Posttraumatic Stress Disorder Symptoms and Criminal Behavior in U.S. Army Populations: The Mediating Role of Psychopathy and Suicidal Ideation

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Whereas past research has demonstrated the relationship between posttraumatic stress disorder (PTSD) and criminal behavior, the present study examines the underlying mechanisms driving this association. The primary objective was to determine the role of psychopathy and suicidal ideation as mediating factors in the relationship between military PTSD symptoms and criminal behavior (defined as incarceration status). A correlational study using archival data from the U.S. Disciplinary Barracks (USDB) and a control population of U.S. Army soldiers was conducted. The USDB provided data from 310 incarcerated male U.S. Army soldiers. Data were also collected from 310 nonincarcerated, male U.S. Army soldiers in the greater Fort Rucker, Alabama area. Data validity checks eliminated some cases, thus yielding a final dataset of 246 USDB and 252 control participants. The results suggested partial mediation, in that PTSD symptoms had a direct effect on incarceration status, and significant indirect effects through suicidal ideation and psychopathy while controlling for intelligence and warmth. In furnishing evidence of how psychopathy and suicidal ideation mediate the relationship between PTSD and incarceration status in military personnel, this research highlights specific internalization and externalization mechanisms that may increase the tendencies of people with greater PTSD symptoms to engage in criminal behaviors. By adding to the small amount of prior research on why PTSD sometimes leads people to engage in criminal behaviors, our research provides specific, observable symptoms that clinicians may use to identify, treat, and possibly ameliorate facets of PTSD that can lead affected people to engage in criminal behaviors.

KEYWORDS: posttraumatic stress disorder, criminality, military, psychopathy, personality

Crimes involving military service members have received increasing national attention since the beginning of Operation Enduring Freedom in 2001 and Operation Iraqi Freedom in 2003. The most recent (2011–2012) government statistics suggest that veterans compose approximately 8% of the prison population (including local jails and state and federal prisons; Bronson, Carson, Noonan, & Berzofsky, 2015). Other studies present accounts of service members and veterans exhibiting increased tendencies for aggressive, violent, or criminal behavior after returning home from overseas deployments (Booth-

Kewley, Larson, Highfill-McRoy, Garland, & Gaskin, 2010; Elbogen, Johnson, Newton, et al., 2012; Elbogen, Johnson, Wagner, et al., 2012; Gonzalez, Novaco, Reger, & Gahm, 2016; MacManus, Dean, Al Bakir, et al., 2012; MacManus, Dean, Iversen, et al., 2012; Monson, Taft, & Fredman, 2009; Novaco & Chemtob, 2015; White, Mulvey, Fox, & Choate, 2012). Of those incarcerated, Operation Enduring Freedom and Operation Iraqi Freedom veterans are nearly three times as likely to be diagnosed with posttraumatic stress disorder (PTSD) than veterans who served in other conflicts (Tsai, Rosenheck, Kasprow, & McGuire, 2013).

Theory

Previous research has repeatedly demonstrated how combat exposure and other forms of military-related trauma (e.g., including sexual assaults, threats and physical altercations, military training accidents) can lead people to exhibit PTSD and its related symptoms, including anxiety, threat attention biases, somatic disruptions, difficulties with social integration, and personality changes (Blodgett et al., 2015; Eid, 2003; Friedman, 2011; Shea & Fishback, 2012; Tanielian & Jaycox, 2008). Researchers have also established links between PTSD symptoms, related psychological disorders, and criminal behaviors in military populations (Bonta, Law, & Hanson, 1998; Gendreau, 1996; Hodgins & Müller-Isberner, 2004; Monahan, 1992; Walsh & Kosson, 2007). For example, past studies (Erickson, Rosenheck, Trestman, Ford, & Desai, 2008; Rosellini et al., 2016) found that service members with psychological disorders were more likely to have been incarcerated, and other studies have reported that military personnel who have been exposed to service-related trauma are more likely to exhibit violent behaviors and to be subsequently arrested (Blodgett et al., 2015; Eid, 2003; Elbogen, Johnson, Wagner, et al., 2012; Friedman, 2011; Gonzalez et al., 2016; Maguen et al., 2010; Marshall, Panuzio, & Taft, 2005; Novaco & Chemtob, 2015; Shea & Fishback, 2012; Taft, Monson, Hebenstreit, King, & King, 2009; Taft, Vogt, Marshall, Panuzio, & Niles, 2007; White et al., 2012).

