Effects of genetic and environmental explanations of psychopathy and gender on perceptions of criminal behaviors

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Effects of genetic and environmental explanations of psychopathy and gender on perceptions of criminal behaviors

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ABSTRACT
Genetic/biological evidence is increasingly introduced into courtrooms but findings regarding its impact are mixed. This study integrates research on psychopathy and the use of genetic evidence in legal contexts by considering how information on genetic causal accounts of psychopathy affect perceptions of culpability, recidivism, amenability to treatment, and sentencing severity. Perpetrator gender was examined as a moderator. Two-hundred thirty-eight undergraduates read a hypothetical violent crime vignette and mock expert testimony regarding psychopathy. The testimony included a diagnosis only, or a diagnosis plus genetic or environmental explanations of the etiology of psychopathy. Results indicated that a genetic account of psychopathy was not clearly perceived as aggravating or mitigating such that participants were more lenient in their perceptions of culpability yet more punitive in their sentencing recommendations when perpetrators were described to have genetically-caused psychopathy. An environmental account of psychopathy was mitigating but only for sentencing severity. In addition, although participants were more lenient in sentencing male and female perpetrators when provided with an environmental cause of psychopathy, participants judged male perpetrators most harshly when provided with a genetic cause of psychopathy. Implications of the relations between etiology and gender in legal decision-making are discussed.

ARTICLE HISTORY
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KEYWORDS
Psychopathy; genetic essentialism; legal decision-making; perpetrator gender

Psychopathy is defined by superficial charm, callousness, a lack of remorse or guilt, shallow affect, narcissism, disinhibition, and deceitfulness (Patrick, 2005). Psychopathic individuals are prone to antisocial behaviors, including increased risk for committing violent crimes (Patrick, 2005). There is accumulating evidence of biological, neurological, and genetic underpinnings of
psychopathy (Dhanani et al., 2018). Individuals with psychopathic traits have abnormal amygdala functioning and impaired affective processing for threat and reward-related stimuli (Umbach, Berryessa, & Raine, 2015). Many genes have also been implicated in the etiology of psychopathy, such as the serotonin transporter gene and the monoamine oxidase A gene (Glenn, 2011). Indeed, behavioral genetic research suggests modest to high heritability of psychopathic traits (Dhanani et al., 2018).

The current study examined how the label of psychopathy interacts with varying etiological accounts to influence perceptions of criminal behavior. This study integrates research on psychopathy and the use of genetic/biological evidence in legal contexts by considering how information on genetic and environmental accounts of psychopathy are used to inform views of an alleged perpetrator. Further, we extend previous work (e.g. Aspinwall et al., 2012) by examining the moderating effects of perpetrator gender in influencing perceptions.

Prior work suggests that providing evidence of psychopathy has a prejudicial impact on decision-making among (mock) jury members and judges. The *label* of psychopathy was associated with perceptions of increased risk for future crime and violence and predicted more guilty verdicts and longer sentencing recommendations (Blais & Forth, 2013; Mowle, Edens, Clark, & Sörman, 2016). Providing *descriptions* of the defendant’s behaviors as consistent with features of psychopathy was similarly associated with harsher perceptions of the defendant (e.g. increased perceived dangerousness, increased perception of future risk of violence) and more punitive sentencing recommendations (e.g. increased support for capital punishment, decreased likelihood of recommending treatment; Costa, Pate, & Gibson, 2017; Cox, Clark, Edens, Smith, & Magyar, 2013; Edens, Colwell, Desforges, & Fernandez, 2005; Edens, Davis, Smith, & Guy, 2013; Edens, Desforges, Fernandez, & Palac, 2004). Thus, evidence of psychopathy in legal contexts seems to be perceived negatively.

