudes towards the police. Rather than primarily relying on a static factor, such as, race as a determinant of confidence in the police, Cao et al. (1996) posit that residents of a community strongly consider the impact of contextual factors, which are more dynamic and appear to be a stronger indicator of not only confidence in the police and the criminal justice system, but probably of other institutions in a community tasked with maintaining social order, public safety, and social-welfare.

Ren, Cao, Lovrich, & Gaffney (2005) examined data collected from a series of

community policing initiatives in order to study the relationship between police performance and

confidence in the police. Their results demonstrate that victimization experiences and traffic

tickets significantly reduced the confidence that the community had in the police. Contrary to

previous research conducted by Carter (1985); Ren et al., (2005) found that frequent voluntary

contacts between the police and the community members increased trust and confidence in the

police. However, the nature of the contacts, officer training, and community demographics may

have varied widely between the experiences of respondents surveyed in the studies conducted by

Carter (1985) and Ren et al., (2005). Given the mixed results, it is important to emphasize that

police contacts remain an important component of the community policing model, which the

paradigm assumes will facilitate increased perceptions of fairness and trust between the police

and the community (Goldstein, 1987).

Roberts (2007) examined confidence in the Canadian criminal justice system and found

that 57% of respondents indicated having a positive level of confidence and that 34% had a

negative level of confidence in the criminal justice system. Similarly, respondents had high-

levels of confidence in the school system (65%) and in the health care system (67%). However,

only 41% of respondents had confidence in the welfare system, though confidence in public

institutions is similar to levels of confidence in the banking system (67%). Based on these

results, Roberts (2007) argues that confidence in the criminal justice system is comparably lower

than other public institutions in Canada because of its inherently complicated role in social

management and control of public order. Confidence in the health care and education systems is

higher than the justice system because health care and education deliver services to the

community that primarily focus on the needs of individuals.

The confluence of multiple and often times conflicting pressures and interests seeking to

shape the direction of the justice system make it an institution which is the target of constant

scrutiny and debate, particularly, when it involves controversial issues, such as, policing tactics,

court administration, and punishment schemes. Furthermore, the evaluation of public institutions

is heavily driven by individual ideological perspectives, and when empirical reality of the

operation of the criminal justice system conflicts with ideological perspective, the results tend to

be distrust, dissatisfaction, and lower confidence in the criminal justice (Roberts, 2007). When an

individual who supports a rigorous approach to public safety through policies that emphasize

crime control and punitive sanctions, observes that the criminal justice system is treating

offenders with leniency, their ultimate perception of the justice system is likely to be negative.

Roberts (2007) also found that in the United States, people have on average a

significantly lower level of confidence in banks (50% v. 68%), health care (44% v. 67%), schools

(40% v. 64%), government (29% v. 43%), corporations (22% v. 40%), and the criminal justice

system (29% v. 57%). These findings highlight that there is a consistently negative level of

confidence in the vital institutions tasked with maintaining the social, political, and economic

order with in the U.S. These findings can be linked to ideological dissatisfaction, negative

personal experiences, or a combination of both that is impacting the overall perceptions that the

public has on the criminal justice system. Hence, the need to use multivariate models to identify

and decompose the predictor and control variables that are influencing the direction and

magnitude of the relationship between competing theoretical perspectives as they apply to the

measurement of confidence levels in the criminal justice system.

According to Bradford (2011), individuals who utilized victims support services

following a crime demonstrate a greater satisfaction with how their individual case is handled

(Bradford 2011). This study used survey data from the British Crime Survey and found that

individuals who are provided with victim support services had a greater confidence in the criminal justice system compared to those individuals who were not provided with victim support services. Those individuals who received victims' services also had significantly higher levels of trust and increased perceptions of procedural fairness in regards to the criminal justice system. That is, victims link their personal experiences and treatment in the criminal justice system with their overall perception of the criminal justice system (Bradford, 2011).

Reisig and Holtfreter (2007) describe how substantial differences in the availability of reporting procedures for street crime versus consumer fraud may mediate victims' perceptions of confidence and trust in the authorities. The researchers argue that street or visible crime occupies a larger presence in the policy priorities outlined by law enforcement and government officials because of the greater availability of avenues for reporting street crime through witnesses, surveillance technology, expert testimony, victim statements, and confidential informants. Whereas, the reporting of consumer fraud "almost exclusively" relies on individual victims becoming aware that they were a victim of fraud and then reporting their suspicions to the authorities for further follow-up and investigation of the financial paper- or digital- trail possibly left by the perpetrators.

Additionally, consumer fraud which may have been committed years before, thereby exceeding the statute of limitations for initiating an investigation and prosecution may leave victims feeling that they were denied an opportunity for justice. However, for serious street and visible crimes, such as, homicide or rape there are often extended lengths of time or no expiration dates for the statute of limitations, thereby creating the conditions for perception of differential enforcement by victims of financial crimeswas regarding the treatment of different types of crime by the justice system (Reisig and Holtfreter, 2007).

Results from the survey of victims of consumer fraud (N = 918) conducted by Reisig and

Holtfreter's (2007) reveal that 48.2 percent of respondents had either "a great deal" or "quite a

bit" of confidence in the criminal justice system for investigating and prosecuting perpetrators of

consumer fraud. Additionally, they found that levels of confidence in the criminal justice system

are inversely related to how recently an individual experienced victimization. Reisig and

Holtfreter's (2007) tested a regression model and report that the best predictor variables of low

confidence in the criminal justice system is younger aged respondents, higher levels of

education, financial risk-takers, and being a recent victim of fraud.

Research Question and Hypotheses

In this study, we are interested in examining whether experiences of victimization impact

confidence in the criminal justice system. First, we hypothesize that those respondents who have

self-reported experiences of victimization will have lower levels of confidence in the criminal

justice system compared to individuals who have not been victimized.

Additionally, we are interested in conducting a hierarchical regression analysis to

examine the directionality, magnitude of effects, and statistical significance of our control

variables on our self-reported measure of confidence in the criminal justice system. We will be

measuring and examining general sociological variables as control variables in our models. More

specifically we will be measuring the effects of socio-demographic characteristics, political and

religious orientation values, and the geographical location of respondents on our measure of

confidence in the criminal justice system. Secondly, we hypothesize that our control variables

will have a statistically significant effect on confidence in the criminal justice system. Thirdly,

we hypothesize that self-reported experiences of victimization will remain a strong and

significant predictor of confidence in the criminal justice system even after entering our control

variables into the final model.

Methods

Participants and Data

We used a convenience sample (N = 1471) of primary source survey respondent data that was collected from undergraduate students, graduate students, and faculty from six different countries during a two year period between 2014 and 2016. Potential participants were identified and recruited using multiple methods, such as, through email, online college directories, and having researchers visit college classrooms. There were no financial incentives provided to study participants agreeing to complete the survey. The survey data was collected from respondents using the SurveyMonkey online survey platform and printed copies of the survey were distributed in locations without access to the internet. We achieved an 87% survey completion rate for the data that was collected online using the SurveyMonkey platform. Response rate data was not collected for this study and its implications are discussed in the limitations section.

All survey respondents participating in this study were 18 years or older and affiliated with a college or university. Because we conducted a non-probability convenience sampling strategy, we narrowly focused our data collection efforts on recruiting potential participants studying criminal justice, social sciences, or liberal arts and humanities related degrees. We did not target students studying science, technology, engineering, or mathematics degrees because of limited resources and limited access to students in those degree programs. The survey instrument used in this study provides a comparative examination of university student attitudes about two subject areas: (1) punitive versus rehabilitative approaches to criminal behavior and (2) the rights of people who have gay or lesbian sexual orientations (Gerstenfeld et al., 2015; Mboka et al., 2016).

Predictor Variables

In table 1, we provide descriptive statistics for our outcome variable where we measure

experiences of victimization by using a dichotomously coded variable (0 = *no, I have never been*

a victim of crime and 1 = *yes, I have been a victim of one or more different types of crime*) to

indicate whether a respondent has been a victim of any of the following crimes using 6-items: (1)

burglary, (2) robbery, (3) arson, (4) kidnapping, (5) assault or battery, and (6) other crimes. Based

on the respondents' self-reported data on experiences of victimization, using 6-items, we

construct an aggregate variable, that measures *experiences of victimization* by examining

whether the respondents have been a victim of one or more different types of crime.

Outcome Variables

In table 2, we provide descriptive statistics for the items that we analyze to create the

confidence in the criminal justice system factor score variable by conducting a dimension

reduction, using factor analysis, of respondent ratings to the following statements: (1) confidence

in the criminal justice system to solve crime, (2) confidence in the criminal justice system to

prevent crime, (3) confidence in the criminal justice system to have regard for defendants'

rights, (4) confidence in the criminal justice system to have regard for victims' rights, (5)

confidence in the criminal justice system to rehabilitate prisoners, and (6) confidence in the

criminal justice system to deter future offending. All of the statements are on a Likert scale that

is continuously coded (1 = *Not at all* to 4 = *A great deal of confidence*).

Next, we conducted a factor analysis of the 6- items to determine whether there is a

unidimensional and latent construct for measuring *confidence in the criminal justice system.* The

exploratory factor analysis that we conduct includes a reliability analysis that allows us to

examine the internal consistency of the items in terms of fitting a unidimensional and latent

construct. The factor score for *confidence in the criminal justice system* indicates that the 6-items have an alpha reliability of 0.78 and that the one factor solution explains 48.0% of the total variation in those items as a linear combination (table 3, in results section).