PTSD symptoms have also been associated with criminal behavior in civilian-focused research (Gibson et al., 1999; Maschi, Bradley, & Morgen, 2008; Spitzer et al., 2001; Wolff & Shi, 2010). Specifically, studies of inmates found that about one third had been exposed to severe psychological trauma, and 33% met the diagnostic criteria for PTSD at some point in their lives (Gibson et al., 1999; Maschi et al., 2008; Wolff & Shi, 2010). Additionally, PTSD symptoms and symptom severity have been associated with risky behaviors, suggesting that the clinical threshold for a PTSD diagnosis does not need to be met for such symptoms to influence behaviors. These studies have shown direct relationships between symptoms and firearm possession, substance use, and aggression (Jakupcak et al., 2007; Strom et al., 2012; Taft, Kaloupek, 2007).

Given these prior findings, our first hypothesis is as follows:

> Hypothesis 1: There exists a positive relationship between PTSD symptoms and incarceration status in a military prison.

Although prior researchers have found a connection between PTSD symptoms and incarceration status, it is important for researchers and clinicians to understand the key psychological mechanisms through which PTSD symptoms increase the tendency to engage in criminal behaviors. In the present study, we test whether PTSD and criminal behaviors are linked through specific externalization and internalization mechanisms (Miller, Greif, & Smith, 2003; Miller, Kaloupek, Dillon, & Keane, 2004; Wolf et al., 2010; Wright, Borrill, Teers, & Cassidy, 2006). Externalization factors address how people express distress through outwardly directed cognitions, emotions, and behaviors, such as substance abuse, risk taking, aggression, sensation seeking, or antisocial behaviors (Miller et al., 2003, 2004; Wolf et al., 2010). Alternatively, internalization describes how people express their distress through more inwardly directed cognitions, emotions, and behaviors, such as depression, anxiety, or social avoidance (Miller et al., 2003, 2004; Wolf et al., 2010; Wright et al., 2006). Prior research has shown that PTSD symptoms are related to both externally and internally directed thoughts, emotions, and behaviors (de Carvalho et al., 2013; Miller et al., 2003, 2004; Wolf et al., 2010; Wright et al., 2006). In the present study we argue that military personnel who exhibit increased symptoms of PTSD are related to both the externalization of their symptoms through psychopathic tendencies and the

internalization of their symptoms through suicidal ideation, resulting in an increased tendency to engage in criminal behaviors.

In terms of the externalizing of symptoms, we first argue that symptoms of psychopathy positively mediate the relationship between PTSD symptoms and incarceration status (Cima, Smeets, & Jelicic, 2008; Kerig & Becker, 2010; Krischer & Sevecke, 2008). Research has repeatedly shown links between psychopathy and a proclivity toward criminal behavior. For example, prior research has found that people who suffer from PTSD often externalize their PTSD symptoms through psychopathic mechanisms including aggression (Porter & Woodworth, 2006; Taft et al., 2009; Taft, Vogt, et al., 2007; Tetan, Miller, Bailey, Dunn, & Kent, 2008), violence (Porter & Woodworth, 2006; Taft, Vogt, et al., 2007), and impulsivity (Bate, Boduszek, Dhingra, & Bale, 2014; Blonigen, Sullivan, Hicks, & Patrick, 2012; Ruiz, Skeem, Poythress, Douglas, & Lilienfeld, 2010; Teten et al., 2008). Studies (Cima et al., 2008; Krischer & Sevecke, 2008) have also demonstrated how children who are exposed to trauma at an early age evolve psychopathic tendencies that can lead them to manifest criminal behaviors later in life. Given that psychopathic people often exhibit conduct disorder symptoms, antisocial behavior, substance use, and disinhibitory personality traits, their reduced levels of empathy and personal attachment can increase their tendencies to act out in risky, violent, and often unlawful ways (Bate et al., 2014; Blair & Mitchell, 2009; Blonigen et al., 2012; Hare, 1996, 2003; Patrick, Hicks, Krueger, & Lang, 2005; Ruiz et al., 2010; Stalenheim, 2004; Willemsen, De Ganck, & Verhaeghe, 2012). It should be noted that psychopathy is also characterized by internal traits, including a lack of guilt and emotional attachments. Although these internal features are most often accompanied by criminal and antisocial behaviors, behavior alone does not meet the clinical definitions of psychopathy (Cleckley, 1976).