**Genetic/neurological/biological evidence in legal contexts**

Independent of psychopathy, biological explanations have been successfully used to mitigate responsibility in court (Forzano et al., 2010). However, research on the legal implications of genetic or neurological information paints a more nuanced picture. In several studies, genetic or neurological information did not influence attitudes or perceptions toward the defendant (Appelbaum, Scurich, & Raad, 2015), verdicts, or sentencing recommendations (Appelbaum et al., 2015; Schweitzer et al., 2011; Scurich & Appelbaum, 2016). In contrast, in some studies, genetic/biological evidence increased perceptions of future dangerousness, need for treatment, and fear of the defendant (Costa et al., 2017; Scurich & Appelbaum, 2016), indicating
aggravating effects. Still, other studies found mitigating effects of presenting genetic/neuroscientific information such that perceptions of culpability of the defendant were reduced (Schweitzer et al., 2011), perceptions of remorsefulness and sympathy were increased (Green & Cahill, 2012), and less guilty verdicts and severe sentences were recommended (Catley & Claydon, 2015; Green & Cahill, 2012; Schweitzer & Saks, 2011). Thus, legal implications of presenting genetic/neurological/biochemical information appear inconsistent and may vary as a function of the outcome (conviction vs. sentencing, beliefs/perceptions toward the defendant vs. legal decisions).

Mixed findings may be due to genetic essentialist biases, which impact perceptions of control, rehabilitation, recidivism, and judgments of criminal responsibility and sentencing in opposing ways. Dar-Nimrod and Heine (2011) argued that when people are presented with genetic information about the cause of a behavior, they exhibit a bias by viewing the behavior as absolute, determined, and representing something deeply-rooted in the individual. However, the bias of interpreting genetic information as evidence of a one-to-one correspondence between genotype and phenotype is often inaccurate because the majority of genetic effects are multifactorial and polygenetic even for a single behavior or trait (Dar-Nimrod & Heine, 2011). On the one hand, genetic attributions of behaviors such as violence may invoke perceptions of diminished control because the cause of the behavior is genetic, hence outside of an individual’s control. As such, genetic attributions would invoke perceptions of diminished criminal responsibility and more lenient punishments (Aspinwall et al., 2012; Dar-Nimrod & Heine, 2011). On the other hand, genetic attributions may also elicit perceptions of immutability and determinism (Dar-Nimrod & Heine, 2011). When the cause of the behavior is viewed as immutable and internal, the individual is more likely to reoffend, suggesting increased dangerousness, a decreased likelihood of amenability to treatment, and thus requiring more punitive sentencing to protect the public (Aspinwall et al., 2012; Dar-Nimrod & Heine, 2011). Thus, a single behavior (i.e. violence) attributed to genetic causes can simultaneously lead to perceptions of diminished culpability yet harsher sentencing. Indeed, Cheung and Heine (2015) found that genetic evidence functioned as both a mitigating and aggravating factor in a single case.

Only a handful of studies have examined how the label/diagnosis of psychopathy interacts with biological accounts of etiology to influence perceptions of criminal behavior. Some studies found no interactive effects between psychopathy and the presence of neuroscientific testimony (e.g. Gurley & Marcus, 2008). Others found that neuroscientific evidence had mitigating effects even when judging psychopathic defendants, such as reduced perceptions of dangerousness, reduced judgments of responsibility, and less severe sentence recommendations (Marshall, Lilienfeld, Mayberg, & Clark, 2017; Saks, Schweitzer, Aharoni, & Kiehl,
Still, other studies report both mitigating and aggravating effects. Aspinwall et al. (2012) found that presenting biological evidence of psychopathy reduced perceptions of culpability relative to the absence of such evidence, yet biological evidence also increased perceived likelihood of recidivism among judges. Similarly, neurogenetic evidence of psychopathy helped lower perceptions of legal responsibility relative to only a diagnosis of psychopathy, yet when genetic information was provided by the prosecution, judges tended to recommend longer sentences (Fuss, Dressing, & Briken, 2015). Thus, it seems that providing genetic/biological information regarding the cause of psychopathy may be a ‘double-edged sword.’ More research is needed to examine the effects of biological explanations in relation to additional or alternative valid explanations of psychopathy, such as environmental or psychosocial accounts.

**Psychosocial evidence in legal contexts**

To our knowledge, there has been no research examining the use of psycholegal evidence regarding environmental etiologies for psychopathy in the courtroom. Several studies have examined how contextual variables, primarily child abuse history, affect perceptions of offenders and legal decision-making independent of psychopathy. Such studies yielded similar inconsistent results. Evidence of history of child abuse functioned as a mitigating factor in some studies (e.g. less severe sentencing; Nunez, Dahl, Tang, & Jensen, 2007) but functioned as an aggravating factor in others (Stevenson et al., 2015). Stevenson (2009) reasoned that mixed findings may be due to methodological differences with designs and samples, where mock jurors in vignette studies may perceive the isolated effect of psychosocial evidence as mitigating, whereas court officials in surveys and correlational studies may view it as aggravating due to confounding factors inherent in real cases involving a history of child maltreatment (e.g. chaotic home environment, substance use). The present study also attempted to address mixed findings on psychosocial information in the context of psychopathy.

