Latent Classes of PTSD Symptoms in Veterans Undergoing Residential PTSD Treatment

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Abstract

Although most veterans in the Department of Veterans Affairs (VA) health system are treated for posttraumatic stress disorder (PTSD) in the outpatient setting, the VA has approximately 40 residential PTSD treatment facilities across the country for those requiring more intensive care. The symptom profiles of these veterans are poorly understood. Thus, the current study was designed to characterize classes of PTSD symptoms in a national sample of veterans undergoing residential treatment. We analyzed latent classes of PTSD symptoms among 2,452 veterans entering VA PTSD residential treatment in fiscal year 2013. The model with the best fit was a 4-class model comprising a low symptom class, moderate symptom class with high re-experiencing symptoms, a moderate symptom class with high emotional numbing, and a high symptom class. Compared to classes identified in outpatient samples, these classes were similar in type but greater in severity. Classes differed by age, race/ethnicity, trauma type, co-occurring medical conditions, co-occurring psychiatric conditions, and social functioning. Compared to the moderate class with high emotional numbing, those in the moderate class with high re-experiencing symptoms were more likely to be non-white, have greater pain severity, greater sleep problems, and were less likely to be depressed. Our findings suggest that veterans in residential treatment who have more severe PTSD symptoms also experience other medical and psychosocial stressors. A better understanding of symptom profiles may help to create more individualized treatment planning and thus potentially improve care for these veterans.

Keywords

Posttraumatic Stress Disorder; VA; Veteran Affairs; Residential; Latent Class Analysis

Posttraumatic stress disorder (PTSD) is a large and growing health concern for the US veteran population. Recent estimates suggest that up to a third of returning Operation Enduring Freedom/Operation Iraqi Freedom/Operation New Dawn (OEF/OIF/OND) veterans have PTSD (VA, 2015), and that the number of veterans seeking care for PTSD in the Department of Veterans Affairs (VA) Health System has increased 249% from 2002 to 2012 (VA, 2013). Although the majority of VA patients with PTSD are treated in the outpatient setting (VA, 2013), for those requiring more intensive care, VA has 39 residential facilities focused exclusively on veterans with PTSD that treat approximately 4,000 veterans a year (VA, 2013). These programs have long been an important part of VA PTSD care (Rosenheck, Fontana, & Errera, 1997), and historically have treated the most severe and chronic cases of PTSD (Cook et al., 2014).

Recent work has significantly improved our understanding of PTSD symptom profiles among VA outpatients (e.g., Hebenstreit, Madden, Koo, & Maguen, 2015; Hebenstreit, Madden, & Maguen, 2014; Maguen et al., 2013; Naifeh, Richardson, Del Ben, & Elhai, 2010). Outpatient treatment is considered the least intrusive level of care for veterans with PTSD; however, for some veterans outpatient treatment is not sufficient to address severe, chronic, or disabling PTSD symptoms, or related disorders and functional disability. Although veterans for whom residential services are recommended might differ in their symptom profiles from outpatients, the generalizability of findings from outpatients to residential treatment recipients is unknown. Gaining a better understanding of the types of symptom patterns and associated characteristics experienced by veterans in PTSD residential programs may aid in tailoring clinical interventions to address specific symptom clusters and/or co-occurring conditions for those veterans and allow for more individualized, veteran-centered treatment planning. Thus, the current study was designed to identify and characterize potential classes of PTSD symptoms in a national sample of veterans receiving VA residential services.

Previous investigations of latent classes of PTSD symptoms in outpatient veteran samples have typically revealed three or four classes. Three-class models generally consist of low, moderate, and high symptom profiles (Contractor et al., 2015; Steenkamp et al., 2015; Steenkamp et al., 2012); whereas, four-class models typically consist of a low class, moderate class, moderate class with high levels of emotional numbing symptoms, and a high class (Hebenstreit et al., 2014; Maguen et al., 2013). These studies have included veteran samples in the community or seeking treatment on an outpatient basis. However, important differences exist between veterans receiving outpatient treatment and veterans receiving residential treatment due to the level of care and reasons for the need for more intensive services. For example, veterans who receive residential care have greater PTSD severity, greater rates of co-occurring substance use disorders and other psychiatric disorders, greater rates of unemployment, and are less likely to be married (VA, 2013). Thus, the nature of latent classes and latent class membership in these veterans may also differ.