> Hypothesis 2: A person's level of psychopathy positively mediates the relationship between their PTSD symptoms and their incarceration status in a military prison.

In terms of internalizing symptoms associated with PTSD, we also argue that suicidal ideation positively mediates the relationship between PTSD and criminal behavior. Previous research has demonstrated strong relationships between PTSD and the tendency to internalize their disorder through conditions such as depression and anxiety, both of which can lead people to exhibit suicidal ideation (Kerig & Becker, 2010; Miller et al., 2004). Additionally, a narrative review identified strong links between PTSD and suicidal thoughts (Panagioti, Gooding, & Tarrier, 2009). Numerous studies have also shown strong links between PTSD and suicidal tendencies in military personnel (Boscarino, 2006; Drescher, Rosen, Burling, & Foy, 2003).

Suicidal ideation brought about by PTSD can lead people to engage in criminal behaviors. General strain theory (Agnew, 1992) suggests that people who exhibit negative affect after traumatic events may attempt to alleviate the strain associated with their trauma and address beliefs that they are "futureless" (Kerig & Becker, 2010) by engaging in risk-seeking and criminal behaviors (Agnew & White, 1992; Asnis, Kaplan, Hundorfean, & Saeed, 1997; Miller et al., 2004; Strom et al., 2012). For example, a study (Asnis et al., 1997) reported that 86% of people who exhibited homicidal ideation had previously reported suicidal ideation, suggesting that this dynamic may lead people suffering from PTSD to direct their aggression both inwardly and outwardly.

> Hypothesis 3: A person's level of suicidal ideation positively mediates the relationship between their PTSD symptoms and their incarceration status in a military prison.

Purpose

Because situations where current or former service members engage in criminal behaviors constitute situations with negative impacts on public health and safety, it is important to consider what specific factors may lead service members to engage in criminal behaviors for the purpose of providing targeted rather than universal prevention programs (Rosellini et al., 2016). The present study examines different mental health symptoms as factors that are related to incarceration status among U.S. military personnel. Within this study, we use incarceration status (i.e., one's criminal conviction and presence in a military prison) as an indication that a person has engaged in

criminal behavior. Given the importance of PTSD symptoms as the signature mental health problem among military personnel after combat operations in Iraq and Afghanistan (Hoge et al., 2004; Tanielian & Jaycox, 2008), the present study examines PTSD symptoms as a predictor of incarceration in a military prison (Booth-Kewley et al., 2010) and more importantly whether symptoms of psychopathy and suicidal ideation mediate the relationship between PTSD symptoms and incarceration status. These hypotheses are examined through comparison of different mental health symptoms in a sample of service members incarcerated in a military prison and a group of nonincarcerated service members.

EXPERIMENT

METHODS

Design

This correlational study examined deidentified, archival data from the U.S. Disciplinary Barracks (USDB) intake and risk assessment battery and a convenience sample of active-duty military personnel from a U.S. Army base. Before implementation, the study was reviewed and approved by the U.S. Army Research Development and Engineering Command Institutional Review Board. Informed consent was received from all nonarchival data study participants, and the study was conducted in compliance with the 2013 version of the Declaration of Helsinki.