**Gender disparities in legal decision-making**

Several studies have examined gender disparities in sentencing decisions with varying results. Female defendants may be half as likely to be incarcerated as males (Steffensmeier, Ulmer, & Kramer, 1998) and may receive over 60% shorter sentences than male defendants (Starr, 2015). Although women may be less likely to be incarcerated when including all types of offenses, there seem to be no significant gender differences in sentencing decisions for violent crimes (Rodriguez, Curry, & Lee, 2006). Rodriguez and
colleagues argued that because violent offending violates feminine norms, female perpetrators are perceived more negatively.

This argument is consistent with benevolent sexist attitudes (e.g. women are nurturing, in need of protection) toward women who do not conform to traditional gender roles (e.g. by committing acts of violence) and are thus deserving of increased sanctions (Glick & Fiske, 1996). Female offenders may be perceived as more hostile and deviant than male offenders, and ostensibly mitigating variables such as childhood abuse may not function as such for females (Stevenson, 2009). For instance, Nunez, Dahl, and Hess (2005) found that female offenders with a history of childhood abuse were sentenced more harshly than their male counterparts. Such effects may be more pronounced in the context of genetic accounts of psychopathy, with female perpetrators being ‘wired’ as less empathic and more callous than what is viewed as typical of females, further violating gender norm expectations. In the only known study investigating perceived differences in amenability to treatment and likelihood of reoffending for psychopathic individuals, there were no significant differences between perceptions of male and female perpetrators (Blais & Forth, 2013).

The current study

This study addressed whether information regarding psychopathy functions as a mitigating or aggravating factor and whether different causal accounts (i.e. genetic vs. environmental) differentially influence perceptions of criminal behavior. Five conditions were included: 1) control (no perpetrator gender/no etiology); 2) male/genetic; 3) male/environmental; 4) female/genetic; or 5) female/environmental. The present study extended previous research by manipulating the etiology of psychopathy to examine both biomechanical and environmental causal explanations as well as by considering the moderating effect of perpetrator gender in these relations, as a separate line of research has highlighted a potential role of gender in legal decision-making.

Hypotheses

H1: In accordance with Blais and Forth (2013) and Mowle et al. (2016)’s findings, the diagnosis of psychopathy alone (control) was expected to be related to perceptions of high culpability and recidivism, low amenability to treatment, and more severe sentencing recommendations, relative to evidence of psychopathy with etiological explanations. H2: Genetic accounts of psychopathy were expected to reduce perceived culpability and amenability to treatment but increase perceived recidivism and sentencing severity, relative to all other conditions, consistent with the theory of genetic essentialism and findings
from Aspinall et al. (2012) and Fuss et al. (2015). H3: Because environmental variables are often presented as mitigating evidence (Bell-Holleran, Vaughan, & Vandiver, 2017), it was hypothesized that environmental accounts of psychopathy would similarly reduce perceived culpability but to a lesser degree than genetic accounts, consistent with findings from Cheung and Heine (2015) and Schweitzer and Saks (2011). However, it was hypothesized that environmental accounts of psychopathy would also reduce the perceived likelihood of recidivism, increase perceived amenability to treatment, and decrease sentencing severity, due to findings of mitigation with prior vignette-based studies (Stevenson, 2009). Gender of the perpetrator was examined as a moderator. H4: It was hypothesized that female perpetrators would be viewed more harshly when coupled with a genetic account of psychopathy, due to gender role violations associated with violent crime (Glick & Fiske, 1996; Rodriguez et al., 2006).

Method

Participants

Participants were 238 undergraduates (79% female, 21% male) recruited to participate in an anonymous online survey in exchange for course credit. Participants were required to be at least 18 years of age (M = 19.97, SD = 2.29) and were primarily White/Caucasian (73.1%), with a smaller representation of non-White (23.5%) and biracial/multiracial (2.9%) individuals. Participants were predominantly born in North America (91.2%), and most received their education in North America (95.8%), primarily in the U.S. The median family of origin income level was $75,000-$99,999. Most participants (95.4%) did not have an arrest history. Most participants indicated their religious background as Christian (64.7%) and 29% as non-religious/atheist (2.5% as other, 3.8% as missing). The sample, on average, was somewhat liberal in its political affiliation (M = 3.8, SD = 1.79, 1 = far left/liberal, 7 = far right/conservative).

