Research report

Exploring the relationship between underlying dimensions of posttraumatic stress disorder and depression in a national, trauma-exposed military sample

Jon D. Elhai [a,*], Ateka A. Contractor [a], Patrick A. Palmieri [b], David Forbes [c], J. Don Richardson [d,e]

[a] Department of Psychology, University of Toledo, Ohio, United States
[b] Center for the Treatment and Study of Traumatic Stress, Department of Psychiatry, Summa Health System, Ohio, United States
[c] Australian Centre for Posttraumatic Mental Health and Department of Psychiatry, University of Melbourne, Melbourne, Australia
[d] Operational Stress Injury Clinic, St. Joseph's Health Care London, Parkwood Hospital, London, Ontario, Canada
[e] Veterans Affairs Canada, Hamilton, Ontario, Canada

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ABSTRACT

Background: Posttraumatic stress disorder (PTSD) and depression are highly comorbid and intercorrelated. Yet little research has examined the underlying processes explaining their interrelationship.
Method: In the present survey study, the investigators assessed the combined symptom structure of PTSD and depression symptoms, to examine shared, underlying psychopathological processes. Participants included 740 Canadian military veterans from a national, epidemiological survey, previously deployed on peacekeeping missions and administered the PTSD Checklist and Center for Epidemiological Studies-Depression Scale (CES-D).
Results: An eight-factor PTSD/depression model fit adequately. In analyses validating the structure, PTSD's dysphoria factor was more related to depressive affect than to several other PTSD and depression factors. Somatic problems were more related to dysphoria than to other PTSD factors.
Limitations: Only military veterans were sampled, and without the use of structured diagnostic interviews.
Conclusions: Results highlight a set of interrelationships that PTSD's dysphoria factor shares with specific depression factors, shedding light on the underlying psychopathology of PTSD that emphasizes dysphoric mood.

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1. Introduction

Studies demonstrate that major depressive disorder (MDD) and PTSD are highly comorbid and statistically correlated, despite some symptom overlap. Studies have not examined the individual, underlying structural dimensions of both PTSD and depression to explore their associations.

PTSD has clear conceptual and empirical ties to depressive disorders. Based on nationally representative studies, 48–55% of individuals diagnosed with a lifetime history of PTSD were also diagnosed with lifetime major depression (Elhai et al., 2008; Kessler et al., 1995). The substantial PTSD-depression comorbidity persists, even after removing items that overlap between the disorders, in large-scale epidemiological studies of adult civilians (Elhai et al., 2008) and military veterans (Grubaugh et al., 2010). Furthermore, among the most widely used PTSD instruments, relationships with depression

* Corresponding author at: Department of Psychology, University of Toledo, Mail Stop #948, 2801 W. Bancroft St., Toledo, Ohio 43606-3390, United States. Tel.: +1 419 530 2829; fax: +1 419 530 8479.
URL: http://www.jon-elhai.com (J.D. Elhai).

severity range from .61 to .75 for the Clinician-Administered PTSD Scale (CAPS; reviewed in Weathers et al., 2001), and from .63 to .67 for the Posttraumatic Stress Disorder Checklist (PCL; e.g., Adkins et al., 2008).

The most empirically supported structural PTSD models (Elhai and Palmieri, 2011; Yufik and Simms, 2010) were developed by King et al. (1998) and Simms et al. (2002). King et al.'s emotional numbing model involves four intercorrelated factors, separating the DSM-IV PTSD model's avoidance and numbing factors, in addition to reexperiencing and hyperarousal (King et al., 1998). Simms et al.'s dysphoria model revises King et al.'s model by moving PTSD's sleep disturbance, irritability, and impaired concentration symptoms from the hyperarousal to emotional numbing factor, reconceptualizing this factor as general dysphoria or distress (Simms et al., 2002). We focus here on the dysphoria model, given its large dysphoria factor which is conceptually and empirically related to depression.

Regarding depression's factor structure, we focus on the original 20-item Center for Epidemiological Studies-Depression Scale (CES-D) (Radloff, 1977), used in the present study. The four-factor CES-D model includes depressive affect, positive affect, somatic complaints and retarded activity, and interpersonal problems (Radloff, 1977). Research studies have most consistently supported this CES-D model (e.g., Nguyen et al., 2004; Sheehan et al., 1995).