Control Variables

Our study includes eight control variables that are classified in the domains of social demographic characteristics, political and religious orientation, and the geographical location of respondents. These control variables allow us to measure the strength and magnitude of the relationship between our predictor and outcome variables when testing our multiple regression models.

The social demographic characteristics we measure: (1) *age* and (2) *gender*. *Age* is a continuously coded ratio-level variable. *Gender* is a dichotomously coded nominal-level variable (0 = *Female* and 1 = *Male*). *Sexual orientation* is a dichotomously coded nominal-level variable (0 = *Homosexual* and 1 = *Heterosexual*).

For education characteristics we measure the respondents' *college degree major*. We disaggregate college degree data by students who are majoring in criminal justice or legal studies related degrees from those students receiving a broader education in the social sciences, humanities, and liberal arts. We assume that those students pursuing a more focused criminal justice or legal education program are sociologically and ideologically different than students who do not pursue those degrees. The *college degree major* is a dichotomously coded nominal-level variable (0 = *Social Sciences, Arts, or Humanities* and 1 = *Criminal Justice or Legal Studies*).

For the political and religious orientation characteristics of respondents we measure the following variables: (1) self-reported rating of *political orientation*, (2) self-reported rating of

their *religious beliefs*, and (3) self-reported *frequency of religious attendance*. We measure the

self-reported rating of the *political orientation* variable on a Likert scale that is continuously

coded (1 = *Extremely Liberal* and 7 = *Extremely Conservative*). We measure the self-reported

rating of *religious beliefs* variable on a Likert scale that is continuously coded (1 = *Not at all* and

4 = *A great deal*). We measure the self-reported rating of *frequency of religious attendance*

variable on a Likert scale that is continuously coded (1 = *Not religious* and 6 = *More than once a*

week).

For the location of the respondents, we measure their geographical location of origin for

completing the survey. We use four different dummy-coded variables as indicators of

geographical location of respondents: North America, Eastern Europe, Asia, and Other. The

dummy variable for *North America* consists of respondents from the U.S. The dummy variable

for *Eastern Europe* consists of respondents from Croatia, Russia, and Macedonia. The dummy

variable for *Asia* consists of respondents from Japan, Taiwan, and India. The dummy variable for

Other consists of respondents who decided not to self-identify their geographical location.

Plan of Analysis

Data analysis begins with descriptive statistics that demonstrates the aggregate percentages

and means for predictor, outcome, and control variables. Next, we conduct bivariate analysis of

the predictor variable and outcome variable using the Independent Samples *t*-test. We report the

magnitude, direction of the effect, and statistical significance using *p*-values. We discuss the

results from our bivariate analysis and how our results allow us to specify our hierarchical

regression models.

In the final part of our analysis, we will conduct a hierarchical multiple regression

analysis to examine our predictor variable of *experiences of victimization* and its ability to

predict factor score outcomes for *confidence in the criminal justice system*. Using a hierarchical multiple regression test, we enter our predictor and control variables into our models in order to examine their relationship with our outcome variable. We interpret and report each of the models' R-square, F-value, and statistically significant unstandardized coefficients of predictor and control variables in our regression models. Along with our theoretical variable, *experiences of victimization*, we will enter the following control variables into our hierarchical regression models: *age, gender, sexual orientation, college major, political orientation, role of religion, frequency of religious service attendance,* and *geographic regional origin.*

Results

Descriptive Statistics

The descriptive statistic results, in table 3, present the sample size, percentage, mean, standard deviation, and missing data for our predictor variable, outcome variable, and control variables. When measuring our predictor variable, *experiences of victimization*, we find that 48% of our respondents indicated being a victim of one or more different types of crime and 40% of respondents indicate never having been a victim of crime with 12% of our sample missing data. When measuring our outcome variable, *confidence in the criminal justice system* factor score, we observe that the mean is zero, the standard deviation is one, and 12% of our sample missing data.

The average age of respondents is 26.6 years and with 1.1% missing data. We found that 71% of our sample was male, 28% female, and 1% missing data. The sexual orientation of our respondents is 82% heterosexual, 4% homosexual, and 14% missing data. The college degree held by our respondents was 51% criminal justice or legal studies, 41% social science or humanities, 8% missing data.

Respondents for our study indicated that their political orientation was 9.2% extremely

liberal, 30.5% liberal, 13% slightly liberal, 23.6% moderate, 8.7% slightly conservative, 7.7%

conservative, 1.1% extremely conservative, and 6.3% missing data. Respondents for our study

report that the extent to which religion played a role in their life was 19.9% not at all, 27% not

much, 31% a fair amount, 15.8% a great deal, and 6.3% missing data. The frequency of religious

attendance among our sample was: 19.8% not religious, 34.1% almost never, 15% once a month,

9.8% two or three times a month, 12% once a week, 2.9% more than once a week, and 6.5%

missing data. The geographic region from where our sample data was collected is: 55.6% from

the United States, 32.9% Eastern Europe, 5.9% Asia, and 5.6% other.

Bivariate Statistical Test Results

In table 4, we present the results of our Independent Sample *t*-test where we examined

mean differences, using our outcome variable *confidence in the criminal justice system*, between

respondents who reported *no, I have never been a victim of a crime* when compared to those who

self-reported *yes, I have been a victim of a victim one or more different types of crime*. The

results, of our Independent Sample *t*-test, demonstrate a statistically significant difference

between those individuals who reported *no, I have never been a victim of a crime* that had a

mean of 0.06 (*SD* = 1.01) and respondents who self-reported *yes, I have been a victim of one or*

more different types of crime had a mean of -0.06 (*SD* = 0.98) when examining factor scores of

confidence in the criminal justice system. These results indicate that those respondents who

reported *no, I have never been a victim of a crime* had a statistically significant higher

confidence in the criminal justice system compared to respondents who self-reported *yes, I have*

been a victim of one or more different types of crime ($p < 0.05$).

Hierarchical Multiple Regression Statistical Test Results

The results from our hierarchical multiple regression analysis, in table 5, represents statistically significant models for examining the relationship between our predictor variable, control variables, and outcome variable. In table 5, model 1, we examine how *experiences of victimization* predicts the factor score outcome for *confidence in the criminal justice system*. In table 5, model 2, we examine how our control variables predict *confidence in the criminal justice system*. Finally, in table 5, model 3, we assemble our full model and enter both *experiences of victimization* and the control variables to predict our outcome variable, *confidence in the criminal justice system*. Next, we interpret and report statistically significant results from our models and variable coefficients.

The R-square for model 1 indicates that the predictor variable: *experiences of victimization,* explains less than one percent of the variance in the outcome variable: *confidence in the criminal justice system* ($p < 0.05$). Furthermore, those respondents who responded: *yes, I have been a victim of one or more different types of crime* are 0.12 units less likely to have *confidence in the criminal justice system* ($p < 0.05$). This indicates that those individuals who have reported experiencing victimization are statistically significant less confident in the criminal justice system compared to individuals who self-reported never having experienced victimization.

The R-square for model 2 indicates that our control variables explain 14 percent of the variance in the outcome variable, *confidence in the criminal justice system* ($p < 0.01$). Furthermore, we observe that a one-unit increase in *age* yields a 0.01 unit decrease in *confidence in the criminal justice system* ($p < 0.05$). This indicates that older individuals have statistically significant lower levels of confidence in the criminal justice system compared to younger individuals.

We observe that those respondents who indicated that their sexual orientation is *homosexual* are 0.30 units less likely to have *confidence in the criminal justice system* ($p < 0.05$) compared to those who are heterosexual. This indicates that those individuals who reported being homosexual are statistically significant less confident in the criminal justice system compared to heterosexuals.

We detect that those respondents who indicated that their degree major is *criminal justice or legal studies* are 0.42 units more likely to have *confidence in the criminal justice system* ($p < 0.01$) compared to those who study other degrees. This indicates that those individuals who have reported studying criminal justice or legal studies have statistically significant more confidence in the criminal justice system compared to social science and art majors.

Our analysis reveals that a one-unit increase in *political orientation* yields a 0.11 unit increase in *confidence in the criminal justice system* ($p < 0.01$). This indicates that the more conservative someone self-reports being ideologically, the more confidence they have in the criminal justice system compared to those with a liberal leaning ideology.

Finally, in model 2, we find that those respondents who indicated that their geographic location of origin is in *Eastern Europe* are 0.36 units lower in *confidence in the criminal justice system* ($p < 0.01$) compared to our reference category, North America. This indicates that those individuals who have reported being from Eastern Europe are statistically significant less confident in the criminal justice system compared to individuals from North America.

The R-square for model 3 indicates that our predictor and control variables explain 15 percent of the variance in the outcome variable: *confidence in the criminal justice system* ($p < 0.05$). Furthermore, those respondents who responded: *yes, I have been a victim of one or more different types of crime* are 0.14 units lower in *confidence in the criminal justice system* ($p <$

0.05) compared to individuals who have report never having been a victim of crime. This finding indicates that those individuals who have reported experiencing victimization are statistically significant less confident in the criminal justice system.

We observe that those respondents who indicated that their sexual orientation is *homosexual* are 0.28 units lower in *confidence in the criminal justice system* ($p < 0.05$) compared to those who are heterosexual. This indicates that those individuals who have reported being of homosexual orientation have statistically significant lower confidence in the criminal justice system.

We detect that those respondents who indicated that their degree major is *criminal justice or legal studies* are 0.42 units higher in *confidence in the criminal justice system* ($p < 0.01$) compared to those who study other degrees. This indicates that those individuals who have reported studying criminal justice or legal studies have statistically significant higher confidence in the criminal justice system compared to those individuals who self-report studying social sciences or art.