Procedure

Participants were informed that the researchers were interested in understanding how they perceive variables related to legal decision-making. Participants were randomly assigned to one of five conditions (see Figure 1 for study design): 1) 79 in control (no perpetrator gender/no etiology); 2) 37 in male/genetic; 3) 41 in male/environmental; 4) 39 in female/genetic; and 5) 42 in female/environmental. All participants were presented with the same hypothetical vignette describing a violent crime (see Supplemental Materials for vignette and descriptions of etiology). Participants in the
Control condition did not receive information on the gender of the perpetrator or victim, whereas participants in the other four conditions were presented with the gender of the perpetrator and victim (e.g. Male/Genetic etiology condition read a case about a male perpetrator and male victim). Participants were then presented with mock expert testimony regarding the perpetrator’s diagnosis of psychopathy, similar to Aspinwall et al. (2012) paradigm. Participants in the Control condition did not receive further information about the etiology of psychopathy. Participants in the genetic and environmental conditions received further fictional descriptions about the etiology of psychopathy that corresponded to their condition (i.e. genetic mutation in the genetic condition; adverse childhood experiences in the environmental condition). All participants then completed questions regarding their perceptions of the alleged perpetrator.

Measures

Demographics
Participants provided demographic information regarding their sex, gender, race/ethnicity, country of birth/education, religious background, political affiliation, level of income, level of education, and prior history of arrest.
Culpability
The content of the questions was comparable to Cheung and Heine (2015). Minor changes were made to fit the content of the current vignette, and the Likert scale was changed (Likert scales varied across items in Cheung and Heine’s study). Participants rated five items on a 6-point scale (1 = not at all, 6 = completely) the degree to which: 1) the perpetrator had conscious control over his/her actions, 2) the perpetrator intended to harm the victim, 3) the perpetrator had knowledge that his/her actions would injure the victim, 4) the perpetrator could fully control the cause of his/her behavior, and 5) the perpetrator was criminally responsible for the crime, given all available evidence.

Recidivism
Items were adapted from Cheung and Heine (2015) in a similar manner to what was described above. Participants rated six items on a 6-point scale (1 = not at all, 6 = completely) the degree to which: 1) the perpetrator will engage in the same act if released, 2) the perpetrator will pose a risk of violence, 3) the perpetrator will engage in any future criminal behavior, 4) the cause of the perpetrator’s behavior will always play a role in future violent behavior, 5) the cause of the perpetrator’s behavior will influence all areas of his/her life, and 6) the cause of the perpetrator’s behavior is due to something about the perpetrator.

Amenability to change
Participants rated two items on a 6-point scale (1 = very unlikely, 6 = very likely) the degree to which: 1) the perpetrator will benefit from psychological treatment (from Boccaccini, Murrie, Clark, & Cornell, 2008), and 2) the cause of the perpetrator’s behavior is something that can be changed or corrected (from Cheung & Heine, 2015).

Sentencing severity
Participants chose from 5 options: 1) the court should require the perpetrator to receive psychological treatment in the community, 2) the court should require the perpetrator to receive intensive supervision with probation (but no time behind bars), 3) the court should require the perpetrator to be treated at a forensic psychiatric hospital until he/she is no longer dangerous, 4) the court should require the perpetrator to be incarcerated with the possibility of parole, and 5) the court should require the perpetrator to be incarcerated without the possibility of parole. This item was adapted from Boccaccini et al. (2008) with minor wording changes to reflect recommendations for an adult perpetrator rather than for youth. Participants were also asked to recommend one of three options: 1) shorter than average punishment, 2) average punishment, and 3) longer than average punishment. This item was from Aspinwall et al. (2012).
**Data analytic plan**

A factor analysis was conducted on the 13 culpability, recidivism, and amenability to change items to determine the appropriate factors to use as outcome variables. Correlations between demographic and legal perception variables were examined to determine appropriate covariates to include in subsequent models. To address H1, t-tests were conducted to assess differences between experimental conditions and the control condition. To address H2, H3, and H4, multivariate analyses of variance (MANOVA) were conducted for continuous outcome variables (e.g. culpability), and chi-square tests were conducted for categorical outcome variables (e.g. sentence recommendations). A full factorial design was not possible because we did not cross gender in the control condition. Instead, two sets of dummy variables were created to represent conditions. To examine the effect of etiology, an etiology dummy variable was created collapsing across demographic conditions (0 = control, 1 = genetic, 2 = environment). To examine the interactive effects of demographic and etiology information, a condition dummy variable was created (0 = control, 1 = female/gene, 2 = female/environment, 3 = male/gene, 4 = male/environment). These variables served as fixed factors in MANOVAs.