Latent classes of PTSD symptoms may be associated with other important clinical characteristics. Predictors of PTSD symptom profiles in outpatient samples include demographic characteristics such as age (Hebenstreit et al., 2014; Naifeh et al., 2010; Pietrzak et al., 2014) and race/ethnicity (Hebenstreit et al., 2014; Pietrzak et al., 2014), co-

occurring psychiatric diagnoses (Manhapra, Stefanovics, & Rosenheck, 2015; Naifeh et al., 2010; Pietrzak et al., 2014), co-occurring physical health conditions (Armour et al., 2015; Pietrzak et al., 2014), and level of social functioning and support (Armour et al., 2015; Frankfurt, Anders, James, Engdahl, & Winkowski, 2015). These studies typically find that Black and Hispanic individuals (Hebenstreit et al., 2014; Pietrzak et al., 2014), individuals with co-occurring physical health conditions (Pietrzak et al., 2014), and individuals with poor social support (Armour et al., 2015; Frankfurt et al., 2015) are overrepresented in the more severe classes. However, these associations have not yet been tested in residential treatment settings. Because pretreatment PTSD severity is associated with treatment outcomes (Currier, Holland, & Drescher, 2014; Elliott, Biddle, Hawthorne, Forbes, & Creamer, 2005; van Minnen, Arntz, & Keijsers, 2002), understanding the factors associated with severity as well as symptom profiles may be important for informing strategies to improve treatment response.

In summary, recent work has begun to characterize symptom patterns in veterans with PTSD receiving VA outpatient services. We built on this work by examining PTSD symptom expression in a national sample of veterans entering residential treatment for PTSD in 2013 to identify distinct symptom classes. We also examined the association between class membership and clinically significant factors including demographic characteristics, social support, and co-occurring conditions. We hypothesized that individuals with lower social support and more co-occurring conditions would belong to more clinically severe symptom classes.

Methods

Sample Characteristics

The sample consisted of all unique veterans entering residential VA PTSD treatment in fiscal year 2013 with completed PTSD symptom measures ($N = 2,452$). Ninety-three percent of the sample was male, 42.2% was non-white, 31.4% was under the age of 35, and 76.0% met criteria for at least one co-occurring psychiatric diagnosis (see Table 1). Data were provided by the VA Northeast Program Evaluation Center (NEPEC). The VA Ann Arbor Healthcare System Institutional Review Board approved this study, and granted a waiver of informed consent for access to protected health information.

Measures

Baseline PTSD symptoms were measured using the Posttraumatic Stress Disorder Checklist (PCL), a 17-item self-report measure of PTSD symptoms based on DSM-IV criteria (Weathers, Litz, Herman, Huska, & Keane, 1993). Cronbach's alpha for the sample was .84. Although previous latent class analyses (Hebenstreit et al., 2014; Maguen et al., 2013) have categorized item responses of 1–2 as absent and 3–5 as present, we found that doing so resulted in very few individuals reporting symptoms as absent (average 9.8% per item). Thus, we opted to dichotomize each PCL item at the overall sample median (Hagenaars & McCutcheon, 2002). Accordingly, responses of 1–3 were categorized as absent and responses of 4–5 were categorized as present. The distribution of PCL scores was negatively skewed (Mean = 67.32, Median = 68, Kolmogorov-Smirnov $D = .05$, $p < .01$), however,

levels of skewness and kurtosis were within an acceptable range (i.e. < 2 ; Field, 2009; Gravetter & Wallnau, 2008; Trochim & Donnelly, 2005), and latent class analysis is robust to moderately skewed data (Muthén & Muthén, 1998–2011). The sum of dichotomized PCL items followed a similar distribution.

Independent variables of interest—Independent variables of interest were obtained from the program evaluation forms collected and maintained by NEPEC. These included demographic characteristics, co-occurring psychiatric and medical conditions, and social functioning variables.

