Lifetime trauma victimization and PTSD in relation to psychopathy and antisocial personality disorder in a sample of incarcerated women and men

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Abstract

Purpose ——Antisocial personality disorder (ASPD) and psychopathy are similar, but distinct, psychiatric conditions that are common in male and female inmates; a segment of the population with high rates of trauma exposure. It is unclear whether specific types of lifetime trauma are associated with ASPD and psychopathy in incarcerated women and men. Furthermore, the unique roles of post-traumatic stress disorder (PTSD) symptom severity and trauma victimization in antisocial personality disturbance are not well-understood. The paper aims to discuss these issues.

Design/methodology/approach ——This study investigated associations between trauma variables (different kinds of traumatic experiences and PTSD) and antisocial personality variables (ASPD and psychopathy) in a sample of incarcerated women and men who participated in a randomized clinical trial for major depressive disorder. In total, 88 incarcerated men and women were assessed for ASPD diagnosis, psychopathy severity, PTSD symptom severity, and history of physical, sexual, and crime-related trauma. Regression analyses predicted ASPD or psychopathy from trauma variables, controlling for gender.

Findings ——Physical trauma was the only form of trauma that was significantly related to psychopathy. Physical trauma and crime-related trauma were associated with ASPD. PTSD symptom severity was not associated with psychopathy or ASPD.

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Originality/value ——There are associations between some kinds of lifetime trauma exposure and current ASPD/psychopathy in the target sample, but these associations do not appear to be mediated through current PTSD symptoms.

Keywords

Psychological health; Post-traumatic stress disorder; Psychopathy; Abuse; Antisocial personality disorder; Trauma

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High rates of personality disturbance, especially antisocial personality disorder (ASPD), have been documented in incarcerated populations. ASPD is a persistent pattern of disregard for societal rules and the rights of others that is characterized by unlawful behavior, deception, impulsiveness, aggression, and lack of remorse (American Psychiatric Association, 2000). ASPD has public health importance in that, perhaps due to characteristics of the disorder (i.e. impulsivity and indifference to behavioral consequences), individuals with this disorder are prone to suicidal behavior, are vulnerable to death by unnatural causes, and have serious patterns of prolonged substance abuse and dependence, which may contribute to high rates of morbidity in this population (see Davison, 2002; De Brito and Hodgins, 2009; Moran, 1999). Moreover, individuals with ASPD place a hardship on society in that their apathy, propensity toward irritability and aggression, and remorselessness negatively impacts their families and the victims of their crimes (De Brito and Hodgins, 2009). A systematic review conducted over several decades in 12 countries revealed that 57 percent of males and 21 percent of women in prison carry an ASPD diagnosis (Fazel and Danesh, 2002).

Exposure to traumatic events during childhood is common among individuals with ASPD (Afifi et al., 2011; Battle et al., 2004; Bierer et al., 2003). The association between trauma history and ASPD diagnosis has led some researchers to conclude that childhood abuse and neglect may play an important role in the development of ASPD (see Farrington, 2005; Johnson et al., 1999; Luntz and Widom, 1994). For example, several researchers have argued that childhood abuse affects the development of emotion regulation capacities, including the ability to regulate anger (Erwin et al., 2000; Ford, 2009). Emotion regulation deficits may persist into adulthood and can result in aggressiveness and violent behavior; two key features of ASPD. However, it is unclear whether distinct forms of interpersonal trauma (i.e. physical, sexual, and crime-related trauma) are differentially related to ASPD. It is possible that different types of trauma have differential effects on risk for ASPD or contribute distinctly to the severity or maintenance of the personality disturbance. Understanding how different types of interpersonal trauma effect risk and/or maintenance of ASPD will add to our understanding of the phenomenology of ASPD and elucidate how trauma interacts with ASPD.