**Results**

The factor analysis with principal axis factoring and oblimin rotation, specifying three factors, revealed that this solution accounted for 47.16% of the variance. One factor represented culpability (4 items, one item was dropped to improve reliability- ‘the perpetrator can control the cause of his/her behavior’), one factor represented recidivism (6 items), and one factor represented amenability to change (2 items).

Descriptive statistics are in Table 1. Females provided higher ratings of likely recidivism than males, $t(234) = −2.21, p = .028, d = .35$. Males were more likely to endorse the most punitive recommendation (perpetrator to be incarcerated without the possibility of parole), $\chi^2(4) = 14.7, p = .005$. Country of birth significantly influenced ratings of likely recidivism, $F(6) = 2.39, p = .029, \eta^2 = .06$. Planned contrasts indicated that participants who were born in North America provided higher ratings of recidivism than participants who were born in Europe, $b = −1.02, s.e. = .40, p = .012, 95\% CI [−1.92, −.23].

<table>
<thead>
<tr>
<th>Variables</th>
<th>M</th>
<th>SD</th>
<th>Min/Max</th>
<th>Skew</th>
<th>Kurtosis</th>
<th>α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culpability</td>
<td>4.84</td>
<td>.96</td>
<td>2/6</td>
<td>−.70</td>
<td>−.47</td>
<td>.83</td>
</tr>
<tr>
<td>Recidivism</td>
<td>4.73</td>
<td>.70</td>
<td>2.33/6</td>
<td>−.41</td>
<td>.02</td>
<td>.81</td>
</tr>
<tr>
<td>Amenability to Change</td>
<td>3.94</td>
<td>.91</td>
<td>1/6</td>
<td>−.52</td>
<td>.54</td>
<td>.52</td>
</tr>
</tbody>
</table>
Age, income, ethnicity, and political affiliation were not significantly related to perceptions of criminal behavior. Thus, participant gender and country of birth were included as covariates in MANOVA models.

The addition of demographic and etiological information

T-tests revealed differences in perceptions of criminal behavior when comparing the addition of gender or etiological information to the control condition. Additional information helped lower perceptions of culpability, $t(234) = 2.95, p = .003, d = .41$. Participants in the control condition also recommended more severe sentencing than expected assuming equal probability across each of the recommendation categories (i.e. incarceration without the possibility of parole), whereas participants who received additional information recommended more lenient sentencing than expected (i.e. intensive supervision without jail or treatment in a forensic psychiatric hospital), $\chi^2(4) = 10.15, p = .038$. Similarly, participants in the control condition were more likely to recommend a ‘longer than average’ punishment than those who received gender and etiological information, $\chi^2(2) = 8.85, p = .012$. H1 was partially supported. The control condition was related to higher perceptions of culpability and more severe sentencing recommendations than the other conditions, but there were no differences for recidivism or amenability to change.

Comparing genetic, environmental, and control conditions

A MANOVA was conducted with etiology as the fixed factor, gender and country of birth as covariates, and culpability, recidivism, and amenability to change as outcomes. Results revealed significant group differences across etiology conditions, Pillai’s trace $V = .07, F(6, 458) = 2.61, p = .017$. Significant group differences emerged for culpability, $F(2) = 4.16, p = .011, \eta^2 = .04$, but not recidivism, $F(2) = .95, p = .387$, or amenability to change, $F(2) = .89, p = .414$ (Table 2). Three planned contrasts were conducted to explore group differences in perceived culpability with alpha criterion set to .02 to account for family-wise error. Results indicated significant differences between the genetic and control conditions, $b = -.45, s.e. = .15, p = .004, 95\% \text{ CI} [-.75, -.14]$, with perpetrators in the control vignette being perceived as more culpable. The environmental and control conditions did not differ from one another, $p = .027$, and the genetic and environmental conditions did not differ from one another, $p = .476$.

