The structure of co-occurring PTSD and depression symptoms in a cohort of Marines pre- and post-deployment☆

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ABSTRACT

Symptoms of posttraumatic stress disorder (PTSD) and major depressive disorder are the most frequently co-occurring problems following potentially traumatic events. It is unclear whether these comorbidities represent two correlated but distinct disorders or a common post-event response. We sought to inform this question by examining the distinctiveness of PTSD and depression symptoms at four cross-sectional time points, using data from a parent prospective longitudinal study of 858 Marines evaluated before deployment and approximately 1, 5, and 8 months after returning from the Afghanistan war. We conducted a series of cross-sectional confirmatory factor analyses of PTSD and depression symptoms at each time point, using the Posttraumatic Stress Disorder Checklist IV and the Beck Depression Inventory II. Analyses indicated that across all four assessments, self-reported symptoms on the measures were best explained by distinct but correlated subclusters of symptoms within each measure. This structure was supported by the data both before and after deployment, even with increases in average PTSD symptoms after deployment. These findings suggest that despite shared method variance and some symptom overlap, self-reports of PTSD and depression symptoms across a stressful combat deployment show distinct symptom subclusters rather than a general common trauma reaction in this sample of Marines.

1. Introduction

Posttraumatic stress disorder (PTSD) and major depressive disorder (MDD) commonly co-occur following exposure to potentially traumatizing events (PTE; Blanchard et al., 1998; Breslau et al., 2000; Brown et al., 2001; Kessler et al., 2005; Norris et al., 2004; Rytwinski et al., 2013). Understanding the nature of PTSD and depression comorbidity can have important implications for assessment, treatment planning, and the selection of therapeutic targets (Zoellner et al., 2014). For example, if the symptoms of one disorder are primary and account for the variance in the symptoms of the other disorder, a focus on the primary disorder in assessment and treatment might be warranted. If the two disorders share core symptoms, transdiagnostic treatment approaches might be most efficient. Furthermore, if the two disorders overlap significantly following PTEs, it might be most efficient to include a single measure of the common symptoms. Factor analytic approaches have the

potential to clarify the nature of the relationship between symptoms of PTSD and depression after PTEs.

There has been a considerable amount of research on the factor structure of these two disorders using clinical interviews and commonly used self-report measures of symptoms (e.g. Posttraumatic Stress Disorder Checklist [PCL]; Weathers et al., 1993 and Beck Depression Inventory II [BDI-II]; Beck et al., 1996b). However, a number of these studies did not assess symptoms across time or examine factor structures before and after exposure to potentially traumatizing events, which could affect symptom expression and the relationships between PTSD and depression. The goal of this study was to examine the factor structure of reports of PTSD and depression symptoms in a large sample of Marines before deployment and then after exposure the PTEs, approximately 1, 5, and 8 months after returning from the Afghanistan war in 2010.

We tested two broad theories about the nature of the relationship

between PTSD and depression symptoms. The first model suggests that the symptoms of PTSD and MDD are *distinct but correlated* constructs (Blanchard et al., 1998; Erickson et al., 2001; Franko et al., 2005; Ginzburg et al., 2010; Grant et al., 2008; Gros et al., 2010; Post et al., 2016, 2011; Simms et al., 2002). The second model proposes that the co-occurrence of PTSD and depression symptoms indicates a common *general traumatic stress reaction* rather than two distinct disorders (Au et al., 2013; Breslau et al., 2000; Dekel et al., 2014; Elhai et al., 2011a; Norman et al., 2011; O'Donnell et al., 2004). A related model, the quadripartite model of psychopathology, suggests that PTSD and depression share underlying negative affectivity, which might account for their comorbidity (Watson, 2005, 2009).

Research is mixed on the distinct but correlated and the common stress reaction models of PTSD and depression co-occurrence, as there is some evidence to support each model. A number of studies that have used cross-sectional confirmatory factor analyses (CFA) suggest that although PTSD and depression co-occur following PTE and their symptoms are correlated, they still represent distinct disorders. For instance, using total scores of interview and self-report measures as factor indicators (i.e., construct-level analysis), Blanchard et al. (1998) reported that nearly half of participants who met criteria for PTSD one to four months following a motor vehicle accident also met criteria for depression, yet the two disorders still represented independent constructs in factor analyses. Grant et al. (2008) examined both construct-level and symptom-level (i.e., measurement items used as factor indicators) CFA in a sample of treatment-seeking motor vehicle accident survivors, who had an accident one to 516 months prior to data collection. Construct-level analyses revealed separate but correlated PTSD, depression, and generalized anxiety disorder (GAD) factors. Symptom-level analyses demonstrated distinct depression and GAD factors, along with two PTSD factors. Another study involving treatment-seeking veterans demonstrated that symptoms of the PCL and BDI-II represented two separate factors with a subset of overlapping symptoms (Gros et al., 2010). Recent research by Post et al. (2016) also demonstrated the distinctiveness of PTSD and depression in a construct-level factor analysis, with a sample that varied in time since trauma and index trauma.