Psychopathy is a clinical construct that substantially overlaps with, but is distinct from, ASPD (Hare et al., 1991; Ogloff, 2006; Warren and South, 2006). Both psychopathy and ASPD share features of impulsivity, irresponsible behavior, aggression, deception, and social norm violations (Dolan and Vollm, 2009; Rogstad and Rogers, 2008; Warren and South, 2006). However, psychopathy has interpersonal and affective personality deficits (i.e. glib

and superficial, lack of empathy and remorse, inflated and arrogant self-appraisal) at its core (Rogstad and Rogers, 2008); it is possible to have ASPD (especially an impulsive, dysregulated version – e.g., being irritable and aggressive, impulsive, and irresponsible) without being psychopathic (e.g. cunning, manipulative, cold, calculating) and vice versa. In contrast to the estimated 57 percent of males and 21 percent of women in prison that carry an ASPD diagnosis (Fazel and Danesh, 2002), an estimated 15 percent of men and 7 percent of women in prison are considered to be psychopathic (Cunningham and Reidy, 1998; Hare, 1996). Despite considerable overlap between the two constructs, the unique features and differential prevalence rates of ASPD and psychopathy highlight the importance of examining the relationship between trauma and the two disorders separately.

Although the association between trauma (particularly childhood trauma) and ASPD has been examined (to a lesser extent in incarcerated samples than in community and clinical samples (e.g. Gunter et al., 2012; Afifi et al., 2011; Battle et al., 2004)), there has been much less investigation into the association between interpersonal trauma exposure and psychopathy. Trauma, which can contribute to both emotional under-reactivity and over-reactivity, could be theorized to have a negative or a positive association with psychopathy, which is characterized by under-reactivity to emotional cues (Marsh and Blair, 2008). A few investigations suggest a positive association. Among a sample of incarcerated adolescent offenders, Campbell et al. (2004) found an association between psychopathy trait severity and presence of childhood physical abuse. Krischer and Sevecke (2008) found similar results for males, but not females, in a sample of detained adolescents. Weiler and Widom (1996) found a relationship between childhood abuse (physical and sexual combined) and psychopathy trait severity, while controlling for demographic characteristics and criminal history, in a community sample of young adults. However, more studies examining the association between various kinds of trauma and psychopathy, especially in non-adolescent samples, are needed.

We were interested in the impact of trauma exposure throughout the lifespan on psychopathy and ASPD. A number of the studies that have explored the relationship between trauma exposure and personality disturbance have focussed on the enduring effects of childhood trauma exposure on adulthood outcomes (Horowitz et al., 2001). However, research and theory suggests that the childhood trauma exposure alone does not directly lead to adverse outcomes in adulthood (Hillberg et al., 2011). Instead, the influence of childhood trauma on adulthood functioning seems to be indirect and contingent upon coping styles, relationship factors, adulthood trauma, and other environmental contingencies (Arata, 2002; Horowitz et al., 2001). From a lifespan perspective, it is possible that trauma exposure during adolescence or adulthood may play a role in shaping personality by reinforcing antisocial or psychopathic traits that were previously dormant. Other findings (e.g. Afifi et al., 2011) suggest that characteristics of conduct disorder may increase risk for being in high-risk situations that can activate psychopathic or ASPD traits. Given our limited understanding of the impact of later trauma exposure on personality disturbance, the present study examines the association between lifetime trauma exposure and ASPD and psychopathy.

In addition to examining associations between trauma and ASPD/psychopathy, we also examined the relationship between post-traumatic stress disorder (PTSD) symptom severity

and ASPD/psychopathy for two reasons. First, we sought to explore whether PTSD symptom severity has a stronger association with antisocial and psychopathic personality disturbance than does trauma. If PTSD symptom severity has a stronger relationship with antisocial and psychopathic personality disturbance than trauma, this finding might suggest that ASPD/psychopathy intervention strategies should target-specific PTSD symptoms. Second, understanding whether trauma exposure *per se* or PTSD symptom severity is more related to ASPD/psychopathy may suggest or rule out potential mechanisms of association between trauma and personality constructs. A better understanding of these relationships will deepen our understanding of the phenomenology of ASPD and psychopathy and facilitate the development of more effective treatment strategies.

The purpose of the current study was to explore the association among specific types of interpersonal trauma and PTSD symptom severity with ASPD and psychopathy in a sample of incarcerated adult men and women. We chose to examine these relationships among prisoners because trauma, PTSD, ASPD, and psychopathy are extremely common (Cale and Lilienfeld, 2002; Gunter et al., 2012; Lewis, 2006; Teplin, 1990) and impairing in this population. Given the multifaceted effects of trauma on emotion regulation, attachment/interpersonal functioning, and neurobiological functioning, a positive relationship between lifetime trauma exposure and psychopathy was hypothesized. In order to better understand the specific relationship between specific types of interpersonal trauma and personality disturbance, we explored whether lifetime exposure to three types of trauma (physical, sexual, and crime-related trauma) were differentially associated with ASPD and psychopathy.

