Published in final edited form as:
Drug Alcohol Depend. 2013 October 1; 132(3): 597–602. doi:10.1016/j.drugalcdep.2013.04.009.

Factor Structure of PTSD Symptoms in Opioid-Dependent Patients Rating Their Overall Trauma History

Madhavi K. Reddy[a,b,c], **Bradley J. Anderson**[d], **Jane Liebschutz**[e], and **Michael D. Stein**[d,f]

[a]Psychosocial Research, Butler Hospital, 345 Blackstone Blvd., Providence, RI 02906, USA

[b]Providence VA Medical Center, 830 Chalkstone Ave, Building 32, Providence, RI 02908, USA

[c]Department of Psychiatry and Human Behavior, Alpert Medical School of Brown University, Box G, Providence, RI 02912, USA

[d]General Medicine Research Unit, Butler Hospital, 345 Blackstone Boulevard, Providence, RI 02906, USA

[e]Division of General Internal Medicine, Boston University School of Medicine, Boston, MA 02118

[f]Department of Medicine, Alpert Medical School of Brown University, Box G, Providence, RI 02912, USA

Abstract

Background—The current standard for posttraumatic stress disorder (PTSD) diagnosis is a 3-factor model (re-experiencing, avoidance, and hyperarousal). Two 4-factor models of PTSD, the emotional numbing model (re-experiencing, avoidance, emotional numbing, and hyperarousal) and the dysphoria model (re-experiencing, avoidance, dysphoria, and hyperarousal), have considerable empirical support in the extant literature. However, a newer 5-factor model of PTSD has been introduced that is receiving interest. The 5-factor model differs from the four-factor models in its placement of three symptoms (irritability, sleep disturbance, and concentration difficulties) into a separate cluster termed dysphoric arousal. We empirically compared the theoretical factor structures of 3-, 4-, and 5-factor models of PTSD symptoms to find the best fitting model in a sample of opioid dependent hospitalized patients.

Methods—Confirmatory factor analyses were conducted on the 17 self-reported PTSD symptoms of the Posttraumatic Checklist- Civilian Version (PCL-C) in a sample of 151 men and women with opioid dependence.

Corresponding Author: Madhavi K. Reddy, 345 Blackstone Blvd., Providence, RI 02906, USA, phone: (401)-680-4103, fax: (401) 455-6235, madhavi_reddy@brown.edu.

Contributors
Madhavi K. Reddy conceptualized the present study and wrote the first draft of the manuscript. Bradley J. Anderson performed the statistical analysis and contributed to manuscript preparation. Jane Liebschutz supervised data collection and provided edits of the manuscript. Michael D. Stein conceptualized the present study, provided edits of the manuscript and is the Principal Investigator of the parent study from which this data was collected.

Conflict of Interest
No conflicts of interest noted.

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Results—Both four-factor models fit the observed data better than the three-factor model of PTSD; the dysphoria model was preferred to the emotional numbing model in this sample. The recently introduced five-factor model fit the observed data better than either four factor model.

Conclusions—PTSD is a heterogeneous disorder comprised of symptoms of re-experiencing, avoidance, numbing, and dysphoria. Three symptoms, irritability, sleep disturbance, and concentration difficulties, may represent a unique latent construct separate from these four symptom clusters in opioid dependent populations who have experienced traumatic events.

Keywords

PTSD; opiate dependence; factor analysis

1. INTRODUCTION

Posttraumatic stress disorder (PTSD) and substance-use disorders frequently co-occur in clinical and community samples (Cottler et al., 1992; Desai et al., 2008). One-third of persons with an opioid use disorder have met criteria for PTSD during their lifetime, and the PTSD prevalence rate among those with an opioid use disorder is significantly higher than all other drug use disorders combined (Grice et al., 1995; Mills et al., 2005). Additionally, those with co-morbid PTSD and opioid dependence exhibit worse physical and mental health and occupational functioning after treatment than those with only opioid dependence (Mills et al., 2005). Given the high co-occurrence of PTSD and opioid-dependence and resulting poor treatment outcome, it is of interest to understand the structure of PTSD symptoms within opioid-dependent populations.