Yet, there is also empirical support for the common stress reaction model. Using clinical interviews to assess symptoms across a range of PTE, Breslau et al. (2000) found that participants exposed to PTE who did not develop PTSD were also not likely to develop depression, whereas those with PTSD were significantly more likely also to have depression. Self-reported symptoms of PTSD and MDD in individuals who suffered severe physical trauma showed similar trajectories over a 7-month period, with a peak in symptoms one month after trauma exposure and a steady decline over the follow-up period (Norman et al., 2011). Further, PTSD and MDD symptoms in that study were associated with similar risk factors, such as pain and PTSD symptoms in the immediate post-injury period. Using canonical correlations, O'Donnell et al. (2004) found that at 3- and 12-months post-traumatic injury, depression and PTSD symptoms (assessed by diagnostic interviews) were associated with one general traumatic stress factor. At the 3-month assessment, another factor emerged that was unique to depression, but this dissipated over time such that only a general factor remained one year after exposure to PTE. Au et al. (2013) used latent profile analyses with a sample of female sexual assault survivors and found that self-reported symptoms of PTSD and depression cohered tightly at each of four assessments after the assault and at all levels of severity. Most important, there were no symptom profiles that contained primarily PTSD or depression symptoms at any of the time points. Armour et al. (2015) reported similar findings in a longitudinal study of Canadian military service members and veterans. In a sample of Israeli veterans and prisoners of war, Dekel et al. (2014) also found that self-reported DSM-consistent symptom clusters of PTSD and depression, assessed across three time points over 17 years, loaded onto a single latent variable in CFA. Elhai et al. (2011a) found support for a single dimension that characterized both disorders, using Rasch

modeling employing the National Comorbidity Survey – Replication database. They concluded that PTSD and depression might not be distinct disorders with unique variance, but rather might represent a common stress response in the face of trauma. Using online surveys of symptoms of PTSD, depression, and GAD, Price and van Stolk-Cooke (2015) examined interrelationships among symptom clusters to conclude that the overlapping symptoms of negative affectivity were not specific to any of the disorders following PTE. Reviews of factor analyses and other studies examining comorbidity among PTSD and depression symptoms led Watson (2005, 2009) to argue that PTSD symptoms lack specificity to such a degree that both PTSD and depression should be classified in the DSM as distress disorders, having common associations with underlying general distress and negative affectivity.

Thus, it is not yet clear whether PTSD and depression symptoms represent separate but correlated constructs or one common response in the aftermath of PTE. The disparate findings may be due to widely varied populations, exposure types, and methodological approaches. Further, no study to our knowledge has examined the factor structure of co-occurring PTSD and depression symptoms prior to and following the experience of a PTE. In times of war, the military offers unique opportunities to collect data on groups of service members before and after deployments, when PTEs commonly occur. We examined the factor structure of co-occurring PTSD and depression symptoms in a cohort of Marines with shared culture and experiences deployed to a combat mission in Afghanistan in late 2010. In addition, when studied epidemiologically, this population typically has positively skewed symptom severity levels that are more similar to the general population than to clinical and treatment-seeking samples. We evaluated this cohort at four time points: approximately one month before deployment, one month after return from deployment, and in the early readjustment period 5 and 8 months after return from deployment. We hypothesized that reports of symptoms before deployment would fit a model supporting the distinct but correlated model such that individual subclusters of each measure (5 for the PCL and 2 for the BDI-II) would be associated but would not load onto a higher-order common factor. We predicted that the common distress model would provide the best fit to the data after the sample had been exposed to warzone PTEs. At these time points, we hypothesized that individual subclusters of each measure would load onto a common higher-order factor due to increases in symptoms across measures following deployment-related stress.

2. Methods

2.1. Participants

This is a secondary analysis of data that were originally collected as part of the Marine Resilience Study (MRS), a 4-wave longitudinal study of active duty Marines deployed to Iraq or Afghanistan between 2008 and 2012 (Baker et al., 2012). Four separate cohorts were scheduled to complete a battery of assessments in garrison one month before a 7-month deployment and then roughly 3-, 5-, and 8-months after returning from deployment. Across all cohorts, 2600 Marines completed the pre-deployment assessment, 2317 (89.1%) completed the 3-month assessment, 1901 (73.1%) completed the 5-month assessment, and 1634 (62.8%) completed the 8-month assessment. Participation at each assessment was voluntary, and individual informed consent was obtained before enrollment.

Only cohort 4 was included (n = 858) in this study because this cohort was exposed to the most combat and combat losses (they deployed to Helmand Province in Afghanistan at a time of heavy conflict and unrest) and thus provides the best test of changes in the combined structure of PTSD and depression symptoms associated with combat stress and exposure to PTE (see Nash et al., 2015). Data imputation (Muthén and Muthén, 2008–, 2011) techniques were used to ensure that all participants contributed data to factor analyses at each of the