Chi-square tests revealed group differences for sentencing severity, $\chi^2(4) = 13.26, p = .010$, but not for court recommendations, $\chi^2(8) = 12.69, p = .123$. Participants were less likely to endorse a ‘shorter than average’ punishment in the genetic condition relative to the other conditions.
Participants in the environmental condition were more likely to endorse a ‘shorter than average’ punishment relative to the control condition and less likely to endorse a ‘longer than average’ punishment relative to the control and genetic conditions (Figure 2).

H2 was partially supported. Although genetic explanations were related to reduced perceived culpability and increased sentencing severity, they were not associated with perceived recidivism or amenability to change. H3 was also partially supported. Environmental explanations were tied to decreased sentencing severity but did not reduce ratings of culpability or recidivism or increase perceptions of amenability to change.

**Table 2.** MANOVA results for the effect of etiology.

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Dependent Variable</th>
<th>Sum of Squares</th>
<th>df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Culpability</td>
<td>.002</td>
<td>1</td>
<td>.002</td>
<td>.962</td>
</tr>
<tr>
<td></td>
<td>Recidivism</td>
<td>2.355</td>
<td>1</td>
<td>4.798</td>
<td>.030</td>
</tr>
<tr>
<td></td>
<td>Amenity to Change</td>
<td>1.601</td>
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<td>1.900</td>
<td>.169</td>
</tr>
<tr>
<td>Birth Country</td>
<td>Culpability</td>
<td>.709</td>
<td>1</td>
<td>.783</td>
<td>.377</td>
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<td></td>
<td>Recidivism</td>
<td>2.355</td>
<td>1</td>
<td>.029</td>
<td>.865</td>
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<tr>
<td></td>
<td>Amenity to Change</td>
<td>1.601</td>
<td>1</td>
<td>.151</td>
<td>.698</td>
</tr>
<tr>
<td>Etiology</td>
<td>Culpability</td>
<td>8.326</td>
<td>2</td>
<td>4.594</td>
<td>.011</td>
</tr>
<tr>
<td></td>
<td>Recidivism</td>
<td>.937</td>
<td>2</td>
<td>.954</td>
<td>.387</td>
</tr>
<tr>
<td></td>
<td>Amenity to Change</td>
<td>1.493</td>
<td>2</td>
<td>.886</td>
<td>.414</td>
</tr>
</tbody>
</table>

Note: Etiology was coded as 0 = control, 1 = genetic, 2 = environmental.

Interactions between demographic and etiological information

A MANOVA was conducted with condition as the fixed factor, gender and country of birth as covariates and culpability, recidivism, and amenability to
change as outcomes. Results revealed significant group differences for culpability, $F(4) = 2.42, p = .033, \eta^2 = .05$, but not for recidivism, $F(4) = 1.15, p = .336$, or amenability to change, $F(4) = .52, p = .724$ (Table 3). Eight planned contrasts were conducted for the culpability outcome, with alpha criterion set to $\alpha = .006$.

Considering gender comparisons, there were no significant contrasts between male and female conditions within etiological accounts (i.e. no difference between female/genetic vs. male/genetic or between female/environment vs. male/environment). Planned contrasts indicated trends for differences between the female/gene condition vs. control, $b = -.50, s.e. = 19, p = .008, 95\% \text{ CI} [-.87, -.13], r_{\text{contrast}} = .17$, male/gene condition vs. control, $b = -.39, s.e. = .19, p = .042, 95\% \text{ CI} [-.77, -.02], r_{\text{contrast}} = .14$, and female/environment condition vs. control, $b = -.46, s.e. = .18, p = .014, 95\% \text{ CI} [-.82, -.09], r_{\text{contrast}} = .16$, but no significant difference between male/environment condition vs. control. Thus, perpetrators in the control vignette tended to be perceived as more culpable than those in the male/gene condition and in the female/gene and female/environment conditions, although these effects were not significant at the corrected level of alpha.