Our analysis reveals that a one-unit increase in *political orientation* yields a 0.11 unit increase in *confidence in the criminal justice system* ($p < 0.05$). This indicates that the more conservative someone self-reports being, the more confidence they have in the criminal justice system.

Finally, in model 3, we find that those respondents who indicated that their geographic location is in *Eastern Europe* are 0.38 units lower in *confidence in the criminal justice system* ($p < 0.01$) compared to our reference category, North America. This indicates that those individuals who have reported being from Eastern Europe are statistically significant lower in their confidence in the criminal justice system.

Discussion

Using survey data collected from a sample of multinational survey respondents (N = 1471), our statistical analysis yields important empirical results regarding the direction, magnitude of strength, and statistical significance in the relationship that exists between *experiences of victimization* and *confidence in the criminal justice system*. The core findings from our study are consistent with procedural justice theory (Tyler, 2003). More specifically, we observe a direct, strong, and statistically significant relationship between *experiences of victimization* and *confidence in the criminal justice system*. Primarily, we find support for our first hypothesis that those individuals who have experienced victimization have statistically significant lower levels of confidence in the criminal justice system compared to those individuals who have never reported experiencing victimization. Given that our findings are consistent with previous research, we believe that findings from our study represent additional empirical support for procedural justice theory and replicate previous findings regarding the relationship between victimization and confidence in the criminal justice system (Cao et al., 1996; Tyler, 2003; Ren et al., 2005; Bradford, 2007; Reisig and Holtfreter, 2007).

However, we also find support for our second hypothesis, that sociological characteristics measured using control variables strongly impact measurement of confidence in the criminal justice. Our finding is consistent with the extant literature on the effects of sociological variables and their influence on perceptions of procedural fairness in the criminal justice system (Cao et al., 1996). The impact of socio-demographic characteristics, political orientation, and the geographical location of respondents remains statistically strong in our final model when measuring the relationship between *experiences of victimization* on *confidence in the criminal justice system* using a hierarchical regression analysis.

Therefore, we believe that theoretical discussions examining perceptions of procedural fairness and confidence in the criminal justice system should not ignore the strong and persistent role that sociological factors have on self-reported evaluations of confidence in the criminal justice system. Procedural justice theory (Tyler, 2003) offers a strong set of assumptions regarding how consumers of criminal justice services explicitly evaluate the legitimacy and fairness of institutions of justice based on their direct and personal, indirect and observed, or vicarious experiences with administrators and practitioners of justice.

However, our empirical results demonstrate that sociological characteristics are equally as important for individuals' formulating judgments about the criminal justice system. Procedural justice theory ignores the wide-ranging sociological and environmental influences that impact individual judgments and perceptions of fairness regarding the criminal justice system outside of direct or indirect interactions that the public has with agents of justice. Our empirical evidence suggests that sociological characteristics impact judgment, perceptions of fairness, and ultimately confidence in the criminal justice. Our research findings demonstrate that sociological factors prove to have an equal, if not greater, statistical influence on an individual's confidence in the criminal justice system when compared to the criminological variable measuring direct experiences of victimization among our sample of survey respondents.

In order to understand our results regarding the influence of sociological characteristics on measurements of confidence in the criminal justice system by the general public, we must first analogously consider how implicit biases have an unconscious effect on the actions of law-enforcement, judges, and juries inside and outside of the courtroom (Kang, Bennett, Carbado, and Casey, 2011). Implicit biases can impact the decision to investigate crime, make an arrest, and ultimately sentencing decisions delivered by judges and juries. Implicit biases can be

associated with unconscious perceptions and judgements about another person based on observations of that person's gender, race, ethnic background, education level, occupation, class status, physical appearance, clothing, body language, and other observable and notable distinguishing characteristics about an individual, which can then be used as a basis for holistically judging someone's' abilities, intelligence level, integrity, or involvement in deviant or criminal behavior.

Unconscious judgments and implicit biases are often due to culturally entrenched stereotypes, learned prejudices, or inherited beliefs and upbringing (Devine, 1989). Implicit biases impact the observers' treatment of others. If left unchecked and unexamined, implicit biases are detrimental to the trust that society places in the criminal justice system and erodes the publics' confidence in the system's ability to deliver blind justice and equal protections for all citizens. Systematic or the wide-spread influence of implicit biases expressed by agents of criminal justice has adverse effects on the due process rights of suspects and defendants which ultimately undermines the publics' confidence and trust in the legitimacy of institutions representing justice and authority.

The criminal justice system is designed to be the foundational institution for examining and evaluating the truth and culpability of offenders, through the use of evidence and testimony, to achieve blind justice or neutrality in arriving at a verdict decided by the jury while being given guidance by the authorities (Kang et al., 2011). Therefore, if the citizens of a society or victims of crime generally believe that administrators or practitioners of justice possess implicit or even explicit biases that influence their judgments toward the communities that they serve, then the public may lose significant confidence and trust in the legitimacy of the criminal justice system (Tyler, 2003; Kang et al., 2011).

Interestingly, the empirical results from our study allow us to argue that implicit biases are not exclusive to only practitioners and administrators of justice, but implicit biases are widely possessed by the general public when evaluating their confidence in the criminal justice system itself. Our research demonstrates that the general publics' confidence in the criminal justice system is impacted heavily and deeply by sociological factors. We find that sociological factors strongly influence perceptions of confidence in the criminal justice system beyond the scope of individual experiences of victimization.

For example, we found that the following sociological characteristics of survey respondents, such as, sexual orientation, college degree, political ideology, and origin of geographical location have a significant and predictive influence over measurements of confidence in the criminal justice system. Our results reveal that being a heterosexual, studying criminal justice, being ideologically conservative, and originating from North America results in significantly higher levels of confidence in the criminal justice system. Alternatively, our study reveals that individuals who self-identify as homosexual, studying social sciences and art, being ideologically liberal, and originating from Eastern Europe have statistically significantly lower levels of confidence in the criminal justice system. These findings combined, indicate to us that our current theoretical framework for understanding the relationship between experiences of victimization and confidence in the criminal justice system requires considerable theoretical refinement when discussing or applying procedural justice theory (Tyler, 2003).

Conclusion

In sum, the policy implications of our findings point to the need for increased research for examining how the experiences of victims are being processed in the criminal justice system is related to perceptions of procedural fairness and confidence in the criminal justice system.

Previous research demonstrates that a stronger understanding of the experiences of victims is essential for enhancing public safety, bringing offenders to justice, and shaping policies and laws that protect victims. We do not want to minimize the traumatic and deadly experiences of victims, but we cannot deny the importance of victim experiences in the administration of the criminal justice system that play an essential and vital component in the delivery of justice. Victims are a key component in multiple stages of the judicial process from providing forensic evidence and victim impact statements to law-enforcement, to providing eye-witness testimony at trial against offenders, to making sentencing recommendations, shaping criminal justice policies (i.e. Meghan's Law, 1996; Amber Alerts, 1996), and highlighting injustices perpetrated by agents of the justice system itself (Mack and Roberts-Lewis, 2016).

Findings from our research demonstrate that experience of victimization and its relationship to confidence in the criminal justice system does not clearly fit within the context of a single theoretical framework. Tyler's (2003) procedural justice theory offers a foundation for examining our research question and testing our hypotheses, but is not able to account for the effects of sociological variables on measurements of confidence in the criminal justice system.

Tyler (2003) provided an in-depth set of assumptions for examining how society evaluates and measures the performance of the authorities and how it relates to perceptions of justice and legitimacy. Through the research process we uncovered statistically significant results which strongly suggest that increased experiences of victimization decreases confidence in the criminal justice system. This finding alone is troublesome because it highlights how victims of crime may develop a cynical attitude towards the machinations of justice which inevitably undermine the legitimacy and operation of the criminal justice system (Kochel, 2015). If we continue to observe that crime victims believe that the criminal justice system is ineffective at

maintaining public safety or bringing offenders to justice, then society risks devolving into a state of retribution, vigilantism, and mob justice where passions, emotions, and anger trump searching for the truth through logical reasoning, evidence, testimony, and juris prudence in the administration of justice. Victims' experiences and their confidence in the criminal justice system is a vital indicator of the efficacy of the criminal justice system in both managing public safety and holding offenders accountable.

The results from our study point to an interesting set of relationships that deserve further consideration for theory-development and research regarding the possibility of implicit biases regarding static and dynamic sociological characteristics and their impact on measurements of confidence in the criminal justice system. These findings combined strongly suggest that factors other than personal experiences with the criminal justice system, effect the evaluation and judgment that individuals have towards the criminal justice system. Instead, we find that sexual orientation, ideological commitment, college degree type, and geographical location are equally as important as experiences of victimization in predicting confidence in the criminal justice system.

It would behoove policy makers to remain vigilant against impassioned policy making in the criminal justice system that is based on ideological orientation. Additionally, more consideration must be given to the experiences of victims who are often the primary reason for maintaining the administration of the criminal justice system and public safety policies. We encourage more evidence-based policy research to be conducted that examines and decomposes the relationship between experiences of victimization, sociological characteristics, and confidence in the criminal justice system. Results from our research study suggest that more attention needs to be focused on developing policies, laws, and programs for victims that provide

them with confidence in the criminal justice system and reaffirms the publics' commitment to public safety and offender accountability. We encourage future research to consider how support for punitive punishment policies mediates the relationship between experiences of victimization and confidence in the criminal justice system.

