



Research report

Relations between the underlying dimensions of PTSD and major depression using an epidemiological survey of deployed Ohio National Guard soldiers



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ABSTRACT

Background: In the present study, the authors investigated the relationship between the underlying symptom dimensions of posttraumatic stress disorder (PTSD) and dimensions of major depressive disorder (MDD).

Method: A sample of 1266 Ohio National Guard soldiers with a history of overseas deployment participated and were administered the PTSD Checklist (assessing PTSD) and Patient Health Questionnaire-9 (assessing depression).

Results: Using confirmatory factor analysis, results demonstrated that both PTSD's dysphoria and hyperarousal factors were more related to depression's somatic than non-somatic factor. Furthermore, depression's somatic factor was more related to PTSD's dysphoria than hyperarousal factor.

Limitations: Limitations of this study include the use of self-report measures and a predominately male military sample.

Conclusions: Results indicate that PTSD's dysphoria factor is related to depression specifically by way of depression's somatic construct. Given PTSD's substantial dysphoria/distress component, these results have implications for understanding the nature of PTSD's high comorbidity with depression.

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1. Introduction

There are substantial rates of comorbidity between posttraumatic stress disorder (PTSD) and major depression. For example, the National Comorbidity Survey (NCS) found that 48–55% of individuals diagnosed with PTSD were also diagnosed with major depression in their lifetimes (Kessler et al., 1995). While the comorbidity between PTSD and depression is well established (Elhai et al., 2011a; Keane and Kaloupek, 1997), few studies have examined how the underlying dimensions of PTSD and depression

are most related to each other in order to further understand the high comorbidity rates.

Several hypotheses have been proposed to explain the significant comorbidity between PTSD and major depressive disorder. We focus on two hypotheses in particular. First, several symptoms overlap between *DSM-IV* major depressive disorder (MDD) and PTSD (i.e., difficulties with sleep, concentration and anhedonia). As a consequence, satisfying criteria for one of these two disorders places an individual at substantial risk of being diagnosed with the other disorder merely by virtue of these overlapping symptoms (Spitzer et al., 2007). Second, there may be a shared underlying latent association behind depression and PTSD. Watson (2005) proposed that mood and anxiety disorders are defined by a higher order negative affect factor which subsumes a broad range of negative emotional states including fear, anger, and sadness. Watson argued that this higher order

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factor accounts for the high rates of comorbidity among mood and anxiety disorders, such as major depression and PTSD.

Recently, researchers have investigated the overlapping symptoms hypothesis of PTSD's comorbidity. Spitzer et al. (2007) suggested that removing the overlapping PTSD–depression items should result in a more pure, less comorbid PTSD diagnostic construct. However, a study by Elhai et al. (2008) found instead that removing overlapping items had negligible effects on PTSD's comorbidity rates (after removing overlapping items, comorbidity rates dropped nominally from 54.72% to 54.41% in the NCS Replication dataset). Similar results were found in a study of military veterans by Grubaugh et al. (2010) and a study of nationally representative, trauma-exposed adolescents conducted by Ford et al. (2009). Thus symptom overlap does not seem to primarily account for the PTSD–MDD comorbidity.

The shared latent mechanism hypothesis has been investigated as well, by examining PTSD's robust, empirically supported latent factor of dysphoria that is conceptually similar to the general negative affect construct (Simms et al., 2002). We discuss the dysphoria construct more extensively below in the context of factor analysis. Factor analysis is a relatively under-utilized approach to examining issues of comorbidity between mental disorders. The use of factor analysis can help to elucidate the nature of comorbidity by examining which underlying factors of a disorder are more highly correlated with factors of another similar mental disorder. This method can be used to test the construct validity of a disorder (e.g., its uniqueness as a disorder) in a more refined manner than by examining comorbidity between crudely measured, observed diagnostic variables. Furthermore, this research is particularly timely given that a new edition of the *DSM* is currently being developed.