TABLE 1. Age Range Frequencies by Group

Age	U.S. Disciplinary Barracks (%)	Control (%)
18-24 years	67 (27.45)	75 (29.76)
25-29 years	52 (21.31)	66 (26.19)
30-34 years	58 (23.77)	68 (26.98)
35-39 years	30 (12.30)	21 (8.33)
40-44 years	22 (9.02)	10 (4.10)
45-50 years	12 (4.92)	6 (2.38)
50+ years	3 (1.23)	5 (1.98)
Total	244[a]	251

[a]*Data were missing for 2 participants.*

Participants

The USDB provided data in March 2015 from 310 of the 461 (62.40%) incarcerated male U.S. Army soldiers who were in the prison at the time the study was conducted. Data were also collected from 310 nonincarcerated male U.S. Army soldiers stationed at Fort Rucker, Alabama. Women were excluded because the USDB is an all-male prison. Because of the incarceration of high-profile offenders at the USDB, potentially identifiable information (e.g., rank, Military Occupational Specialty, education level) were not collected, and age ranges rather than exact age were reported. A total of 55 control participants and 64 USDB participants were excluded from data analysis because of their elevated scores on data validity scales built into the Personality Assessment Inventory (PAI) (Morey, 2014; 55 control and 64 USDB participants excluded), ineligibility (history of incarceration for control group; 3 control participants), or missing data on many variables (1 control participant), yielding a final dataset of 246 USDB and 251 control participants. The two groups were similar with respect to age ranges (Table 1), $\chi^2(6) = 11.38$, $p > .05$; however, additional demographic information (e.g., race and ethnicity, marital status) and clinical data (e.g., treatment history, medical records including prior diagnoses) were not provided for the incarcerated participants, thereby preventing additional tests of group comparability. Control group data were examined, and no evidence was found to suggest differences in outcome measures by Military Occupational Specialty.

Measures

PAI.

The PAI (Morey, 2014) is a 344-item self-report measure of various domains of personality and psychopathology in adults and was designed for use in professional and research settings. The response format is a 4-point Likert-type scale descriptive of the extent to which items reflect participants' experiences. These items are then combined into 22 nonoverlapping full scales, but for the purpose of this study, only two scales were considered: the suicidal ideation and warmth scales. The suicidal ideation scale (PAI-SI) reflects one's propensity for suicide. Scores do not translate to likelihood of successful suicide but rather the extent to which suicidal thoughts preoccupy the person. Low scores indicate no reports of self-harm thoughts, whereas high scores indicate morbid preoccupation with suicidal thoughts. The warmth scale

(PAI-W) captures the degree to which a person is interested in and comfortable with attachment relationships. Low scores reflect that the person may be cold or distant in relationships, whereas high scores suggest the person is warm, friendly, and sympathetic.

PSYCHOPATHY CHECKLIST–REVISED (PCL-R).

The PCL-R (Hare, 2003) assesses psychopathic personality disorders in forensic populations. It provides complete coverage of the domain of psychopathic traits and behaviors. Like the original version, the PCL-R 2nd edition (Hare, 2003) provides a total score used for the overall assessment of psychopathy. The total score can be interpreted dimensionally in terms of degree of match to the prototypical psychopath, or it can be used categorically to help identify or diagnose psychopaths. In the present study we used the continuous total score on the measure to assess an overall tendency toward psychopathy. Ratings were made using a structured interview and a review of collateral information.

SHIPLEY INSTITUTE OF LIVING SCALE (SILS).

The SILS (Zachary & Shipley, 1986) provides an assessment of general intellectual functioning in adults and adolescents. Higher total scores (used in the present study) indicate higher intellectual functioning.

PTSD CHECKLIST–MILITARY (PCL-M).

The PCL-M (Weathers, Litz, Huska, & Keane, 1994) is a validated measure of PTSD, corresponding to the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed. [*DSM–IV*]; American Psychiatric Association, 1994), used by the Department of Veterans Affairs to screen, diagnose, and monitor symptom change during and after treatment. The measure has been used for nearly 20 years, and more than a dozen validation studies have been conducted (McDonald & Calhoun, 2010). For the present study, PTSD symptoms were assigned as a total score summing across the 17 items. Higher scores indicate greater number of symptoms and severity reported.

Procedure

After providing informed consent, control group participants completed the PCL-R (structured interview portion) with the assistance of a research team member. The participants then completed all other questionnaires individually. For the USDB participants, deidentified data were transferred to the research team by the USDB clinical staff. The measures were originally completed during the USDB intake process, whereas control participants completed the measures in a laboratory setting. The USDB intake process allows the person to refuse any testing. However, this rarely occurs. Although the USDB participants probably encountered environmental factors that were different from those encountered by control participants, we are confident that participants in both samples provided accurate responses to the issues of primary interest in this study (personal communication, chief of the Mental Health Division at the Military Correctional Complex, December 30, 2016). Both sets of participants completed the assessments individually, with the exception of the interview procedure administered by intake personnel (USDB participants) and trained research staff (control participants) as part of the PCL-R.