Limitations

A major limitation of this study is the use of a non-probability convenience sampling strategy for recruiting participants and collecting data. We did not record how many requests were sent out to potential participants. There exists the possibility that a self-selection bias impacted our response rate for this study. However, upon analysis of our data, we observe that the data contained in our variables meet the statistical assumptions required for conducting hierarchical linear regression analysis. This indicates that there is a high degree of variance in the types of responses provided by survey participants. Therefore, we have no reason to be concerned that the self-selection bias or type I and II errors impact the reliability or validity of our data and analysis results.

Ethical Considerations

The research protocols for ethical treatment of human subjects, participant recruitment, data collection, data analysis, and dissemination of results were approved by the Institutional Review Board at California State University, Stanislaus. All of the data that was analyzed in this study has been de-identified and stored on a password protected hard drive to protect the privacy and confidentiality rights of the research participants.

Table 1. Descriptive statistics of experiences of victimization items

Outcome Variables	No	Yes	Missing
	n (%)	n (%)	n (%)
Experiences of victimization			
1. Burglary	944 (64)	352 (24)	175 (12)
2. Robbery	1124 (76)	172 (12)	175 (12)
3. Arson	1277 (87)	18 (1)	176 (13)
4. Kidnapping	1282 (87)	13 (1)	176 (13)
5. Assault or battery	999 (68)	299 (20)	173 (12)
6. Other crimes	985 (67)	303 (21)	1288 (88)
Have you ever been a victim of crime? (aggregate variable)	590 (40)	698 (48)	183 (12)

Table 2. Descriptive statistics of confidence in the criminal justice system items

Outcome Variables	None at all	Not very much confidence	Quite a lot of confidence	A great deal of confidence	Missing	Factor Loading
	n (%)	n (%)	n (%)	n (%)	n (%)	
Confidence in the criminal justice system						
... to solve crime?	83 (6)	542 (36)	563 (38)	198 (7)	174 (12)	0.726
... to prevent crime?	208 (14)	658 (45)	347 (24)	83 (6)	175 (12)	0.700
...to have regard for defendants' rights?	80 (5)	606 (41)	535 (36)	77 (5)	173 (12)	0.688
...to have regard for victims' rights?	95 (7)	578 (39)	531 (36)	92 (6)	175 (12)	0.682
...to rehabilitate prisoners?	409 (28)	685 (47)	181 (12)	20 (1)	176 (12)	0.676
...to deter future offending?	384 (26)	730 (50)	160 (11)	19 (1)	178 (12)	0.683

Table 3. Descriptive statistics of control variables

Variable (Groupings)	n (%)	M (SD)	Missing n (%)
N	1471(100)	-	0 (0)
Predictor variable			
Experiences of victimization			
Yes, I have been a victim of one or more different types of crime (1)	698 (48)		183 (12)
Outcome variable			
Confidence in the criminal justice system	1289 (88)	0 (1)	182 (12)
Control variables			
Social demographic characteristics			
Age	-	26.61 (9.70)	21 (1.4)
Gender			
Male	1044 (71)	-	16 (1.1)
Female	411 (27.9)	-	-
What is your sexual orientation?			
Homosexual	61 (4.1)	-	203 (13.8)
Heterosexual	1207 (82.1)	-	-
What is your college degree major?			
Social Science, Art, or Humanities	603 (41.0)	-	119 (8.1)
Criminal Justice or Legal Studies	749 (50.9)	-	-
Political and Religious Orientation			
Rate your basic political orientation			
Extremely liberal	135 (9.2)	-	92 (6.3)
Liberal	448 (30.5)	-	-
Slightly liberal	191 (13.0)	-	-
Moderate	347 (23.6)	-	-
Slightly conservative	128 (8.7)	-	-
Conservative	114 (7.7)	-	-
Extremely conservative	16 (1.1)	-	-
To what extent does religion play a role in your life?			
Not at all	293 (19.9)	-	92 (6.3)
Not much	397 (27.0)	-	-
A fair amount	456 (31.0)	-	-
A great deal	233 (15.8)	-	-
How frequently do you attend religious services?			
Not religious	291 (19.8)	-	95 (6.5)
Almost never	502 (34.1)	-	-
Once a month	220 (15.0)	-	-
Two or three times a month	144 (9.8)	-	-
Once a week	177 (12.0)	-	-
More than once a week	42 (2.9)	-	-
Location of Respondent			
Geographic Region			
United States	818 (55.6)	-	-
Eastern Europe	484 (32.9)	-	-
Asia	87 (5.9)	-	-
Other	82 (5.6)	-	-

Table 4. Summary of Independent Sample *t*-test on experiences of victimization and confidence

in the criminal justice system

Variables	Confidence in the criminal justice system (factor score) Mean (SD)
Have you ever been a victim of crime?	
No, I have never been a victim of a crime	0.06 (1.01)*
Yes, I have been a victim of one or more different types of crime	-0.06 (0.98)

* $p < 0.05$, ** $p < 0.01$

Table 5. Summary of regression models

Variable (Groupings)	Model 1 B	Model 2 B	Model 3 B
Experiences of victimization (yes, I have been a victim of one or more different types of crime = 1)	-0.12*	-	-0.14*
Age	-	-0.01*	0.00
Gender (Male = 1)	-	0.05	0.05
What is your sexual orientation? (heterosexual = 1)	-	0.30*	0.28*
What is your college degree major? (Criminal Justice and Legal Studies = 1)	-	0.42**	0.42**
Rate your basic political orientation	-	0.11**	0.11**
To what extent does religion play a role in your life?	-	0.05	0.05
How frequently do you attend religious services?	-	-0.01	-0.02
North America (reference)			
Eastern Europe (yes = 1)	-	-0.36**	-0.38**
Asia (yes = 1)	-	0.10	0.09
Other (yes = 1)	-	0.05	0.02
R-square	0.00	0.14	0.15
F	4.39*	19.8**	19.0**

*$p < 0.05$, **$p < 0.01$

References

Aguirre Jr, A., Davin, R. P., Baker, D. V., & Lee, K. (1999). Sentencing outcomes, race, and victim impact evidence in California: A pre-and post-Payne comparison✻. *Criminal*

Justice Studies, 11(3), 297-310.

Bradford, B. (2011). Voice, neutrality and respect: Use of Victim Support services, procedural fairness and confidence in the criminal justice system. *Criminology and Criminal Justice*, 1-22.

Cao, L., Frank, J., & Cullen, F. T. (1996). Race, community context and confidence in the police. *American Journal of Police*, 15(1), 3-22.

Carter, D. L. (1985). Hispanic perception of police performance: An empirical assessment. *Journal of Criminal Justice*, 13(6), 487-500.

Cohen, S. (2002). Folk devils and moral panics: The creation of the mods and rockers. Psychology Press.

Devine, P. G. (1989). Stereotypes and prejudice: Their automatic and controlled components. *Journal of personality and social psychology*, 56(1), 5.

Fahey, P. M. (1992). Payne v. Tennessee: An Eye for an Eye and Then Some. *Connecticut Law Review*, 25, 205.

Fisher, B. S., Daigle, L. E., Cullen, F. T., & Turner, M. G. (2003). Reporting sexual victimization to the police and others results from a national-level study of college women. *Criminal justice and behavior*, 30(1), 6-38.

Gerstenfeld, P., Chiang, C., Mboka, A., Chintakrindi, S., Werling, R., & Gao, H. (2015). Comparative Study of Student Attitudes Towards Punitiveness and Gay and Lesbian Issues Dataset. California State University, Stanislaus.

Goldstein, H. (1987). Toward community-oriented policing: Potential, basic requirements, and threshold questions. *NPPA Journal*, 33(1), 6-30.

Kang, J., Bennett, M., Carbado, D., & Casey, P. (2011). Implicit bias in the courtroom. *UCLA Law Review*, 59, 1124.

Kochel, T. R. (2015). Assessing the Initial Impact of the Michael Brown Shooting and Police and Public Responses to it on St Louis County Residents' Views about Police. *Southern Illinois University Carbondale.*

Kochel, T. R. (2016). Police legitimacy and resident cooperation in crime hotspots: effects of victimisation risk and collective efficacy. *Policing and society*, 1-20.

Mack, L. R., & Roberts-Lewis, K. (2016). The Dangerous Intersection between Race, Class and Stand Your Ground. *Journal of Public Management & Social Policy*, 23(1), 4.

Mancini, C., & Mears, D. P. (2010). To execute or not to execute? Examining public support for

capital punishment of sex offenders. *Journal of Criminal Justice*, 38(5), 959-968.

Mboka, A., Chintakrindi, S., Chiang, C. P., Gerstenfeld, P., McClellan, D., & Kovčo Vukadin, I. (2016). Classical Criminological Perspective and Attitudes Toward Same-Sex Rights. *Kriminologija i socijalna integracija*, 23(2), 142-172.

Messner, S. F., Baumer, E. P., & Rosenfeld, R. (2006). Distrust of government, the vigilante tradition, and support for capital punishment. *Law & Society Review*, 40(3), 559-590.

Reisig, M. D., & Holtfreter, K. (2007). Fraud victimization and confidence in Florida's legal authorities. *Journal of Financial Crime*, 14(2), 113-126.

Ren, L., Cao, L., Lovrich, N., & Gaffney, M. (2005). Linking confidence in the police with the performance of the police: Community policing can make a difference. *Journal of Criminal Justice*, 33(1), 55-66.

Roberts, J. V. (2007). Public Confidence in Criminal Justice in Canada: A Comparative and Contextual Analysis 1. *Canadian journal of criminology and criminal justice*, 49(2), 153-184.