Demographic characteristics: Demographic variables of interest included gender, age category (< 35 , $35 - 55$, > 55), race/ethnicity, marital status (married or not married), combat era, trauma type, and PTSD disability claim status. Race and ethnicity were combined into a single variable with two categories: non-Hispanic White versus non-White. For categorizing combat era, veterans were classified as Vietnam-era (2/28/1961 – 5/7/1975), post-Vietnam/Gulf War (5/8/1975 – 9/10/2001) or OEF/OIF/OND (9/11/2001 – Present). Due to the small number of veterans in these programs who served before Vietnam, they were excluded from the analysis. For veterans that served in multiple combat eras, the following hierarchy was used to assign a single combat era: If veterans served in OEF/OIF/OND, they were classified as OEF/OIF/OND era. If not, and if they served in Vietnam, they were classified as Vietnam era. Otherwise, they were classified as post-Vietnam/Gulf War era. For coding trauma type, we created dummy variables for combat trauma and for sexual trauma (including Military Sexual Trauma or non-military sexual trauma). For coding PTSD disability claim status, we coded claim status as positive if the veteran was currently applying for PTSD-related service-connected disability.

Co-occurring disorders: Co-occurring psychiatric and medical conditions were determined by clinician report. To assess co-occurring psychiatric disorders, we created dummy variables for the presence of the following disorders: alcohol or substance use disorder, anxiety disorder, depression, and serious mental illness (including bipolar disorder, schizophrenia, and other psychosis). We also assessed presence or absence of psychiatric medication use in the past 30 days. Co-occurring medical conditions were assessed with six questions. The first item queried general physical health in the past 30 days (on a scale of 1 – 5 with higher scores representing worse health), the second assessed presence or absence of a pain problem lasting three months or longer, the third assessed average pain severity in the past week (on a scale of 0 – 10 with higher scores representing worse pain), the fourth assessed level of pain interference with activities in the past week (on a scale of 0 – 10 with higher scores representing worse interference), and the fifth assessed presence or absence of a traumatic brain injury (TBI; determined by clinician report). The sixth item, trouble sleeping in the past 30 days, was rated on a scale of 1 – 5, with each item representing a range of days from 0 – 30. To transform this scale into a continuous measure, participant responses were transformed into the midpoint of the range they selected.

Social Functioning: Social functioning variables of interest included social support, social conflict, and aggression. Social support was determined by responses to the following

question: “In the past 30 days, how many days were you in contact or spent time with any family members or friends who are supportive of your recovery?” Responses were provided on a 1 – 5 scale, with each item representing a range of days from 0 – 30. Similar to the sleep item, participant responses were transformed into the midpoint of the selected range. Social conflict was determined by responses to the following question, “In the past 30 days, how much have you been bothered by arguments or problems getting along with any family members or friends?” Responses were provided on a 1 – 5 scale. Aggression was coded as positive if the veteran endorsed any of the following in the previous four months: destroying property, threatening someone with physical violence without a weapon, having a physical fight with someone, or threatening someone with a weapon.

Data analysis

Latent class analysis—Latent class analysis (LCA) identifies discrete, mutually exclusive groups of individuals based on their responses to a series of observed variables (Lanza, Collins, Lemmon, & Schafer, 2007). LCA was conducted using Mplus (Muthén & Muthén, 1998–2011). LCA was run with two classes up to 10 classes. To identify the optimal number of classes, we used the following fit statistics: the Akaike Information Criterion (AIC; Bozdogan, 1987), the Bayesian Information Criterion (BIC; Schwarz, 1978), the sample size adjusted Bayesian information criterion (SSBIC), the Entropy statistic, the bootstrap likelihood ratio test (BLRT; Nylund, Asparouhov, & Muthén, 2007), and the Lo-Mendell-Rubin adjusted likelihood ratio test (LMR; Lo, Mendell, & Rubin, 2001). Parsimony and interpretability were also considered. The LMR and BLRT test a model with K classes against a model with K-1 classes (Nylund et al., 2007). Once the best-fitting model was selected, veterans were assigned to the class to which they had the highest posterior probability of membership.