1.1. PTSD's factor structure

There are two models of underlying PTSD symptoms that have received substantial empirical support. One model proposed by King et al. (1998) comprises the following four intercorrelated factors: re-experiencing, effortful avoidance, emotional numbing, and hyperarousal. This model is essentially identical to *DSM-IV*'s conceptualization of PTSD except that the avoidance and numbing symptom cluster (PTSD's Criterion C) is separated into distinct avoidance and numbing factors, supported by empirical research (reviewed by Asmundson et al., 2004). The other empirically supported PTSD model is the dysphoria model proposed by Simms et al. (2002), comprising the following four intercorrelated factors: re-experiencing, avoidance, dysphoria, and hyperarousal. In this model, the numbing items are combined with three hyperarousal items (difficulties with sleep, concentration difficulties, and irritability) to form a dysphoria factor which involves symptoms of emotional distress common to mood and anxiety disorders (reviewed in Watson, 2005). In this model of PTSD, the hyperarousal factor only contains anxious-arousal items (hypervigilance and exaggerated startle response) which are more characteristic of fear based disorders. Both models have been extensively studied using confirmatory factor analysis (CFA), demonstrating good fit among different trauma exposed samples and using a variety of PTSD instruments (reviewed in Elhai and Palmieri, 2011; Yufik and Simms, 2010).

One specific research question that recent empirical studies have tested is the notion that PTSD's dysphoria factor drives PTSD's association with external measures of depression and general emotional distress. Several studies have found support for this notion (Elklit et al., 2010; Forbes et al., 2010; Simms et al., 2002). However, other studies have found that in contrast to other factors of PTSD, PTSD's dysphoria is no more related to depression and distress (Marshall et al., 2010; Miller et al., 2010). Importantly, these

studies used crude, unitary measures of depression and distress rather than examining these constructs in a more refined manner to better understand the PTSD–depression relationship.

1.2. Depression's factor structure

There is less research regarding the factor structure of major depressive disorder, and the resulting factor structure often differs depending on the specific depression instrument used to assess depressive symptoms. In the present study, the Patient Health Questionnaire-9 (PHQ-9) was used to examine depression's factor structure. The PHQ-9 is a widely used self-report measure of depression and maps directly onto *DSM-IV* symptom criteria for a major depressive episode (MDE) (Kroenke et al., 2001). Although the PHQ-9 has been empirically well-researched, few studies have analyzed its factor structure using CFA. Prior studies have used exploratory factor analyses (EFA) (Cameron et al., 2008; Dum et al., 2008; Huang et al., 2006; Kalpakjian et al., 2009; Krause et al., 2010) and CFA (Baas et al., 2011; Krause et al., 2008) to assess the PHQ-9's symptom structure. Most PHQ-9 factor analytic studies either support a unidimensional depression model (Baas et al., 2011; Cameron et al., 2008; Dum et al., 2008; Kalpakjian et al., 2009) or a two-factor model of somatic and non-somatic/affective dimensions (Krause et al., 2008; 2010; Richardson and Richards, 2008).

The only study, to our knowledge, that has empirically tested several PHQ-9 depression factor models simultaneously with objective statistical criteria using CFA was a study conducted by Elhai et al. (in press). Overall, this and other studies have found the most support for a two-factor model, with one factor comprising five somatic items (sleep changes, appetite disturbances and feeling tired, difficulty concentrating and psychomotor changes) and the other factor primarily based on four non-somatic or affective items (anhedonia, depressed mood, suicidal thoughts, and feeling bad about oneself) (Elhai et al., in press; Krause et al., 2010; Richardson and Richards, 2008).

1.3. Relationship between the factor structure of depression and PTSD

Despite PTSD's high comorbidity with major depressive disorder, lacking in the literature is a more refined analysis of the PTSD–depression relationship by exploring relations between the latent factors of PTSD and MDD. In only one recent study, evidence demonstrated that PTSD's dysphoria factor was strongly related to the Center for Epidemiologic Studies–Depression Scale's (CES-D) factors of somatic problems and negative affect, indicating that the shared variance between the two comorbid disorders may be best accounted for by the dysphoria symptoms present in the PTSD diagnosis (Elhai et al., 2011b). Specifically, this study found that the PTSD dysphoria factor demonstrated a strong relationship with the CES-D's depressive affect ($r=.77$) and somatic problems ($r=.84$) factors, compared to the positive affect ($r=-.45$) and interpersonal problems ($r=.65$) factors. Although this study provides a better understanding of the relationship between the latent factors of PTSD and MDD, the CES-D is a 20-item depression instrument that does not directly map onto *DSM-IV*'s major depressive disorder criteria. Therefore, it is unknown whether those study results are generalizable to a *DSM-IV* major depression-based instrument that would be more likely used to support a MDD diagnosis.

1.4. Study aims

The purpose of the current study was to replicate and extend findings by Elhai et al. (2011b) to further examine the

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