Method

Participants

Study participants were a convenience sample 51 women and 37 men ($n = 88$) who were incarcerated in minimum and medium security prisons in Massachusetts and Rhode Island and who participated in a randomized clinical trial of psychotherapy for major depressive disorder in prisons (R01 MH095230). Major depressive disorder is especially common among individuals with lifetime trauma exposure, and also among those with ASPD (Alegria et al., 2013; Fava et al., 1994; Goodwin and Hamilton, 2003).

The current secondary data analysis uses data that were taken from the parent trial's baseline interview. The mean age of participants was 38.92 (SD = 11.27). The majority of the sample was Caucasian (62.5 percent). Other ethnicities represented in the sample include African-American (15.9 percent), Asian (1.1 percent), Native American (1.1 percent), and other (19.3 percent). The depression treatment study had the following inclusion criteria: current major depressive disorder after at least one month of incarceration and expects to be incarcerated for at least another six months (to allow time to complete the depression study). Individuals who met lifetime criteria for bipolar disorder or a primary psychotic disorder were excluded from the parent study.

Procedures

Potential participants were recruited into the parent study through flyers, letters, and announcements describing the study and ways to contact the researchers to indicate interest in participation. Individuals privately volunteered to be assessed for eligibility. Study staff conducted informed consent procedures in private rooms. The consent form, which was read aloud, described the voluntary nature of study participation. Participants were paid $10 deposited into their inmate accounts for each of two follow-up interviews; no compensation was given at enrollment. There were no legal incentives for participation. ASPD diagnosis was determined via clinical interview using the gold standard *Structured Clinical Interview for DSM Axis II Personality Disorders* (SCID-II; First et al., 1996). Trauma history, PTSD symptom severity, and psychopathy were assessed through well-validated self-report measures. Interviewers offered to read self-report measures aloud to participants if needed. The study followed ethical guidelines for research with prisoners under institutional ethics review board approval.

Measures

Trauma history questionnaire (THQ; Green, 1996).—Lifetime trauma history was measured using 12 self-report items from the THQ which examines crime victimization and unwanted physical and sexual experiences. In total, 83 percent of the sample reported physical trauma, 57 percent reported sexual trauma, and 58 percent reported crime-related trauma.

SCID-II (First et al., 1996).—The presence of ASPD was assessed using the SCID-II interview, the gold standard assessment for this disorder. In total, 73 percent of the sample met criteria for ASPD.

PTSD checklist civilian version (PCL-C; Weathers et al., 1993).—The PCL-C PTSD symptom measure was used to assess PTSD symptom severity. The PCL-C PTSD symptom measure is a 17-item self-report measure that assesses the degree to which each of the 17 DSM-IV symptoms of PTSD are present. Response options range from 1 "not at all" to 5 "extremely." A symptom severity score was obtained for each participant by summing scores from each of the 17 items (severity range = 17-85). The mean (SD) PCL-C PTSD symptom measure score in the sample was 45.40 (12.89).

Psychopathic personality inventory (PPI; Lilienfeld and Andrews, 1996).—This study used the 56-item version of the PPI, a self-report measure that was used to assess the major personality traits that are characteristic of psychopathy. Respondents indicated the extent to which each construct was reflective of their personality using a four-point Likert scale (1 = false, 2 = mostly false, 3 = mostly true, and 4 = true). The PPI has good internal consistency (Cronbach's a = 0.90-0.93) and test-retest reliability (r = 0.95) and exhibits convergent validity with other self-report measures of psychopathy (Lilienfeld and Andrews, 1996). The mean psychopathy score in the present sample was 126.85 (severity range 56-224) with a standard deviation of 14.97.

Data analysis

Analyses were performed using SPSS Software Version 19. Hierarchical linear regression was conducted to assess the impact of type of trauma and PTSD symptoms on ASPD while controlling for sex of participant. Similar analyses were conducted with psychopathy as the dependent variable. Variables were entered into the linear and logistic regression models in blocks. The first block contained sex, the second block contained type of trauma (sexual, physical, or crime-related), and the third block contained an indicator of PTSD symptoms (PCL-C PTSD symptom measure total score). Because depressive symptoms are often elevated in individuals with ASPD, we tested whether depressive symptoms should be covaried in analyses (which predict ASPD and psychopathy). Depressive symptoms were not predictive of either ASPD or psychopathy in this sample of prisoners with MDD, and therefore were not covaried in regression analyses.