Chi-square tests revealed group differences for sentencing severity, $\chi^2 (8) = 15.87, p = .044$. Participants were less likely to endorse a ‘longer than average’ punishment in the female/environment condition than in the other conditions, less likely to endorse a ‘shorter than average’ punishment in the male/gene condition, and were more likely to endorse a ‘shorter than average’ punishment in the male/environment condition than in the other conditions. There were no significant group differences for court recommendations, $\chi^2 (16) = 18.00, p = .324$. H4 was not supported. The control condition was associated with the most severe judgments of culpability. Further, the female/gene condition was not associated with more severe sentencing or court recommendations. Rather, the female/environment and male/environment conditions were associated with mitigation, whereas the male/gene condition was associated with aggravation for sentencing recommendations. There were no differences across conditions for perceived recidivism or amenability to change.

### Table 3. MANOVA results for the combined effect of etiology and demographic.

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Dependent Variable</th>
<th>Sum of Squares</th>
<th>df</th>
<th>F</th>
<th>p</th>
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<td>Intercept</td>
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<td>&lt;.001</td>
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<tr>
<td></td>
<td>Recidivism</td>
<td>189.245</td>
<td>1</td>
<td>386.723</td>
<td>&lt;.001</td>
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<tr>
<td>Gender</td>
<td>Culpability</td>
<td>.004</td>
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<td>.004</td>
<td>.949</td>
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<tr>
<td></td>
<td>Recidivism</td>
<td>2.281</td>
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<td>4.662</td>
<td>.032</td>
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<tr>
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<td>Amenability to Change</td>
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<td>1.916</td>
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<td>Birth Country</td>
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<td>Amenability to Change</td>
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<td>Condition</td>
<td>Culpability</td>
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<td>4</td>
<td>2.662</td>
<td>.033</td>
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<tr>
<td></td>
<td>Recidivism</td>
<td>2.242</td>
<td>4</td>
<td>1.145</td>
<td>.336</td>
</tr>
<tr>
<td></td>
<td>Amenability to Change</td>
<td>1.751</td>
<td>4</td>
<td>.516</td>
<td>.724</td>
</tr>
</tbody>
</table>

Note: Condition was coded as 0 = control, 1 = female/gene, 2 = female/environment, 3 = male/gene, 4 = male/environment.
Discussion

The present study furthered previous research by considering how perceptions of criminal behavior are differentially influenced by genetic versus environmental causal explanations for psychopathy. Consistent with hypothesis and prior literature (Blais & Forth, 2013; Edens et al., 2005, 2013, 2004; Mowle et al., 2016), in the absence of etiological information, participants perceived psychopathy harshly, suggesting that the diagnosis/label of psychopathy alone is aggravating.

Hypotheses regarding the differential impact of genetic versus environmental etiology were only partially supported. Consistent with hypotheses and prior research (Aspinwall et al., 2012; Fuss et al., 2015), genetic explanations mitigated culpability but aggravated sentencing severity, suggesting that a genetic account of psychopathy was not clearly perceived as an aggravating or a mitigating factor. Based on retributive theories of punishment, perpetrators whose criminality is attributed to genetic causes should be perceived less harshly and treated more leniently given ostensibly uncontrollable explanations for their behavior (Cheung & Heine, 2015). However, the same genetic explanations presuppose immutability thus suggesting increased risk for recidivism and reduced amenability to change. The confluence of retributive and essentialist theories may have contributed to ambivalent perceptions. Environmental explanations also mitigated sentencing severity, consistent with hypotheses and prior studies with similar vignette designs (Stevenson, 2009). Although there was a trend that environmental explanation reduced culpability relative to the absence of etiological information, this difference was not statistically significant at the corrected alpha criterion. This lack of difference was unexpected, as previous studies have found genetic evidence to have stronger mitigating effects than environmental or psychosocial evidence (Cheung & Heine, 2015; Schweitzer & Saks, 2011). However, prior studies did not examine these relations in the context of psychopathy. It is possible that because psychopathy is viewed punitively by default (control condition), any etiological explanations may have a mitigating effect by helping to frame behaviors associated with the condition away from personal control, whether it be attributed to genetic or psychosocial factors.