Missing data analysis—3,801 unique individuals entered residential PTSD care in FY 2013. Among the overall sample, 2,672 (70.3%) completed PCLs. Of those who completed PCLs, 220 (8.2%) had missing data on independent variables, and were excluded from the analysis. These 220 veterans did not differ from veterans with complete data on PCL score (Wilcoxon Rank Sum $Z = -1.26$, $p = .21$). The final sample consisted of 2,452 individuals. Compared to the total sample of veterans entering residential care, veterans in the final sample were more likely to be male (93.3% in the final sample versus 90.8% in the overall sample), under age 35 (31.4% versus 25.4%), OEF/OIF era (49.8% versus 41.8%), non-white (42.2% versus 34.9%), combat-exposed (82.1% versus 76.8%), have a substance use disorder (51.3% versus 42.8%), TBI (16.4% versus 10.8%), aggression (65.6% versus 55.8%), and have higher social conflict scores ($M = 3.14$ versus 2.99). They were less likely to have experienced sexual trauma (17.3% versus 20.4%) or to have a pain problem (72.9% versus 79.4%).

Bivariate and multinomial regression analyses—Bivariate analyses (Chi square and Kruskal-Wallis tests) assessed the associations between independent variables and class membership. Multinomial logistic regression was conducted with latent class as the outcome and variables that were significant in bivariate analyses included as independent variables.

Bivariate and multinomial regression analyses were conducted in SAS version 9.4 (SAS Institute, Inc., 2013; SAS 9.4. Cary, NC: SAS Institute Inc.)

Results

LCA results

Using the LMR values and comparing a model with K classes against a model with $K-1$ classes, the four-class solution was found to be superior to the three-class solution, LMR test $2LLDiff34 = 458.70$, $p < .001$; see Table 2. No further models were significant. Based on this test, parsimony, and negligible changes in AIC and BIC values beyond four classes, the four-class solution was deemed to fit best. The four classes were characterized by a low symptom (Class 1; 10.7%), a high symptom (Class 4; 41.1%), and two moderate symptom profiles. One of the moderate symptom classes exhibited high re-experiencing symptoms (Class 2; 23.3%) and the other exhibited high emotional numbing (Class 3; 24.9%). Mean PCL score was 48.78 ($SD = 7.12$) for the low symptom class, 65.24 ($SD = 5.01$) for the moderate symptom class with high re-experiencing, 63.10 ($SD = 5.40$) for the moderate symptom class with high emotional numbing, and 75.88 ($SD = 4.90$) for the high symptom class. The four latent classes are depicted in Figure 1. Each latent class is presented in terms of the within-class probability of endorsing each PCL item.

Bivariate and multinomial regression results

Bivariate results revealed that classes differed by age group, race/ethnicity, combat era, trauma type, co-occurring anxiety, co-occurring depression, psychiatric medication usage, physical health, pain problem, pain severity, pain interference, sleep problems, social support, social conflict, and aggression (see Table 1). In multinomial regression models, there were significant class differences with respect to age group, race/ethnicity, trauma type, co-occurring anxiety, co-occurring depression, psychiatric medication usage, physical health, pain severity, sleep problems, social support, social conflict, and aggression (see Table 3). Compared to veterans in the high symptom class, veterans in the low and moderate classes were more likely to have greater social support and were less likely to be older, have poor physical health, poor sleep, social conflict, and aggression. Compared to the moderate class with high emotional numbing, those in the moderate class with high re-experiencing symptoms were more likely to be non-white, have greater pain severity, greater sleep problems, and were less likely to be depressed.

Discussion

We conducted a latent class analysis of PTSD symptoms among a national sample of 2,452 veterans entering VA PTSD residential treatment in fiscal year 2013. The best fitting model was a 4-class solution comprising a low symptom class, moderate symptom class with high re-experiencing, moderate symptom class with high emotional numbing, and high symptom class. Classes differed by demographic characteristics, co-occurring psychiatric disorders, physical health characteristics, and level of social functioning. Our findings suggest that distinct subgroups exist within residential treatment settings, and that these subgroups differ

by PTSD symptom severity, prominent symptom clusters, and medical and psychosocial stressors.