Results

Associations of trauma and PTSD with ASPD

Three separate hierarchical logistic regressions were conducted to predict ASPD diagnosis from each type of trauma. Physical and crime-related trauma were associated with ASPD, but sexual trauma was not. Those who had a history of physical trauma were 5.04 (95 percent confidence interval: 1.46-17.36) times more likely to be diagnosed with ASPD than those without such a history. Participants who had experienced crime-related trauma were 2.92 (95 percent confidence interval: 1.09-7.85) times more likely to be diagnosed with ASPD than those who had not. PTSD symptom severity was not associated with ASPD in analyses examining any of the three kinds of trauma (see Table I).

Associations of trauma and PTSD with psychopathy

Three separate linear regression analyses were conducted, one for each type of trauma. A history of physical trauma was associated with greater psychopathy (see Table II). However, sexual and crime-related trauma were not associated with greater psychopathy (see Tables III and IV). PTSD symptoms were not associated with psychopathy in any of the three analyses.

Discussion

This study compared the constructs of ASPD and psychopathy and investigated their differential relationships with lifetime interpersonal trauma and current PTSD symptom severity in a sample of incarcerated women and men who participated in a clinical trial for psychotherapy for major depressive disorder in prison. In this sample, after accounting for gender, ASPD was associated with physical and crime-related trauma victimization (but not sexual victimization), while psychopathy was only associated with physical trauma victimization (but not crime-related victimization). There was a trend for a positive association between psychopathy and sexual trauma victimization. After accounting for trauma experiences, current PTSD symptoms were not predictive of ASPD or psychopathy in any of the models. Findings provide further evidence for the link between lifetime trauma

victimization and antisocial personality disturbance, but suggest that current symptoms of PTSD do not play a role in this association.

To our knowledge, this is the first study examining the relative associations of specific types of lifetime interpersonal trauma and PTSD symptom severity with antisocial and psychopathic personality disturbance in a sample of incarcerated women and men. The relationships between interpersonal trauma victimization and ASPD in this study are consistent with previous research on the psychological impact of childhood trauma (Afifi et al., 2011; Bebbington et al., 2004; Bierer et al., 2003; Lobbestael et al., 2010; Luntz and Widom, 1994). A finding that is unique to the current study is the positive association between lifetime crime-related trauma experiences (e.g. home burglary with the victim present, victim of a stick-up or mugging) and ASPD. This connection may be attributable to increased vulnerability for ASPD traits that is created by exposure to crime-related trauma (Swanson et al., 2002). Conversely, it is possible that certain features of ASPD (e.g. sensation seeking, behavioral difficulties) increase vulnerability to crime-related trauma exposure. This hypothesis is in keeping with research findings showing that pre-military antisocial traits predicted assignment to a combat unit (Helzer et al., 1979) and being mugged, beaten, or having seen combat while serving in Vietnam (Helzer et al., 1987). Although mechanisms explaining the relationship between ASPD traits and physical and crime-related trauma cannot be explained by the results of this study, it is possible that the development and maintenance of ASPD traits is heavily influenced by traumatization throughout one's lifetime or vice versa.

Given previous research findings suggesting a link between elevated antisocial personality traits and sexual victimization (e.g. Afifi et al., 2011; Ferguson et al., 2008), it is notable that current ASPD diagnosis was not related to lifetime sexual trauma victimization in this study. This may be accounted for by the methodology used in the present study. While previous studies have measured the impact of childhood sexual trauma on personality disturbance, the current study examined associations between ASPD and lifetime sexual victimization. It is possible that childhood sexual trauma is more strongly associated with ASPD. However, it is also possible that sexual trauma is not related or only very weakly related to ASPD. Consistent with our finding, other researchers have failed to find associations (e.g. Johnson et al., 1999) and predictive relationships between sexual victimization and ASPD (Bernstein et al., 1998; Lobbestael et al., 2010). Given the mixed research results regarding the link between ASPD and sexual abuse, more research is needed to establish a solid link between sexual victimization in ASPD.