Overall, only perceptions of culpability and sentencing severity were influenced by etiological accounts. Types of explanations of psychopathy were unrelated to perceived recidivism or amenability to change. Such null findings may be due to laypersons’ perceptions of psychopathy as ‘something inherently evil, dangerous, and violent,’ which may attenuate the possibility of detecting etiology effects if participants already viewed psychopathic individuals as highly likely to recidivate and not likely to change. Indeed, some research indicates such a bias in perceptions of psychopathy, especially relative to other diagnoses (i.e. psychosis, depression; Green & Cahill, 2012; Gurley & Marcus, 2008; Marshall et al., 2017).
Extending previous findings, etiological explanations for psychopathy seem to function somewhat differently when describing male versus female perpetrators. Perpetrator gender and etiology of psychopathy interacted to predict sentencing recommendations but not in expected ways. It was hypothesized that descriptions of female perpetrators coupled with genetic causes of psychopathy would be viewed most harshly due to extreme gender role violations. Rather, perceptions of male perpetrators seem to be particularly influenced by etiological account. Males who were described as having genetic causes for their psychopathic characteristics were less likely to be recommended for shorter sentences, whereas male perpetrators who were described as having environmental causes for their psychopathic traits were more likely to be recommended for shorter sentences. Some research suggests that masculinity is associated with criminal behavior through shared characteristics of toughness, aggression, and dominance (e.g. Horwitz & White, 1987). However, masculine violence may no longer be reinforced when a ‘criminal orientation’ (such as psychopathy) precludes someone from conforming to legitimized social norms and values (McFarlane, 2013, p. 332). As such, it is possible that perceivers are more understanding of male psychopathic behavior with environmental – and perhaps impermanent – causal pathways. The lack of support for more punitive perceptions regarding female psychopaths with genetically-caused psychopathy is consistent with prior research indicating no gender differences in sentencing recommendations for violent behaviors (Rodriguez et al., 2006) and no gender differences in perceptions of psychopathic perpetrators (Blais & Forth, 2013).

These findings add to the growing literature regarding prejudicial effects of both neurobiological evidence and labels of psychopathy in the courtroom. There are several implications for practitioners working within the criminal justice system. First, the importance of neurogenetic evidence regarding psychopathy may be most relevant for perceptions of culpability and sentencing severity. Second, etiological explanations may be most relevant for male psychopathic offenders. Together, knowledge of these effects may inform how evidence or judicial instructions are presented to jurors.

**Limitations**

There are several limitations to note. First, because gender was not included in the control condition, a full factorial model was not possible. Future studies with fully crossed factorial designs can better discern main and interactive effects of each independent variable. There may not have been sufficient statistical power to detect some contrasts between conditions and interaction effects (i.e. the four experimental conditions had approximately 40 participants each). The sample consisted of undergraduates with relatively high family income, which limits the generalizability of findings pertaining to legal decision-making, as they are a small representation of the eligible pool of jurors, and to sentencing decisions,
because such decisions are made by judges. A larger and more representative sample is necessary to determine whether current findings generalize to the actual criminal trials, as previous studies have indicated different results as a function of the type of participants (Stevenson, 2009). We sought to distinguish between genetic and environmental explanations for criminal behavior more broadly and how such causal factors may be differentially perceived for male and female offenders. Thus, we chose to employ the same genetic manipulation used in Aspinwall et al. (2012)’s study rather than currently identified biological correlates (e.g. amygdala or prefrontal dysfunction). However, future studies incorporating current knowledge of neuroscientific correlates of psychopathy can help increase external validity. Although we reasoned that genetic essentialist bias may be the underlying mechanism leading to ambivalent perceptions related to genetic causes of psychopathy, we did not include a measure of genetic essentialism or related attributions. Future studies can be strengthened with these additional measures to test for mediational models.

**Future directions**

Future research should clarify the relative weight of components of biological versus environmental explanations for psychopathic perpetrators’ violent behavior. Gene-environment transactions (e.g. parental incarceration) may be similarly examined. Future research may also manipulate victim and perpetrator gender to examine the relevance of intergender effects. Violence committed by male psychopathic perpetrators against female victims may be perceived differently from violence committed by female psychopathic perpetrators against male victims. In addition to perpetrator gender, other demographics such as perpetrator race or age may also interact with etiological explanations of psychopathy to predict legal decisions. Given the ambivalent perceptions in this study, researchers should continue to consider which factors contribute to or qualify the double-edged nature of psychopathy and etiological evidence in legal decision-making.

**Disclosure statement**

No potential conflict of interest was reported by the authors.

**References**


Stevenson, M. C. (2009). Perceptions of juvenile offenders who were abused as children. *Journal of Aggression, Maltreatment & Trauma, 18*, 331–349.