Sherman, L. W. (2002). Trust and confidence in criminal justice. *National Institute of Justice Journal*, 248, 22-31.

Tyler, T. R. (2003). Procedural justice, legitimacy, and the effective rule of law. *Crime and Justice: An Annual Review of Research*, 30, 283−357.

THE LEGALIZATION OF MARIJUANA IN WASHINGTON STATE AND ITS EFFECT ON THE PRICE OF THE RECREATIONAL AND THE MEDICAL PRODUCT*

KRYSTAL E. NOGA-STYRON and J. MICHAEL OLIVERO[6]

ABSTRACT

In August 2015, a year after the first state-licensed recreational-marijuana shop opened in Washington State, we surveyed recreational-marijuana retailers and medical-marijuana dispensary operators to compile a database of the strains of marijuana available for sale, as well as the cost of each strain. To update our price information, we returned to the market in August 2017, a full year after the Washington State medical-marijuana dispensaries had been absorbed into the state-licensed recreational-marijuana shops. While there was no significant difference in the price of retail marijuana as compared to medical marijuana in 2015 or in 2017, we did find a statistically significant decrease in the price, per gram, of recreational marijuana from 2015 as compared to 2017, as well as a statistically significant decrease in the price, per gram, of medical marijuana from 2015 as compared to 2017.

---

[6] Department of Law and Justice, Central Washington University

* **Corresponding Author:** Krystal E. Noga-Styron, Department of Law and Justice, Central Washington University, Lynnwood, WA 98036 (e-mail: nogak@cwu.edu)

When the citizens of Washington State voted, in November of 2012, to legalize the recreational use of marijuana, there was concern that the price of state-regulated marijuana – both recreational and medical – would be too expensive to have a significant impact on less expensive black-market sales. The purpose of this research was first, to determine how the price of recreational marijuana at state-licensed shops compared to the price of medical marijuana available at state-sanctioned dispensaries in Washington; and second, whether those prices have changed substantially in the first few years after legalization. We hypothesized that within a short time, the price of recreational and medical marijuana would significantly decrease; in almost all respects, we were correct.

We began our study in August 2015, one year after the first state-licensed recreational marijuana shops had opened in the state of Washington. By conducting a telephone survey of state-licensed recreational marijuana shops and medical dispensaries, we were able to establish a database of commercially available strains of marijuana and their price per gram. At that time, by using the five most commonly available strains of marijuana as our comparison, we noted that the mean price, per gram, of medical marijuana was not significantly lower than the mean price, per gram, of recreational marijuana sold at state-licensed shops. We returned to the state-licensed marijuana marketplace in August 2017, a full year after the medical dispensaries had been absorbed into the recreational market. Using 2017 prices for the same five most commonly available strains of marijuana in our comparison, we found that there was still no significant difference between the mean price, per gram, of recreational marijuana as compared to medical marijuana. However, we did find that the mean price, per gram, of recreational marijuana was significantly lower in 2017 as compared to the mean price, per gram, of recreational marijuana in 2015. We also found that the mean price, per gram, of medical marijuana was significantly lower

in 2017 as compared to the mean price, per gram, of medical marijuana in 2015.

Literature Review

Background of Marijuana Legalization in Washington State

The state-licensed production and sale of recreational marijuana became legal when Washington State voters passed Initiative 502 (I-502) on November 6, 2012. A month later, it became legal for adults aged 21 and older to possess up to one ounce of marijuana (RCW 69.50.4013). The newly renamed Washington State Liquor and Cannabis Board quickly developed rules for the licensing and oversight of recreational marijuana growers, processors, and retailers. On July 8, 2014, the first government-run recreational marijuana shop in the country opened in Washington State. This experiment in policy reform had been gradually taking place for over a decade.

A quasi-legal marijuana supply chain began in Washington State in 1998. At that time, Washington voters approved Initiative 692 (I-692), which decriminalized the possession of limited amounts of marijuana for medical purposes, and permitted authorized patients and designated caregivers an affirmative defense if prosecuted for violating marijuana possession laws[7] (Dilley, J. A., et. al., 2017; Roffman, 2016). Beginning in 2009, hundreds of shops, dispensaries, and collective gardens, which housed and sold medical marijuana, could be found throughout Washington (Dilley, J. A., et. al., 2017; Roffman, 2016). There was no state regulatory system in place to oversee the activity of the medical marijuana authorizers, patients, collective gardens, or dispensaries that flourished after the passage of I-692. According to Roger Roffman (2016), of the School of Social Work at the University of Washington, "in addition to serving legitimate patients, some became sources of supply for non-medical cannabis consumers

---

[7] Prior to the election in November 2012, in Washington State, it was a misdemeanor criminal offense to possess even a minuscule amount of marijuana, which was punishable by mandatory-minimum fines, as well as mandatory-minimum jail time (RCW 69.50.4014). The possession, delivery, or manufacturing of over 40 grams of marijuana was a felony (RCW 9A.20).

who obtained illicit authorizations" (p. 1139). In response, the Medical Cannabis Law (ESSB 5073) was passed in 2011; it provided more clarity and oversight for qualifying patients, health care professionals, as well as for licensed dispensaries and licensed processors of marijuana products.

After voters approved I-502 in 2012, the first state-sanctioned recreational marijuana shops opened in 2014. At that time, purchases at these licensed retail outlets were estimated to account for only 30% of marijuana sales in the state (Yauger & Armes, 2015). The remaining 70% of marijuana sales were thought to be conducted on the black market. According to Brian Yauger and Joe Armes (2015) of Front Runner, the business intelligence software from Washington-based Tetratrak:

> By all accounts the first year of I-502 was successful, with retail sales now topping $35 million a month. Still, recreational marijuana only accounts for approximately 30% of the projected $1.3 billion industry in 2015, with the black market and medical marijuana representing the remaining 70%. I-502 retailers have tried very hard to bring the out-the-door price of the recreational marijuana down to be competitive with the black and medical markets. However, those markets remain robust, in part because they have not been handcuffed by the high taxes and cumbersome regulations put in place for I-502. (n.p.)

While this was the case early on, significant changes have taken place in the Washington State medical and recreational marijuana market in the past three years.

In 2014, the year that state-licensed recreational marijuana shops first opened, marijuana was taxed at a rate of 25% every time that it changed hands in the supply chain (i.e., from the producer, to the distributor, to the retailer, to the consumer) (Department of Revenue, Washington State, 2017). Starting in August 2015, the state-excise taxes paid to the Washington State Liquor and Cannabis Board increased to 37% but, now, marijuana is only taxed once – when it is sold to the consumer (Department of Revenue, Washington State, 2017). As state regulation of the recreational-marijuana market evolved, so did the state regulation of the

medical-marijuana market. Two years after the first licensed recreational marijuana shop opened in 2014, on June 30, 2016, most collective gardens[8] and all medical dispensaries were eliminated. A newly-regulated medical-marijuana market opened in July 2016. The newly-regulated medical-marijuana market was integrated within the recreational market system and the two were melded as one, allowing for greater ease of government control and oversight. Beginning on July 1, 2016, state-licensed recreational marijuana retailers began selling sales-tax and use-tax exempt marijuana to those with a medical-marijuana endorsement (Department of Revenue, Washington State, 2017).

The Current Market

When retail recreational-marijuana shops first opened in Washington in 2014, the street price of a gram of marijuana was roughly $10 (Walker, 2015). At the same time, marijuana in state-licensed retail shops and dispensaries cost an average of $25 per gram (Walker, 2015; Washington State Liquor and Cannabis Board, 2017). According to the Washington State Liquor and Cannabis Board, at the onset, prices were high because the supply could not keep up with the initial demand (2017). Prices were also high due to retail marijuana being taxed at a rate of 25% every time that it changed hands in the supply chain. Over time, as the novelty has worn off, and production has increased, the 2015 price of recreational marijuana in Washington State had decreased to an average of $11 per gram. This is less than half of what it cost when state-licensed recreational-marijuana shops first opened their doors only one year earlier. According to the Washington State Liquor and Cannabis Board, in March of 2016, the price of legal marijuana in Washington was as low as $9.32 per gram (2017). This means that the cost of some retail

---

[8] Some patient-collective gardens continue to exist for those who are registered as medical-marijuana patients with the Medical Marijuana Authorization Database at the Washington State Department of Social and Health Services. Registered patients are authorized to have no more than 15 plants at one time, which they can choose to cultivate in a patient-collective garden. Each garden is to have no more than four patients. The maximum number of plants allowed in each collective garden is 60. Collective gardens may no longer sell to the public (RCW 69.51A.250).

marijuana in Washington State has reached below pre-legalization black-market street prices.

As the *Washington Post* reported in May of 2016, "Legalized marijuana is getting very cheap very quickly" (Humphreys, 2016, n. p.). According to Steve Davenport of the Pardee RAND Graduate School, and Jonathan Caulkins, a professor at Carnegie Mellon University, who aggregated marijuana price data from Washington State's Liquor and Cannabis Board, prices "are now steadily falling at about 2 percent per month. If that trend holds, prices may fall 25 percent each year going forward" (Humphreys, 2016, n.p.) While the speed with which the price of recreational marijuana decreased may come as a surprise to some, others do not find it so surprising.