Similar to Krischer and Sevecke's (2008) study of detained male juveniles, our findings indicated a significant association between lifetime physical trauma and more psychopathic traits. Although no causal implications can be drawn from this cross-sectional study, one possible interpretation of this finding is that physical trauma across the lifespan may play a role in the emergence, expression, and/or maintenance of psychopathic traits. There are several ways in which physical trauma exposure may be related to psychopathy. First, as suggested by Lauterbach and Vrana (2001) it is possible that antisocial traits and trauma exposure mutually influence the other such that exposure to trauma elevates rates of psychopathy (including increased aggressiveness and sensation seeking), thus increasing

risk for further trauma exposure. Research support for this theory includes Resnick et al.'s (1989) finding that combat exposure among Veterans was associated with antisocial behaviors later in life, but not behavioral disturbance before combat exposure. Second, at a neurobiological level, rates of monoamine oxidase A, an enzyme responsible for degrading neurotransmitters in men and women, have been linked to both childhood trauma and aggressive behavior (Frazzetto et al., 2007; Verhoeven et al., 2012). It is possible that physical trauma exerts its influence on personality through interaction with neurobiological predispositions to aggression. Third, it is possible that exposure to physical trauma early in life adversely effects the development of emotional skills such as affect regulation and the capacity for empathy, thus increasing the risk for the development of psychopathic traits. Retraumatization throughout one's lifetime may serve to exacerbate this risk.

We did not find significant associations between current psychopathic traits and sexual or crime-related victimization. It is unclear why no associations were observed. Our findings may suggest that lifetime physical trauma has more of an impact on psychopathy while other types of trauma may be associated with other forms of personality disturbance. Previous research has suggested differential relationships between types of childhood trauma and personality disorders (Lobbestael et al., 2010).

After accounting for trauma experiences, PTSD symptom severity did not add to the prediction of ASPD or psychopathy. Associations among PTSD and ASPD have been noted in nationally representative samples (Goldstein et al., 2010; Goodwin and Hamilton, 2003) and male forensic populations (Gibson et al., 1999), but these studies addressed a different sample and conflated PTSD diagnosis with trauma exposure. The current findings, which disentangled the effects of PTSD from the effects of trauma exposure, suggest that, in the present sample of incarcerated women and men, trauma exposure was more strongly related to personality disturbance than was post-traumatic symptomatology. The finding that it is trauma itself, rather than PTSD symptom severity, that drives the association between trauma victimization and antisocial or psychopathic personality disturbance provides evidence to contradict the theory that severe anxiety (i.e. PTSD) increases the likelihood of antisocial behavior and ASPD (Goodwin and Hamilton, 2003). Instead, our results suggest that trauma exposure may play an important role in the etiology and/or maintenance of ASPD and psychopathy.

The results of the present study (which used a convenience sample and a cross-sectional design) provide preliminary information about the role of trauma exposure in psychopathy and ASPD. Obviously, prospective longitudinal studies in representative samples are needed to understand the developmental progression of psychopathic and ASPD traits and to identify the role of trauma that occurs at different points in development on the expression of personality disturbance and vice versa. Trauma exposure may increase vulnerability for psychopathic personality disturbance, but it is equally plausible that conduct and emotional disturbance preceding the emergence of a personality disorder increases vulnerability for trauma victimization. It will be important to identify whether specific types of trauma differently impact personality development and whether these effects are different for males and females, as has been suggested by the findings of Krischer and Sevecke (2008).

Limitations of the current study should be noted. First, this study was cross-sectional, and thus, we are unable to draw any causal or directional inferences regarding the relationship among trauma and ASPD and trauma and psychopathy. Second, the entirely of a convenience sample of incarcerated individuals who volunteered for a treatment trial of psychotherapy for major depressive disorder; the generalizability of results to other populations or even other prisoner populations is unknown. Third, we used the Psychopathic Personality Inventory to assess psychopathy in the present study, a self-report measure which generates related but not identical psychopathy scores as the Psychopathy Checklist-Revised, a clinical checklist, or as multi-informant approaches (Copestake et al., 2011). Finally, although we used a valid and reliable measure of lifetime trauma exposure, because the study was cross-sectional rather than prospective, recall and reporting bias may have impacted the accuracy of participants' reports.