Our finding of four latent classes is similar to previous studies of veterans with PTSD being treated in outpatient settings. For example, four similar classes were found in a sample of returning veterans (Maguen et al., 2013) and a sample of female veterans (Hebenstreit et al., 2014). However, some studies of veterans have found that a model with fewer classes (such as a 3-class model with low, moderate, and high symptom classes) exhibits better fit (Contractor et al., 2015; Naifeh et al., 2010; Steenkamp et al., 2012). Nonetheless, the prevalence of the four latent classes in our sample was similar to the prevalence of classes in several outpatient samples. For example, in 2,425 female veterans examined by Hebenstreit and colleagues (2014), the High Symptom class represented 50% of the sample (compared to 41% in the current study), followed by the Intermediate Symptom class (21% compared to 23% in the current study), Intermediate Symptom class with High Emotional Numbing (21% as compared to 25% in the current study), and Low Symptom class (9% as compared to 11% in the current study). However, PCL items in these studies were dichotomized based on a cut point of 3, whereas our study dichotomized items at a score of 4. Thus, although we identified similar patterns of symptomatology, we observed greater levels of severity across classes. This higher level of severity is consistent with the finding that veterans in residential PTSD programs have higher average PCL scores than veterans in outpatient programs (VA, 2013). Given that greater initial PTSD severity is associated with poorer treatment outcomes (Currier et al., 2014), this information is relevant to efforts targeting improved treatment response.

Similar to previous studies (e.g., Breslau, Reboussin, Anthony, & Storr, 2005; Hebenstreit et al., 2014; Maguen et al., 2013), we identified two classes that were characterized by moderate symptoms. Class 2 exhibited higher re-experiencing symptoms, whereas Class 3 exhibited higher emotional numbing symptoms. Veterans with high levels of emotional numbing symptoms and more moderate levels of other PTSD symptoms may be less likely to complete minimally-adequate treatment as compared with Veterans who have symptoms that are relatively moderate with higher re-experiencing (Hebenstreit et al., 2015). Moreover, emotional numbing symptoms may respond more slowly to treatment. For example, one study demonstrated that emotional numbing symptoms responded more slowly than re-experiencing symptoms to venlafaxine administration (Stein et al., 2009). Thus, even for veterans with similar overall symptom levels, the presence of high emotional numbing versus high re-experiencing symptoms may have important clinical implications. Future research is needed to determine whether veterans with high emotional numbing symptoms may benefit from additional engagement strategies as compared with veterans with similar overall severity but lower emotional numbing symptoms.

Multinomial regression analyses revealed that the four classes differed on several sociodemographic characteristics, including age/era, race/ethnicity, physical health, and social functioning. Specifically, we found that younger veterans were more likely to be in the lower-symptom classes. This finding is consistent with some studies (Hebenstreit et al., 2014; Roberts & Browne, 2011), but contrasts with others reporting that younger veterans have more severe symptoms (Belsher, Tiet, Garvert, & Rosen, 2012; Naifeh et al., 2010;

Pietrzak et al., 2014) or that symptoms do not vary by age (Contractor et al., 2015; Neria, Besser, Kiper, & Westphal, 2010; Steenkamp et al., 2012). Further work is needed to clarify the association between age and PTSD severity, and why these associations may differ by treatment setting. Shorter duration of PTSD symptoms may explain the finding that younger veterans were more likely to be in the milder symptom classes. Future research should examine duration of symptoms as a factor potentially associated with latent symptom class.

We also found that non-white veterans were less likely to be in the moderate symptom class as compared to the high symptom class. This finding is consistent with previous reports that Black and Hispanic individuals are more likely to be in high symptom classes (Hebenstreit et al., 2014; Pietrzak et al., 2014) and experience worse PTSD symptoms (Galea et al., 2004; Koo, Hebenstreit, Madden, & Maguen, 2016; Pole, Best, Metzler, & Marmar, 2005; Pole et al., 2001), though not all studies adjust for opportunity to diagnose. Factors contributing to higher PTSD symptoms among minority individuals may include greater trauma exposure, lower social support, and greater perceived racism (Pole et al., 2005). These findings suggest that efforts are needed to address the greater burden of PTSD experienced by racial and ethnic minority veterans. Moreover, racial and ethnic minority individuals may experience more hardships in the residential treatment setting, including staff stereotyping and cultural dissimilarities between staff and patients (Kruzich, Friesen, Williams-Murphy, & Longley, 2002). VA residential treatment providers should be aware of these problems and strive to counteract them.