As discussed by Caulkins, et. al., prohibition imposes many costs on illicit drug producers (2016). Black market producers and dealers must operate covertly. In so doing, they cannot publicly advertise, they generally pay higher wages to compensate for the potential risk of arrest and conviction, and they lack legal recourse in civil courts to resolve any contractual disputes (Caulkins, et. al., 2016). In contrast, state-licensed producers and retailers, like those in Washington State, do not take any of these risks. Rather, they may benefit from economies of scale that can lower production costs (Caulkins, et. al., 2016). Additionally, as the price of legal marijuana has decreased, the number of new retail shops entering the market has increased (Washington State Liquor and Cannabis Board, 2017). Now that Washington State has merged its medical dispensaries with its retail stores, there are more state-licensed marijuana shops, resulting in a larger supply of legal marijuana available to the consuming public (Walker, 2015; Washington State Liquor and Cannabis Board, 2017).

RQ1: How does the price of recreational marijuana at state-licensed shops compare to the price of medical marijuana available at state-sanctioned dispensaries in Washington? **RQ2:** Has the

price of recreational and/or medical marijuana significantly changed in the first few years after legalization?

H1: The price of both recreational and medical marijuana in Washington State will significantly decrease from August 2015 to August 2017.

Method and Results

In August 2015, we used the Washington State Liquor and Cannabis Board's list of applicants who had applied for retail marijuana licenses in the state since 2013. As stated earlier, Washington State voters voted to legalize recreational marijuana in November 2012. After a period of rulemaking, the Washington State Liquor and Cannabis Board began accepting applications in 2013, and the first licensed retail marijuana shop in Washington State opened its doors in July 2014. As many new marijuana entrepreneurs admitted, they had no prior business, retail, or marijuana experience (Walker, 2015). For this reason, we chose to begin our examination one full year after these shops had been in existence in order for them to get established and to work through any kinks.

Using the 2015 Washington State Liquor and Cannabis Board list of retail-marijuana license applicants, we were able to obtain the names and phone numbers of all 51-licensed[9] retail-marijuana shops in the state in order to survey retailers about what strains of marijuana they had available for sale, as well as the cost per gram of each strain. We chose to examine costs at the gram level because it was the lowest increment of marijuana available for consumers to purchase. We called each shop over the telephone and asked if they would be willing to speak with us and to provide us with strain and pricing information. Of the 51-licensed retailers that we called, 39 were willing to provide us with the requested information. This resulted in a response rate of 76%, which is well within the acceptable and good range. With this information, we were

---

[9] As of August 2017, there are more than 300-licensed retail-marijuana shops in Washington State.

able to develop a database of available retail-marijuana strains (n=381), as well as the individual price, per gram, of each available retail-marijuana strain.

Next, we used websites, such as Leafly.com, to create a list of the names and phone numbers of medical-marijuana dispensaries in Washington State. We were able to compile a list of 21 dispensaries. As we did with the retail shops, we called all 21 dispensaries over the telephone and asked if they would be willing to speak with us and to provide us with strain and pricing information. Of the 21 medical-marijuana dispensaries that we called, 15 were willing to provide us with the requested information. This resulted in a response rate of 71%, which is well within the acceptable and good range. With this information, we were able to develop a separate database of available medical-marijuana strains (n=32), as well as the individual price, per gram, of each strain.

We chose to limit our focus to the most commonly available strains across all of the recreational shops and medical dispensaries whom we surveyed. A strain was considered commonly available if it was carried at four or more retail stores and four or more medical dispensaries. In August 2015, there were five commonly available strains of marijuana across all outlets in Washington State: *Blue Dream*, *Sour Diesel*, *Train Wreck*, *Green Crack*, and *OG Kush*. At retail recreational-marijuana shops, the mean price, per gram, for these strains was $19.18, $16.16, $12.50, $15.12, and $17.80 respectively. Overall, the mean price of these five most commonly available strains at recreational-marijuana shops in August 2015 was $16.15 per gram. At medical-marijuana dispensaries, the mean price, per gram for these strains was $10, $10.75, $12.50, $18.66, and $18 respectively. Overall, the mean price of these five most commonly available strains at medical-marijuana dispensaries in August 2015 was $13.82 per gram. In August 2015, we found that there was no statistically significant difference ($t = 1.0073$;

p > .05) in the mean price of the five marijuana strains at retail shops ($\bar{x}$ = $16.15) as compared to the price of those same strains in medical-marijuana dispensaries ($\bar{x}$ = $13.82).

We returned to the market in August 2017, a full year after the Washington State medical-marijuana dispensaries had been absorbed into the state-licensed retail-marijuana shops. Now, registered patients with a medical endorsement can purchase marijuana at recreational shops, and at sales-tax and use-tax exempt prices. We called the same 39 retail shops who had previously given us their strain and price information in 2015. Two were no longer in business. All of the remaining 37 shops agreed to give us updated pricing information. As we did in 2015, we compared the strains of *Blue Dream*, *Sour Diesel*, *Train Wreck*, *Green Crack*, and *OG Kush*. This time, the mean recreational-marijuana price, per gram, for these strains was $14.58, $12.33, $7.10, $12.14, and $7.69 respectively. Overall, the mean price of these five commonly available strains at recreational-marijuana shops in August 2017 was $10.76 per gram. The mean price, per gram, of these strains for medical-marijuana patients was $11.66, $9.86, $5.68, $9.71, and $6.15 respectively. Overall, the mean price of these five strains for registered patients with medical-marijuana endorsements in August 2017 was $8.61 per gram. Based on 2017 pricing, we found that there was no significant difference (t = 1.16504; p > .05) in the mean retail price of the five marijuana strains as ($\bar{x}$ = $10.76) as compared to the price of those same strains for patients with medical-marijuana endorsements ($\bar{x}$ = $8.61).

Based upon our calculations, there has been a statistically significant (t =2.91841; p < . 05) reduction in the price of these five strains of marijuana in Washington State's licensed recreational-marijuana market between August 2015 and August 2017. Likewise, there has been a statistically significant (t = 2.4871; p < .05) reduction in the price of these five strains of marijuana when sold to registered patients with a medical-marijuana endorsement between

August 2015 and August 2017. Table 1 illustrates the results of this analysis and reflects the

mean price, per gram, of the five commonly available marijuana strains in Washington State in

August 2015 as compared to August 2017.

Conclusion

Our study, which compared the Washington State prices, per gram, of the five most

commonly available strains of state-licensed recreational marijuana and medical-marijuana in

August 2015, and then again in August 2017, found that, overall, prices have decreased across

the board. Only one strain, *Blue Dream*, when sold as medical marijuana, did not decrease in

price between 2015 and 2017. In August 2015, the difference in the mean price, per gram,

between these strains of recreational marijuana and medical marijuana was not significant. In

August 2017, the difference in the mean price, per gram, between these strains of recreational

marijuana and medical marijuana was still not significant. However, the difference in the mean

price, per gram, of these five strains, when sold on the state-licensed recreational-marijuana

market, was significantly less in August 2017, than it was in August 2015. Likewise, the

difference in the mean price, per gram, of these five strains, when sold as medical marijuana was

significantly less in August 2017 than when it was sold as medical marijuana in August 2015,

despite the increase in the price of *Blue Dream*.

As stated earlier, when the state-licensed retail market first began, prices were high

because the supply could not keep up with the initial demand. Over the course of two years, and

since Washington State merged its medical-marijuana dispensaries with its retail shops, the

number of retail-marijuana shops has increased from 51 to over 300. Prices were also initially

high because the product was taxed at a rate of 25% every time that it changed hands – from the

producer, to the distributor, to the retailer, to the consumer. Today, the product is taxed once, at a

rate of 37%, and only when the product is sold to the consumer. While the novelty has worn off and production and availability has increased, according to the marijuana retailers that we surveyed, the *Blue Dream* strain is one of their top selling strains to patients with medical-marijuana endorsements. Based on basic supply-and-demand economics, this may help to explain why the price of *Blue Dream*, as sold to those with medical-marijuana endorsements, has increased rather than decreased.

Reports indicate that the price of recreational and medical marijuana has also decreased in other states where marijuana has been legalized (Huddleston, 2015). As the price of both recreational and medical marijuana keeps falling in Washington, there are both positive and negative repercussions for the state. While an increase in license applications has meant more money for the state, since retail marijuana in Washington is now only taxed when sold to the consumer, declining sales prices have meant fewer dollars from that particular revenue stream. However, in August 2017, with both recreational and medical marijuana prices at or below black-market prices, more and more consumers may abandon the black market all together. A decrease in the number of drugs sold on the black market equates to fewer costs for law enforcement. States that have legalized marijuana are saving money that they once spent on arresting, adjudicating, and imprisoning non-violent marijuana offenders (O'Brien, 2013). While Washington may be losing tax revenue from marijuana sales, it is making up for that loss in what it saves in law enforcement, court, and incarceration costs.

Other studies have indicated that the legalized marijuana market may also be credited for reducing "gateway," "spillover," or "substitution" effects by decreasing and limiting consumers' contact with other harder, potentially more harmful, and/or addictive substances (Kosterman, et.

al., 2016; Mason, et. al., 2016; O'Brien, 2013; Roffman, 2016). The legalization of marijuana, and the subsequent statistically-significant decrease in its price in Washington State, has meant that legal marijuana is now fully competitive with black-market marijuana. Consumers who buy marijuana at state-licensed shops know that the product that they are purchasing is safe, effective, and consistent – assurances that they will not get on the black market (O'Brien, 2013). They know that the money that they spend on legal marijuana goes to support local businesses and to fund state programs. Perhaps most appealing to consumers is that legalized marijuana has meant that a substantial portion of the population is no longer viewed as criminal, which has effectively lowered crime rates.