Analytic Approach

SPSS version 19 was used to run all analyses. Descriptive statistics were calculated for all study variables, and data distributions were examined before analysis. Group differences were examined with chi-square tests of independence. A binary logistic, mediational model was then used to test the hypothesized relationships between study variables. The model tested the direct effect of military-specific PTSD symptoms and the indirect effects of psychopathy scores and degree of suicidal ideations on incarceration status (offender, nonoffender) while controlling for intelligence and the warmth personality construct. Intelligence was chosen as a control variable given its role in the emergence of PTSD and given its known prediction of criminal behavior (Breslau, Chen, & Luo, 2013; Powers et al., 2014). Warmth was chosen as a proxy variable to assess social attachment or "bonding," a construct connected to understanding the propensity for criminal behaviors (Schroeder, 2014).

The process macro (Hayes, 2012; version 2.16) was used to complete the analyses and test the hypothesized mediation effects. This method uses a logistic regression–based path analytic framework for estimating direct and indirect effects in single- and multiple-mediator models (processmacro.org) and bootstrap methods for estimating confidence intervals (CIs) on indirect effects (bootstrap samples = 5,000).

RESULTS

Descriptive Statistics

Table 2 presents the descriptive data for the study measures by group. The overall mean PCL-M score

(a representation of symptom presence and severity) was 25.34 (SE = 0.54), which is well below the accepted clinical threshold of 50 for PTSD symptoms on this measure. When we looked at the distribution of PCL-M total scores overall, 7.8% of the sample exceeded a score of 50. With respect to each group, 12.80% of the USDB sample exceeded the clinical threshold, whereas 1.60% of the control sample did so, $\chi^2(1) = 21.26$, $p < .01$. The overall mean score on the PCL-R was 32.61 (SE = 0.39), which is interpreted as a "low" level of psychopathy or nonpsychopathy (please note that PCL-R scores have been converted from raw scores to T scores because this is what was provided for the USDB sample). Approximately 23.00% of the USDB sample scored within the moderate to high score thresholds, whereas none of the control sample scored above the "low" level. The overall mean on the suicidal ideation subscale was 48.62 (SE = 0.46), which falls in the average score range, suggesting little or no suicide potential. USDB participants were more likely to score above average than the control participants, $\chi^2(1) = 39.98$, $p < .001$. Specifically, in the USDB sample, 10.20% of the sample scored above average, suggesting periodic thoughts of suicide, and 9.01% scored high enough to suggest significant or severe risk of suicide potential. Alternatively, 2.23% of the control sample scored above average, suggesting periodic self-harm thoughts, with one participant reporting a score indicating significant suicide risk.

Logistic Regression and Mediational Analyses

The primary logistic regression assessed military-specific PTSD symptoms (continuous independent variable), psychopathy scores (continuous mediator), and suicidal ideation (continuous mediator), as predictors of incarceration status (binary dependent variable, offender vs. nonoffender) after controlling for intelligence and warmth. The beta coefficients were used to interpret direct and indirect effects as the log odds of the probability of being incarcerated (Hayes, 2012). The mediation model hypothesized a direct pathway from PCL-M (c' path) and indirect pathways from PCL-R (b_1 path) and PAI-SI (b_2 path) scores to incarceration status while controlling for warmth (PAI-W subscale) and intelligence (SILS score). In other words, the model postulates an effect of military PTSD symptoms on incarceration status through the two mediating variables, suicidal ideation and psychopathy. Paths a_1 and a_2 represent the relationships between the predictor variable and the proposed mediator variables. Figure 1 illustrates the hypothesized conceptual model outlining the direct and indirect effects and the results of the analysis.

The results of the PROCESS model suggested partial mediation, in that PTSD symptoms (PCL-M score) have a direct effect on incarceration status, β = 0.05, SE = 0.02, p = .02, and significant indirect effects through suicidal ideation (indirect effect, 95% CI [0.01, 0.05]) and psychopathy (indirect effect, 95% CI [0.03, 0.09]) while controlling for intelligence and warmth.