In terms of co-occurring conditions, we found that veterans with better physical health, better sleep, and less pain were more likely to be in the lower symptom classes. Poorer physical health has previously been associated with greater levels of PTSD symptoms (Armour et al., 2015; Pietrzak et al., 2014). Physical health problems may exacerbate PTSD symptoms and lead to greater levels of distress (Sharp & Harvey, 2001). Furthermore, poor physical health (Currier et al., 2014; Sofko, Currier, & Drescher, 2016) and pain may predict worse PTSD treatment response (Bartoszek, Hannan, Kamm, Pamp, & Maieritsch, 2017). Further work is needed to determine the potential merits of incorporating interventions that address these co-occurring conditions, such as cognitive-behavioral therapy for chronic medical conditions (Moore, Von Korff, Cherkin, Saunders, & Lorig, 2000), cognitive-behavioral therapy for insomnia (Manber et al., 2008), or cognitive-behavioral therapy for chronic pain (Morley, Eccleston, & Williams, 1999).

Finally, we found that veterans with better social functioning were more likely to be in the lower symptom classes. Previous studies have found similar associations between social support and symptom severity (Armour et al., 2015; Frankfurt et al., 2015; Karstoft, Armour, Elklit, & Solomon, 2013; Lowe, Galea, Uddin, & Koenen, 2014; Rosellini, Coffey, Tracy, & Galea, 2014) and between low social support and poorer PTSD treatment outcomes (Price, Gros, Strachan, Ruggiero, & Acierno, 2013). Efforts to bolster social connection and social functioning may be most helpful for individuals with more severe PTSD symptoms. In residential treatment settings, social support could be addressed by increasing connections to peer support services or family-based services. Cohort-based admission may also help bolster social support among residential treatment participants.

The psychosocial factors associated with class membership in our study are notable in that they closely match the problems for which veterans with PTSD report interest in receiving help. When 812 veterans in residential treatment were asked about the problems that they most wanted to improve through PTSD treatment, their top treatment goals (in addition to PTSD symptoms) were anger (33.7%), sleep problems (14.3%), nightmares (12.3%), and estrangement/isolation (20.8%) (Rosen, Adler, & Tiet, 2013). Furthermore, veterans in residential treatment were more likely than outpatients to want help with estrangement/isolation and depression (Rosen et al., 2013). Thus, the factors that are associated with more severe symptom profiles in veterans undergoing residential treatment are also self-identified by veterans as problems for which they would most like to receive help. Targeting these factors may therefore both address the needs of the most severely ill veterans and will also make VA PTSD care more patient-centered.

Several study limitations merit mention. First, these data are cross-sectional and so they do not address treatment outcomes or other treatment processes such as attrition. These topics are important areas for future research. Second, PTSD severity was determined by self-report and not verified by structured clinical interview. Although these measures are highly correlated with clinician-administered diagnostic interviews (Monson et al., 2008), they may be subject to response bias. Similarly, psychiatric diagnoses may not have been determined by structured clinical interviews in some facilities. Our analysis classified PTSD profiles based on DSM-IV rather than DSM-5 criteria. Emerging LCA studies using DSM-5 diagnostic criteria typically find similar numbers of classes (e.g., Minihan, Liddell, Byrow, Bryant, & Nickerson, 2018); however, they have also tended to identify a dissociative subtype of PTSD (Armour, Karstoft, & Richardson, 2014; Hansen, Ross, & Armour, 2017; Wolf et al., 2017). Future studies are needed to test whether such DSM-5-based findings extend to veterans in residential care and to determine the treatment implications in this setting. Finally, the findings from this group of veterans receiving care in residential VA PTSD treatment facilities may not be generalizable to other veterans with severe symptoms and/or functional impairment who do not receive residential treatment, or to civilian PTSD samples with similar problems.

In conclusion, we identified four latent classes of PTSD symptoms among veterans entering residential VA PTSD care. These classes were similar in type but greater in severity as compared to classes identified in outpatient samples. Factors associated with class membership included demographic, psychosocial, and physical health characteristics. A better understanding of the symptom profiles of veterans receiving PTSD residential services may help individualize treatment and potentially improve care for these individuals.