As with all studies, this one has limitations. First, we cannot fully answer whether the decrease in the price of recreational and medical marijuana has cut into black market sales or profits, or whether black market prices have also decreased to remain competitive with the legal market. Second, this study is limited because it compared only the five most commonly available strains of marijuana in the state. It is possible that the trend that we observed is not indicative of all strains taken as a whole. Third, our comparative study spanned only two years and examined only the first three years post-legalization. As such, future research would include a more longitudinal study and an examination of the less popular strains of marijuana for sale in Washington State. In addition, the law on marijuana continues to be in a state of flux, even in the states where its possession and consumption has been legalized. New legislation could bring significant changes. Federal intervention is always a possibility and we have yet to see what action, if any, will be taken by the Trump Administration.

Table 1. Mean Price, Per Gram, of Most Commonly Available Marijuana Strains in Washington State

	Strain	Mean Cost August 2015	Mean Cost August 2017	Mean Difference
Washington Recreational Marijuana	Blue Dream Sour Diesel Train Wreck Green Crack OG Kush	$19.18 $16.16 $12.50 $15.12 $17.80 $\overline{X}$ = 16.15	$14.58 $12.33 $ 7.10 $12.14 $ 7.69 $\overline{X}$ = 10.76	-$4.60 -$3.83 -$5.40 -$2.98 -$10.11
Washington Medical Marijuana	Blue Dream Sour Diesel Train Wreck Green Crack OG Kush	$10.00 $10.75 $12.50 $18.66 $18.00 $\overline{X}$ = 13.82	$11.66 $ 9.86 $ 5.68 $ 9.71 $ 6.15 $\overline{X}$ = 8.61	+$1.66 -$0.89 -$6.82 -$8.95 -$11.85

References

Caulkin, J.P., Kilmer, B., & Kleiman, M. A. R. (2016). Marijuana legalization: what everyone needs to know. Oxford University Press: New York.

Department of Revenue (2017). Taxes Due on Marijuana. Retrieved from
    https://dor.wa.gov/find-taxes-rates/taxes-due-marijuana

Dilley, J. A., Hitchcock, L., McGroder, N., Greto, L. A., Richardson, S. M. (2017). Community-
    level policy responses to state marijuana legalization in Washington State. *Deviant
    Behavior*, *34:6*, 423-443.

Humphreys, K. (2016, May 4). So, something interesting happens to weed after it's legal. *The
    Washington Post*. Retrieved
    https://www.washingtonpost.com/news/wonk/wp/2016/05/04/the-price-of-legal-pot-is-
    collapsing/?utm_term=.f7aecbcd402f

Huddleston, T. (2015, June 22). Here's why marijuana prices appear to be dropping in Colorado.
    Fortune. Retrieved http://fortune.com/2015/06/22/marijuana-prices-colorado/

Kosterman, R., Bailey, J. A., Guttmannova, K., Jones, T. M., Eisenberg, N., & Hawkins, J.
    D. (2016). Marijuana legalization and parents' attitudes, uses, and parenting in
    Washington State. *Journal of Adolescent Health*, *59*, 450-456.

Mason, W. A., Fleming, C.B., Ringle, J. L., Hanson, K., Gross, T. J., & Haggerty, K. P.
    (2016). Prevalence of marijuana and other substance use before and after Washington
    State's change from legal medical marijuana to legal medical and nonmedical marijuana:
    Cohort comparisons in a sample of adolescents. *Substance Abuse*, *37:2*, 330-335.

O'Brien, P.K. (2013). Medical marijuana and social control: escaping criminalization and
    embracing medicalization. *Deviant Behavior*, *34:6*, 423-443.

Revised Code of Washington CW 9A.20; Classification of Crimes.

Revised Code of Washington 69.50.4013: Possession of controlled substance—Penalty—
    Possession of useable marijuana, marijuana concentrates, or marijuana-infused products
    —Delivery.

Revised Code of Washington 69.50.4014: Possession of forty grams or less of marijuana—
    Penalty.

Revised Code of Washington 69.51A.250: Cooperatives—Qualifying patients or designated
    providers may form—Requirements—Restrictions on locations—State liquor and
    cannabis board may adopt rules.

Roffman, R. (2016). Legalization of cannabis in Washington State: how is it going? *Society
    for the Study of Addiction*, *111*, 1139-1140.

Walker, M. (2016, August 16). Seattle Pot Store Owners Hang on as Weed Prices Fall. *KUOW*

News and Information. Retrieved from http://kuow.org/post/seattle-pot-store-owners-hang-weed-prices-fall

Washington State Liquor and Cannabis Board (2017). Frequently Requested Lists. Retrieved from https://lcb.wa.gov/records/frequently-requested-lists

Yauger, B. & Armes, J. (2015, October 16). MJ research: the 2015 Front Runner/MJBA Washington marijuana retailer report. *Front Runner*. Retrieved from http://mjnewsnetwork.com/business/mj-research-the-2015-front-runnermjba-washington-marijuana-retailer-report/

PSYCHOPATHIC TRAITS AND CORRECTIONAL STAFF TRAINING OF OFFENDER ADAPTIVE FUNCTIONING*

MARCUS T. BOCCACCINI, RAMONA M. NOLAND, LISA Y. KAN,[10] and KATRINA A. RUFINO[11]

ABSTRACT

Diagnosis of intellectual disability (formerly mental retardation) requires an assessment of adaptive functioning, which refers to the conceptual, social, and practical skills that are performed by people in their everyday lives. In forensic cases, evaluators might consider using correctional officers or other correctional staff as informants for scoring adaptive functioning measures. The purpose of this study was to examine whether offenders with higher levels of psychopathic traits would obtain inappropriately low adaptive functioning scores when rated by correctional staff. Overall, there was a pattern of small, but negative correlations between psychopathy and adaptive functioning scores, but these correlations appear to be better explained by an expected association between personality traits and behavior, as opposed to biased ratings from staff.

Psychopathic Traits and Correctional Staff Ratings of Adaptive Functioning

[10] Department of Psychology and Philosophy, Sam Houston State University

[11] Department of Social Sciences, University of Houston Downtown

* **Corresponding Author:** Marcus T. Boccaccini, Department of Psychology and Philosophy, Sam Houston State University, Huntsville, TX 77341 (e-mail: boccaccini@shsu.edu)

Diagnosis of intellectual disability (formerly mental retardation) requires an assessment of intellectual functioning, adaptive functioning, and the age of onset for impairments in these areas (American Psychiatric Association, 2013; Schalock et al., 2010). Diagnosis of intellectual disability among offenders became particularly controversial after the United States Supreme Court ruled in *Atkins v. Virginia* (2002) that it is unconstitutional to execute persons with intellectual disability. Many of the controversies in these cases surround the assessment of adaptive functioning, which refers to "the collection of conceptual, social, and practical skills that have been learned and are performed by people in their everyday lives" (Schalock et al., 2010, p. 15).

Guidelines for assessing adaptive functioning encourage the use of standardized assessment instruments, focusing on what individuals typically do in the present rather than what they or could do (Schalock et al., 2010). Standardized adaptive functioning instruments ask informants who know the patient/offender to rate his or her level of functioning across a number of areas, such as self-care, health, safety, communication, work, and school. For incarcerated offenders, evaluators might consider using correctional officers or other correctional staff as informants for scoring adaptive functioning measures. One survey of experienced forensic evaluators found that most considered interviewing correctional officers about adaptive functioning an appropriate practice in cases involving questions of intellectual disability, although they varied on how much credence they gave to correctional officers' opinions (Young, Boccaccini, Conroy, & Lawson, 2007).

There are, however, reasons to question the validity of adaptive functioning ratings from correctional staff. Correctional officers are not mental health experts, and non-experts appear to have a poor understanding of the adaptive functioning deficits that characterize intellectual disability (Boccaccini, Clark, Kan, Caillouet, & Noland, 2010). Indeed, findings from one recent

study suggest that correctional staff consistently assign adaptive functioning ratings that are too low, suggesting impairment among non-impaired offenders (Boccaccini, Kan, Rufino, Noland, & Young, 2016). Although none of the offenders in the study qualified for a diagnosis of intellectual disability, adaptive functioning ratings from correctional staff placed 28% of the offenders into the intellectual disability diagnostic range.

One possible explanation for these recent findings is that offenders with high levels of psychopathic or antisocial traits might obtain inappropriately low adaptive functioning scores (Young-Lundquist, Boccaccini, & Simpler, 2012). Adaptive functioning measures award higher scores to individuals who avoid transgressions, stay out of trouble, tell the truth, and act in a generally prosocial manner. Offenders with high levels of psychopathic traits may obtain low scores in these areas due to their behavioral choices, as opposed to the types of impairment that are of concern in intellectual disability cases.

In the one study to examine the association between adaptive functioning and psychopathic traits, probationers completed the self-report Adaptive Behavior Assessment System-II (ABAS-I; Harison & Oakland, 2003) and the Psychopathic Personality Inventory-Revised (PPI-R; Lilienfeld & Widows, 2005). Overall, adaptive functioning scores tended to be negatively correlated with psychopathy scores, seeming to support concerns about the possibility of inappropriately low adaptive functioning scores among offenders with high levels of psychopathic traits (Young Lundquist et al., 2012). For example, PPI-R Self-Centered Impulsivity and Coldheartedness factor scores were negatively correlated with ABAS-II General Adaptive Composite scores ($r = .47$ and $-.33$, respectively). In other words, those with the highest psychopathy measures scored tended to receive the lowest adaptive functioning scores.