DISCUSSION

The results of the present study refine and extend prior research showing a relationship between PTSD symptoms and incarceration status and contribute to research addressing why PTSD symptoms are related to important outcomes. Specifically, the results of the present study provide evidence that both psychopa-

TABLE 2. Descriptive Statistics for Study Measures by Group

Scale	USDB mean	USDB *SE*	Control mean	Control *SE*	Overall mean	Overall *SE*
PCL-R*	38.50	0.40	26.49	0.33	32.61	0.39
PCL-M*	29.71	1.14	22.89	0.48	25.34	0.54
PAI-W	49.63	0.67	49.25	0.72	49.45	0.49
PAI-SI*	51.26	0.79	45.75	0.35	48.62	0.46

Note. *PAI-SI = Personality Assessment Inventory suicidal ideation scale; PAI-W = Personality Assessment Inventory warmth scale; PCL-M = PTSD Checklist–Military; PCL-R = Psychopathy Checklist–Revised; USDB = U.S. Disciplinary Barracks.*
**Significant group associations at* p < *.05.*

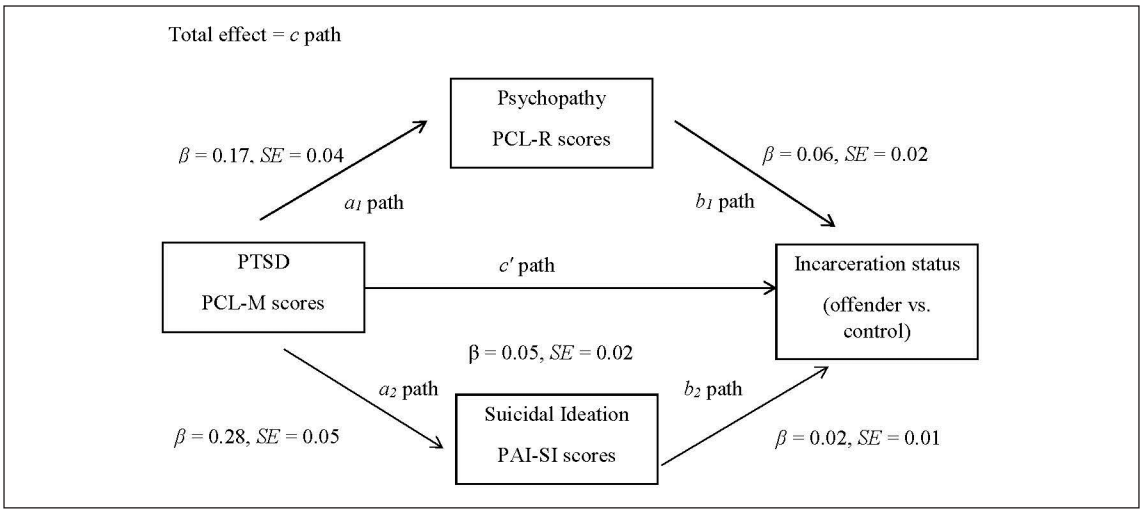

FIGURE 1. Conceptual mediation model predicting incarceration status with primary results. PAI-SI = Personality Assessment Inventory suicidal ideation scale; PCL-M = PTSD Checklist–Military; PCL-R = Psychopathy Checklist–Revised; PTSD = posttraumatic stress disorder

thy and suicidal ideation mediate the relationship between PTSD and incarceration status in military personnel. These findings support the hypotheses that both internalization and externalization mechanisms may increase the tendencies of people with greater PTSD symptoms to engage in criminal behaviors (Bonta et al., 1998; Elbogen, Johnson, Wagner, et al., 2012; Gendreau, 1996; Gonzalez et al., 2016; Hodgins & Müller-Isberner, 2004; Marshall et al., 2005; Monahan, 1992; Novaco & Chemtob, 2015; Taft et al., 2009; Taft, Vogt, et al., 2007; Teten et al., 2008; Walsh & Kosson, 2007). Note that additional variables not available for inclusion in this study (e.g., clinical diagnoses) may influence these relationships and thus warrant additional research.