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Figure 1. Latent Classes of PTSD Symptoms among 2,452 VA Patients in Residential PTSD care
 Class 1 exhibited a low symptom profile, Class 2 exhibited a moderate symptom profile with high re-experiencing symptoms (intrusions, nightmares, flashbacks, psychological distress, and physiological distress), Class 3 exhibited a moderate symptom profile with high emotional numbing symptoms (loss of interest, detachment, restricted affect, and foreshortened future), and Class 4 exhibited a high symptom profile.

Table 1

Final Sample Characteristics (N = 2,452) and Characteristics by Class

Characteristic	Final Sample			Class 1 Low (10.7%)			Class 1 Moderate; High Re- experiencing (23.3%)			Class 2 Moderate; High Emotional Numbing (24.9%)			Class 4 High (41.1%)			
	N	%	n	%	n	%	%	n	%	n	%	%	n	%	χ ²	Phi
Male Gender	2288	93.3	249	95.0	527	92.3		572	93.6	940	93.3	2.30	0.03			
Age category												28.78***	0.11			
<35 years	770	31.4	69	26.3	183	32.1		222	36.3	296	29.4					
35–55 years	924	37.7	86	32.8	205	35.9		208	34.0	425	42.2					
>55 years	758	30.9	107	40.8	183	32.1		181	29.6	287	28.5					
Non-white Race/Ethnicity	1034	42.2	105	40.1	241	42.2		206	33.7	482	47.8	31.56***	0.11			
Married	1018	41.5	102	38.9	228	39.9		262	42.9	426	42.3	2.01	0.03			
Vietnam Era	685	27.9	95	36.3	162	28.4		169	27.7	259	25.7	11.61**	0.07			
Post-Vietnam/Gulf War	840	34.3	82	31.3	190	33.3		195	31.9	373	37.0	6.13	0.05			
OEF/OIF/OND Era	1,222	49.8	109	41.6	278	48.7		338	55.3	497	49.3	14.87**	0.08			
Combat Exposure	2014	82.1	219	83.6	453	79.3		500	81.8	842	83.5	4.81	0.04			
Sexual Trauma	425	17.3	36	13.7	119	20.8		108	17.7	162	16.1	8.43*	0.06			
New PTSD Claim	721	29.4	62	23.7	170	29.8		170	27.8	319	31.7	7.37	0.05			
Alcohol or Substance Use Disorder	1258	51.3	137	52.3	303	53.1		306	50.1	512	50.8	1.28	0.02			
Anxiety Disorder	343	14.0	23	8.8	76	13.3		78	12.8	166	16.5	12.04**	0.07			
Depression	857	35.0	81	30.9	186	32.6		240	39.3	350	34.7	8.35*	0.06			
Serious Mental Illness	211	8.6	14	5.3	52	9.1		55	9.0	90	8.9	3.98	0.04			
Psychiatric Medication	2232	91.0	219	83.6	525	91.9		555	90.8	933	92.6	21.27***	0.09			
Physical Health (<i>M, SD</i>)	3.71	0.98	3.27	0.99	3.61	0.99		3.61	0.94	3.95	0.94	135.61***				
Pain Problem	1,788	72.9	175	66.8	409	71.6		421	68.9	783	77.7	22.01***	0.09			
Pain Severity (<i>M, SD</i>)	4.35	2.94	3.82	2.82	4.29	2.86		3.84	2.85	4.82	3.00	60.76***				
Pain Interference (<i>M, SD</i>)	3.96	3.22	3.30	2.95	3.85	3.11		3.45	3.15	4.50	3.30	55.80***				