Although these psychopathy and adaptive behavior findings are provocative, the researchers did not examine adaptive functioning scores assigned by other informants (e.g., correctional staff). The purpose of this study is to examine whether a similar pattern of negative

correlations between self-reported levels of psychopathic traits and correctional staff ratings of adaptive functioning may help to explain why correctional staff assign such low adaptive functioning scores (Boccaccini et al., 2016).

Method

Participants

Participants were 56 adult male probationers residing in a substance abuse treatment facility. These are the same 56 probationers included in the Boccaccini et al. (2016) study. The approximate length of stay for program completion was 10 months. Program participants progress through phases that begin with intensive treatment and move toward work release. We recruited probationers at treatment program community meetings (over a 10-month period), which are required monthly meetings for probationers. Participants were offered a small monetary compensation of $5.00 for their participation and completed the PPI-R in small groups.

The mean age among probationers was 30.25 years ($SD = 9.10$), and they had been at the community corrections facility for an average of 6.72 ($SD = 6.02$) months (range = 1 to 20 months) at the time of the study. With respect to offense history, 21 (37.5%) had been convicted of only substance related offenses (e.g., possession, distribution, driving while intoxicated) and 35 (62.5%) had been convicted of both substance use and other offenses (e.g., burglary, theft).

Four correctional staff members completed the ABAS-II for at least one probationer. Correctional staff were responsible for the day-to-day management of each probationer, including security and adherence to facility rules. We allowed the four staff members to decide which staff member was most familiar with the probationer. The most familiar staff member served as the informant for the ABAS-II ratings.

Measures

Adaptive Behavior Assessment System-Second Edition (ABAS-II). The ABAS-II

(Harrison & Oakland, 2003) is a standardized, comprehensive measure of adaptive behavior. The

ABAS-II is available in five forms, including a 239 item Adult Form. The Adult Form asks the

informant to rate how often the person being rated performs a specific behavior, without

assistance, when the behavior needs to be displayed (0 = is not able, to 3 = always or almost

always when needed). The ABAS-II item scores are used to compute three general composite

scores (Conceptual, Social, and Practical) and an overall General Adaptive Composite (GAC).

Composite scores have a mean of 100 and standard deviation of 15.

Psychopathic Personality Inventory-Revised (PPI-R). The PPI-R (Lilienfeld &

Widows, 2005) is a 154-item self-report measure of psychopathic traits. There are eight content

scales, three factor scores, and a total score. The three PPI-R factors are Fearless Dominance,

Self-Centered Impulsivity, and Coldheartedness. High Fearless Dominance scores indicate high

levels of interpersonal dominance and low levels of anxiety and worry, and are associated with

low levels of emotionality and neuroticism (Edens & McDermott, 2010; Marcus et al., 2012).

High Self-Centered Impulsivity scores indicate high levels of reckless impulsivity and self-

centeredness, and tend to be associated with high levels of both internalizing and externalizing

disorder symptoms on the PAI (Lilienfeld & Widows, 2005). High Coldheartedness scores

indicate a lack of sympathy for others and tend to be negatively correlated with measures of

anxiety and interpersonal warmth (Lilienfeld & Widows, 2005).

The PPI-R manual reports moderate to strong internal consistency for the PPI-R content

(α = .71 to .84) and factor (α = .76 to .91) scale scores in their normative offender sample

(Lilienfeld & Widows, 2005). With the exception of the Coldheartedness scale (α = .60), internal

consistency values were in the same general range (α = .73 to .86) for PPI-R scores in our

probationer sample. We excluded data from five probationers who scored in the Highly Atypical Range on the PPI-R Inconsistent Responding 40 (IR40) scale, suggesting that they completed the PPI-R in a careless or random manner. Thus, there were 51 probationers in our study analyses.

Results and Discussion

Table 1 provides correlations between ABAS-II and PPI-R scores. Overall, there was a pattern of small and generally negative correlations between self-reported psychopathic traits and staff-rated adaptive functioning. Consistent with prior research examining self-reported adaptive functioning (Young-Lundquist et al., 2012), correlations between the ABAS-II and the PPI-R were largest (and negative) for the PPI-R Self-Centered Impulsivity factor and content scales. For example, the largest correlation between the PPI-R and ABAS-II GAC scores in the study was for Carefree Nonplanfulness ($r = -.30, p = .03$), which is scored on the Self-Centered Impulsivity factor. But these correlations were smaller ($r \approx -.20$) than those based on self-reported adaptive functioning ($r \approx -.40$; Young-Lundquist et al., 2012).

With respect to areas of adaptive functioning, the strongest correlations were for the ABAS-II Practical composite, which focuses on self-care, health, safety, work, and home living. Those with higher levels of Self-Centered Impulsivity were rated by staff as having lower abilities in these areas ($r = -.29, p = .04$). Once again, the largest correlation was for the Carefree Nonplanfulness scale ($r = -.38, p = .006$). Among the ABAS-II Practical composite scales, correlations with Nonplanfulness were stronger for Home Living ($r = -.37, p = .008$), Health and Safety ($r = -.35, p = .01$), and Self Care ($r = -.33, p = .02$) than Community Use ($r = -.01, p = .94$) and Work ($r = -.15, p = .31$).

The PPI-R Carefree Nonplanfulness scale was designed to measure lack of forethought and little attention to long-term goals (Lilienfeld & Widows, 2005). In the PPI-R normative

sample, Carefree Nonplanfulness scores were more strongly correlated with conscientiousness (r = -.58) than any other PPI-R scores. Thus, the correlations between Carefree Nonplanfulness and ABAS-II Practical and General Adaptive Composite scores appear to reflect an expected association between personality traits and behavior, as opposed to biased ratings from correctional staff. Those with higher levels of Carefree Nonplanfulness tend to be low in conscientiousness, so it makes sense that they are rated by staff as lower than others on home living and self-care skills.

Although our findings provided little evidence of adaptive functioning ratings from correctional staff being biased as a result of psychopathic traits, they are based on a relatively small number of correctional staff informants in one probationer treatment setting. Questions about the validity of self-report adaptive functioning scores and information from correctional officers typically arise in discussions about capital case evaluations (Young et al., 2007). The probationers in this study and probation facility in which they resided differed in important ways from the typical capital case evaluation context. For these reasons, the extent to which our findings generalize to more restrictive jail or prison environments, with more violent offenders, is unclear.

Table 1

Correlations Between Psychopathy (PPI-R) and Adaptive Functioning (ABAS-II) Measure Scores

	ABAS-II			
PPI-R Factor/Scale	GAC	Conceptual	Social	Practical
Fearless Dominance	.04	.13	-.01	-.05
Social Influence	.09	.14	-.01	.04
Fearlessness	-.05	.05	.01	-.19
Stress Immunity	-.05	.03	-.09	-.04

Self-Centered Impulsivity	-.21	-.11	-.20	-.29*
Machiavellian Egocentricity	-.07	-.01	-.07	-.10
Rebellious Nonconformity	-.13	.04	-.18	-.21
Blame Externalization	-.18	-.16	-.16	-.20
Carefree Nonplanfulness	-.30*	-.24	-.20	-.38**
Coldheartedness	-.05	.07	-.05	-.04

_____

Note. $N = 51$. **$p \leq .01$, *$p \leq .05$.

References

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders*

    (5th ed.,). Washington, DC: Author

Atkins v. Virginia, 536 U.S. 304 (2002).

Boccaccini, M. T., Clark, J., Kan, L., Caillouet, B., & Noland, R. M. (2010). Jury pool members'

    beliefs about the relation between potential impairments in functioning and mental

    retardation: Implications for Atkins-type cases. *Law and Psychology Review, 34*, 1-24.

Boccaccini, M. T., Kan, L, Y., Rufino, K., Noland, R. M., Young-Lundquist, B. A., & Canales, E.

    (in press). Correspondence between correctional staff and offender ratings of adaptive

    behavior. *Psychological Assessment.* 10.1037/pas0000333

Edens, J. F., & McDermott, B. E. (2010). Examining the construct validity of the Psychopathic

    Personality Inventory-Revised: Preferential correlates of fearless dominance and self-

    centered impulsivity. *Psychological Assessment, 22*, 32-42. doi: 10.1037/a0018220

Harrison, P. L., & Oakland, T. (2003). *Adaptive Behavior Assessment System: Second Edition*

    [Manual]. Los Angles, CA: Western Psychological Services.

Lilienfeld, S. O., & Widows, M. R. (2005). *PPI-R professional manual.* Lutz, FL: Psychological

    Assessment Resources.

Marcus, D. K., Fulton, J. J., & Edens, J. F. (2012). *The two-factor model of psychopathic*

    personality: Evidence from the Psychopathic Personality Inventory, 3, 140-154. doi:

    10.1037/a0025282

Schalock, R. L., Borthwick-Duffy, S. A., Bradley, V. J., Buntinx, W. H. E., Coulter, D. L., Craig,

    E. M., et al. (2010). *Intellectual disability: Definition, classification, and systems of*

    supports (11th ed.). Washington, DC: American Association on Intellectual and

    Developmental Disabilities.

Young, B., Boccaccini, M. T., Conroy, M. A., & Lawson, K. (2007). Four practical and

    conceptual assessment issues that evaluators should address in capital case mental

retardation evaluations. *Professional Psychology: Research and Practice, 38*, 169-178.

doi: 10.1037/0735-7028.38.2.169

Young-Lundquist, B. A., Boccaccini, M. T., & Simpler, A. (2012). Are self-report measures of

adaptive functioning appropriate for those high in psychopathic traits? *Behavioral*

Sciences and the Law, 30, 693-709. doi: 10.1002/bsl.2039