An examination of the processes by which PTSD symptoms were related to incarceration status allows clinicians to target those processes in order to potentially decrease the likelihood of criminal behaviors. Given the evidence we present that symptoms of psychopathy and suicidal ideation mediate the relationship between PTSD symptoms and incarceration status (Miller et al., 2003, 2004; Wright et al., 2006), our research provides clinicians with specific, observable symptoms that they may use to identify, treat, and hopefully ameliorate facets of PTSD that can lead affected people to engage in criminal behaviors. Additional research is needed to examine whether adding a focus on the symptoms of psychopathy and suicidal ideation to the treatment of military personnel with PTSD reduces the likelihood of future criminal behavior. To further delineate how these results may influence practice and guide future research, first consider that psychopathy is not, in fact, a diagnosis. The 5th edition of the *DSM* is the first version of this manual to name psychopathy as a feature of antisocial personality disorder. Psychopathic people tend to be manipulative and often mislead clinicians, thus posing significant challenges to identification of relevant symptoms and behaviors and appropriate treatment approaches. However, research suggests that use of experimental paradigms evoking fear responses and psychophysiological monitoring may provide more objective data regarding psychopathic tendencies (Matusiewicz, McCauley, McCarthy, Bounoua, & Lejuez, 2018). Thus, future research should include additional experimental and clinical data to further validate the results presented here.

In addition to our contributions, we note some limitations of this study that provide relevant opportunities for future research. First, because we examined convicted felons, we relied on objective institution-based classifications of participants' criminal offenses while also building on assumptions that the judicial process generally produces truthful verdicts in the criminal cases of military personnel. To address potential discrepancies between participants' convictions and their criminal behaviors, future re-

search should examine the mediators proposed in the present research with alternative ways of assessing criminal behavior. Related to this point is the possibility of response bias in our sample. Despite encouragement from the USDB personnel regarding accuracy of responses, underreporting or incorrect responses are still possible (Proctor, Hoffmann, & Corwin, 2011).

Second, whereas we sought to examine the effects of PTSD on criminal behavior in a military population, future research should replicate the findings reported here in nonmilitary (i.e., civilian) populations as well. Such research should assess whether the types of psychological trauma experienced in nonmilitary contexts induce suicidal ideation and psychopathy of the forms and levels we report in our study sample (Elbogen, Johnson, Wagner, et al., 2012; Gibson et al., 1999; Gonzalez et al., 2016; Marshall, et al., 2005; Maschi et al., 2008; Novaco & Chemtob, 2015; Spitzer et al., 2001; Wolff & Shi, 2010). Deviations from the results reported here may lead clinicians to amend their diagnostic and treatment protocols in important ways. Relevant to this limitation is that the measure used for PTSD symptoms corresponds to the *DSM-IV* rather than the latest version of the manual.

An additional limitation was that our research study relied on assessments preselected by military-focused clinicians and prison administrators. Although their choices were well reasoned, future research should seek to identify additional relevant assessments that are not described here. Potentially important information such as clinical diagnoses and additional demographic data are also not included in the dataset made available, which poses a challenge to the interpretation of the results. Specifically, future research is necessary to validate the model and incorporate potentially confounding variables that may contribute to the likelihood of incarceration. Doing so may lead to the identification of additional externalization and internalization mechanisms through which PTSD induces criminal behaviors (Miller et al., 2003, 2004; Wolf et al., 2010; Wright et al., 2006). This is because people often externalize their PTSD through a wide range of outwardly directed cognitions, emotions, and behaviors (e.g., substance abuse, sensation seeking, antisocial behaviors; Miller et al., 2003, 2004; Wolf et al., 2010) or internalize their PTSD through a variety of inwardly directed cognitions, emotions, and behaviors such as depression, anxiety, and social avoidance (Miller et al., 2003, 2004; Wolf et al., 2010; Wright et al., 2006). Thus, future research directed at these mechanisms may uncover evidence for additional pathways that lead people with greater PTSD symptoms to manifest criminal thoughts and behaviors (de Carvalho et al., 2013; Miller et al., 2003, 2004; Wolf et al., 2010; Wright et al., 2006).

NOTES

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