Characteristic	N	Final Sample		Class 1 Low (10.7%)		Class 1 Moderate; High Re- experiencing (23.3%)		Class 2 Moderate; High Emotional Numbing (24.9%)		Class 4 High (41.1%)		χ^2	Phi
		%	n	%	n	%	n	%	n	%	n		
Traumatic Brain Injury	403	16.4	33	12.6	104	18.2	96	15.7	170	16.9	170	4.50	0.04
Sleep Problems (<i>M, SD</i>)	18.40	6.86	13.79	7.95	18.36	6.88	17.50	7.30	20.17	5.47	20.17	186.72	****
Social Support (<i>M, SD</i>)	12.59	9.42	13.47	8.93	13.56	9.30	12.92	9.50	11.60	9.49	11.60	22.97	****
Social Conflict (<i>M, SD</i>)	3.14	1.37	2.32	1.12	2.89	1.29	3.05	1.33	3.55	1.35	3.55	214.59	****
Aggression	1609	65.6	123	47.0	352	61.7	386	63.2	748	74.2	748	79.05	****
													0.18

* $p < .05$,

** $p < .01$;

*** $p < .001$

Table 2

Class fit statistics

	2 Classes	3 Classes	4 Classes	5 Classes
AIC	41415.02	40513.72	40087.75	39888.78
BIC	41618.18	40821.36	40499.88	40405.39
SSBIC	41506.98	40652.97	40274.30	40122.62
Entropy	0.83	0.81	0.75	0.74
BLRT	5363.32	937.30	461.97	234.97
BLRT <i>p</i> -value	< .001	< .001	< .001	< .001
LMR	5325.41	930.68	458.70	233.31
LMR <i>p</i> -value	< .001	< .001	< .001	0.43

Note. AIC = Akaike information criterion; BIC = Bayesian information criterion; BLRT = Bootstrap Likelihood Ratio Test; LMR = Lo-Mendell-Rubin Adjusted Likelihood Ratio Test; SSBIC = sample size adjusted Bayesian information criterion

Table 3

Relative Risk Ratios from Multinomial Regression Model Predicting Class Membership (N = 2,452)

	Class 1 (10.7%)	Class 2 (23.3%)	Class 3 (24.9%)	Class 4(41.1%)
	Low Symptom	High Re-experiencing	High Emotional Numbing	High Symptom
Age category (35–55 years)	0.78 (0.53 – 1.16)	0.69 (0.53 – 0.90) **	0.65 (0.50 – 0.85) **	Reference
Age category (>55 years)	0.82 (0.55 – 1.23)	0.73 (0.54 – 0.97) *	0.69 (0.52 – 0.92) *	Reference
Race/Ethnicity (Non-white vs. White)	0.74 (0.54 – 1.01)	0.88 (0.70 – 1.10)	0.63 (0.50 – 0.79) ***	Reference
Sexual Trauma	0.76 (0.50 – 1.17)	1.34 (1.01 – 1.77) *	1.12 (0.84 – 1.48)	Reference
Anxiety Disorder	0.54 (0.33 – 0.89) *	0.84 (0.61 – 1.15)	0.78 (0.57 – 1.07)	Reference
Depression	0.92 (0.67 – 1.27)	0.92 (0.73 – 1.16)	1.27 (1.02 – 1.59) *	Reference
Psychiatric Medication	0.49 (0.31 – 0.78) **	0.95 (0.64 – 1.42)	0.83 (0.57 – 1.22)	Reference
Physical Health	0.64 (0.55 – 0.75) ***	0.77 (0.68 – 0.87) ***	0.81 (0.72 – 0.91) ***	Reference
Pain Problem	1.36 (0.83 – 2.23)	1.00 (0.70 – 1.44)	1.27 (0.89 – 1.81)	Reference
Pain Severity	0.95 (0.88 – 1.03)	0.98 (0.93 – 1.03)	0.91 (0.86 – 0.96) ***	Reference
Sleep Problems	0.90 (0.88 – 0.92) ***	0.96 (0.95 – 0.98) ***	0.94 (0.93 – 0.96) ***	Reference
Social Support	1.02 (1.00 – 1.03) *	1.02 (1.01 – 1.03) **	1.01 (0.999 – 1.02)	Reference
Social Conflict	0.55 (0.48 – 0.62) ***	0.72 (0.66 – 0.78) ***	0.78 (0.72 – 0.85) ***	Reference
Aggression	0.53 (0.39 – 0.73) ***	0.72 (0.57 – 0.91) **	0.72 (0.57 – 0.91) **	Reference

*
 $p < .05$;**
 $p < .01$;***
 $p < .001$