In conclusion, the findings suggest an association between lifetime physical trauma victimization and both ASPD and psychopathy among incarcerated women and men with major depressive disorder. We also found a significant association between ASPD symptom severity and exposure to crime-related trauma. Associations were not explained by PTSD symptoms. These findings offer implications for treatment with incarcerated populations. The current findings suggest that interventions with incarcerated men and women with ASPD and psychopathic traits may benefit from sensitivity to histories of physical and crime-related trauma. Finally, the findings contribute to our understanding of the nature of the relationship between ASPD/psychopathy and trauma exposure, namely, that the association between personality disturbance and trauma is not explained by PTSD symptom severity. Future longitudinal studies may advance our understanding of the mechanisms of the relationship between trauma exposure, post-traumatic symptomatology, psychopathy, and ASPD.

Acknowledgments

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Table I

Hierarchical multivariate logistic regression analysis using physical trauma, sexual trauma, crime relate trauma, and PTSD symptoms to predict antisocial personality disorder

	Block 1		Block 2		Block 3	
	Odds ratio	95% CI	Odds ratio	95% CI	Odds ratio	95% CI
Physical trauma						
Gender	2.14	0.78-5.87	1.51	0.57-4.44	1.52	0.52-4.46
Physical trauma			5.10[**]	1.51-17.26	5.04[**]	1.46-17.36
PTSD symptoms					1.00	0.96-1.04
Sexual trauma						
Gender	2.14	0.78-5.87	2.56	0.89-7.34	2.55	0.89-7.32
Sexual trauma			2.24	0.83-6.07	2.20	0.81-6.00
PTSD symptoms					1.01	0.97-1.05
Crime-related trauma						
Gender	2.14	0.97-1.05	1.85	0.65-5.23	1.86	0.66-5.28
Crime-related trauma			2.94[*]	1.09-7.88	2.92[*]	1.09-7.85
PTSD symptoms					1.01	0.97-1.05

Notes:

[*] $p \leq 0.05$;

[**] $p \leq 0.01$;

[***] $p \leq 0.001$

Table II

Hierarchical multiple regression analysis using physical trauma and PTSD symptoms to predict psychopathy severity

Predictor	Block 1			Block 2			Block 3		
	B	SE B	β	B	SE B	β	B	SE B	β
Gender	−5.90	3.20	−0.20	−3.74	3.23	−0.12	−3.89	3.22	−0.13
Physical trauma				10.50	4.22	0.27[*]	9.68	4.27	0.25[*]
PTSD symptoms							0.15	0.12	0.13
Model parameters									
R^2		0.04			1.04			0.12	
R^2		0.04			0.07			0.02	
F for R^2		3.40			6.18[*]			1.45	

Notes: *B*, unstandardized slope coefficient; SE *B*, standard of *B*; *β*, standardized slope coefficient.

[*] $p \leqslant 0.05$;

[**] $p \leqslant 0.01$;

[***] $p \leqslant 0.001$

Table III

Hierarchical multiple regression analysis using sexual trauma and PTSD symptoms to predict psychopathy severity

Predictor	Block 1			Block 2			Block 3		
	B	SE B	β	B	SE B	β	B	SE B	β
Gender	−5.90	3.20	−0.20	−7.17	3.21	−0.24[*]	−7.03	3.20	−0.24[*]
Sexual trauma				6.30	3.24	0.21	5.73	3.23	0.19
PTSD symptoms							0.18	0.12	0.16
Model parameters									
R^2		0.04			0.08			0.10	
R^2		0.04			0.04			0.20	
F for R^2		3.40			3.85			1.72	

Notes: *B*, unstandardized slope coefficient; SE *B*, standard of *B*; *β*, standardized slope coefficient.

[*] $p \leqslant 0.05$;

[**] $p \leqslant 0.01$;

[***] $p \leqslant 0.001$

Table IV

Hierarchical multiple regression analysis using crime-related trauma and PTSD symptoms to predict psychopathy severity

Predictor	Block 1			Block 2			Block 3		
	B	SE B	β	B	SE B	β	B	SE B	β
Gender	−5.90	3.20	−0.20	−5.21	3.22	−0.17	−5.21	3.20	−0.17
Crime-related trauma				4.47	3.24	0.15	4.27	3.22	0.14
PTSD symptoms							0.18	0.12	0.16
Model parameters									
R^2		0.04			0.06			0.09	
R^2		0.04			0.02			0.03	
F for R^2		3.40			1.91			2.24	

Notes: *B*, unstandardized slope coefficient; SE *B*, standard of *B*; *β*, standardized slope coefficient.

[*] $p \leqslant 0.05$;

[**] $p \leqslant 0.01$;

[***] $p \leqslant 0.001$