Some studies have found unique associations for PTSD's dysphoria factor with depression (Simms et al., 2002) and emotional distress (Forbes et al., 2010); others failed to replicate this finding (Elklit et al., 2010; Marshall et al., 2010; Miller et al., 2010). Examining this issue by using latent dimensions for both PTSD and depression represents a unique contribution in providing improved precision in measuring the disorders' factors, further refining our understanding of the shared psychopathological processes behind PTSD and depression.

The current study aimed to test the joint factor structure of PTSD and depression using the the PCL and CES-D, with a sample of war-zone exposed military veterans. Specifically, it was hypothesized that based on analyses validating the symptom structure, depression's depressive affect and somatic complaint factors would be more related to PTSD's dysphoria factor than to other PTSD or depression factors, given the relationship between dysphoria (which includes somatic distress) with depressive affect (Simms et al., 2002).

2. Method

2.1. Participants and procedure

We used archival data from Veterans Affairs Canada (VAC). VAC anonymously mailed self-administered questionnaires to 2760 Canadian veterans in 1999, with research ethics board approval. This target sample was randomly selected and nationally stratified from 18,443 individuals identified with health conditions after serving in the Canadian armed forces, receiving or eligible for a VAC disability pension (described in Richardson et al., 2006). Informed consent was implied based upon completion and return of the materials, with a response rate of 71.3% ($n = 1968$).

Among those who returned the surveys, 1106 veterans served since 1990, of which 784 reported being deployed on at least one peacekeeping mission. We only report on these 784 respondents deployed since 1990, coinciding with an era of more stressful training and hazardous war-zone deployments (reviewed in Sareen et al., 2010).

Among the 784 respondents with valid data, 95.7% ($n = 749$) were men. Age ranged from 20 to 65 years ($M = 44.92$, $SD = 9.67$). The majority completed high school/secondary education ($n = 224$, 29.8%), or had attended college ($n = 199$, 26.5%) or completed college education ($n = 189$, 25.1%). Canadian forces service duration ranged from <1 year to 45 years ($M = 19.08$, $SD = 10.42$). Concerning unique deployments, 54.1% ($n = 424$) had been deployed once, 31.1% ($n = 244$) were deployed twice, 11.1% ($n = 87$) were deployed three times, and 2.3% ($n = 18$) were deployed four or more times. Although race/ethnicity data are not typically collected in Canada, the vast majority of the larger veteran pool sampled was Caucasian.

2.2. Instrumentation

The PTSD Checklist (PCL)-military version was used to measure PTSD symptoms. The PCL (Weathers et al., 1993) is a 17-item self-report measure of PTSD severity, mirroring DSM-IV's PTSD symptoms, using a five-point Likert scale (1 = "not at all" to 5 = "extremely"). The PCL has excellent internal consistency, test retest reliability, and diagnostic validity (reviewed in McDonald and Calhoun, 2010). The four-factor PTSD CFA model by Simms et al. (2002) has been supported with the PCL, including with military veterans (e.g., Naifeh et al., 2010; Pietrzak et al., 2010; Simms et al., 2002).

The CES-D (Radloff, 1977) is a 20-item, self-report depression instrument with a four-point Likert response format (0 = "rare or none of the time" to 3 = "most or all of the time"). Excellent internal consistency, test-retest reliability and convergent validity have been established (Knight et al., 1997; Radloff, 1977). Several studies support a four-factor CES-D model (e.g., Nguyen et al., 2004; Sheehan et al., 1995).

2.3. Analysis

Forty-four participants were eliminated for missing at least 20% of responses on the PCL or CES-D. Among the resulting sample of 740 subjects, 119 respondents on the PCL and 59 respondents on the CES-D were missing 1–2 items, distributed completely randomly; we used Mplus 6.1 software (Muthén and Muthén, 2010a) to derive parameter estimates using full information maximum likelihood (ML) procedures with a pairwise present estimation (Muthén and Muthén, 2010b).

Significant non-normality was found for the PCL. Therefore, ML estimation with a mean-adjusted Satorra–Bentler (S–B) chi-square statistic was used for the PCL CFA, which is robust to non-normality (Satorra and Bentler, 2001), treating PCL items as continuously-scaled. For CFAs including the CES-D items, we treated CES-D items as ordinal rather than continuous variables; as a result, those models used polychoric covariances and probit regression coefficients, robust weighted least squares estimation with a mean- and