PTSD is a heterogeneous disorder that is currently defined as a three-dimensional cluster of seventeen symptoms (re-experiencing, avoidance/numbing, and hyperarousal; American Psychiatric Association, 2000). However, empirical evidence from confirmatory factor analyses suggests that PTSD symptoms are better represented by either a 4-factor emotional numbing model (King et al., 1998) or a 4-factor dysphoria model (Simms et al., 2002). Both models advocate separating the avoidance/numbing cluster of the tripartite model into distinct factors of active avoidance and emotional numbing/dysphoria, but differ from each other in their assignment of three symptoms, sleep disturbance, irritability, and difficulty concentrating. The emotional numbing model loads these symptoms onto a hyperarousal factor while the dysphoria model loads them onto a dysphoria or general distress factor.

While both the emotional numbing model (Asmundson et al., 2004; Mansfield et al., 2010) and dysphoria model (Baschnagel et al., 2005; Boelen et al., 2008; Pietrzak et al., 2010) have received support in a wide range of samples such as military peacekeepers, active duty military, college students exposed to 9/11 terrorist attacks, and bereaved community members, only one study has assessed the PTSD factor structure in a primarily substance-abusing population (Stewart et al., 1999). Stewart and colleagues examined the factor structure of PTSD symptoms in a sample of substance-abusing women through the use of exploratory factor analysis and extracted four factors that corresponded most closely with the emotional numbing model (Stewart et al., 1999).

Even though both 4-factor models have received empirical support as better fitting models than the 3-factor model of PTSD, neither is the best representation of symptoms across all studies. To that end, the measurement of PTSD has been examined to determine the conditions in which a 4-factor model may perform most robustly. Differences between models depended on whether PTSD symptoms were measured by self-report or through clinician-administered interviews; the dysphoria model fit better when self-reports were used and the emotional numbing model fit better when interviews were used (Palmieri et al., 2007). Moreover, model fit has also differed based on whether PTSD symptoms were rated on one distressing traumatic event (dysphoria model) or across cumulative trauma history (emotional numbing model; Elhai et al., 2009).

Although the emotional numbing model and the dysphoria model have each provided a better fit of PTSD symptom structure compared to the three-factor model, the overall model fit, as assessed by commonly reported fit statistics, in these confirmatory factor analysis studies is merely adequate (Elhai et al., 2011a) indicating that improvements could be made to these four-factor models. To that end, Elhai and colleagues (2011b) attempted to improve the model fit of PTSD symptoms by taking the three symptoms that are in contention between the emotional numbing model and dysphoria model (sleep disturbance, irritability, and difficulty concentrating) and assigned them to a separate factor termed “dysphoric arousal.” The remaining two symptoms of the hyperarousal cluster, hypervigilance and exaggerated startle response, were termed “anxious arousal.” In a sample of female survivors of domestic violence, Elhai and colleagues (2011b) compared the model fit of this new 5-factor model with the emotional numbing model and the dysphoria model. They found that separating sleep disturbance, irritability, and difficulty concentrating into a separate factor significantly improved the model fit of the emotional numbing and the dysphoria model and that “dysphoric arousal” represented a separate construct from the arousal factor in the emotional numbing model and the dysphoria factor in the dysphoria model.

The goal of the present study was to investigate the seemingly contradictory evidence for the factor structure and model fit of PTSD symptoms by comprehensively testing the theoretical models in the extant literature in a sample of opioid-dependent men and women with a varied trauma history. The hypotheses were three-fold: 1) the emotional numbing model, dysphoria model, and 5-factor dysphoric arousal model would be a better fit of the data than the 3-factor model, 2) the emotional numbing model would be a better fit of the data than the dysphoria model since our sample reported symptoms based on their cumulative trauma history by an interview method instead of self-report, and 3) given the relative novelty and minimal empirical support for the 5-factor model, we do not hypothesize that it will outperform both 4-factor models but do expect it to fit the data as well as both 4-factor models.

2. METHODS

2.1. Study Design and Recruitment

This analysis includes baseline assessment data from a randomized clinical trial (inpatient buprenorphine detoxification vs. buprenorphine linkage to outpatient maintenance treatment) where hospitalized opioid dependent patients were recruited from the inpatient medical service of a safety-net, urban, academic hospital [Boston Medical Center (BMC)]. Inclusion criteria were age 18 or older, English-speaking, able to provide consent, opiate dependent and not receiving outpatient opiate agonist treatment, and willingness to receive primary care at a BMC-affiliated primary care practice during their study participation. Participants were excluded if they expressed a desire to harm themselves or others, were in alcohol withdrawal or used alcohol daily, used cocaine daily, reported benzodiazepine misuse, required opioid pain medication past hospital discharge, were not available for follow-up visits during the 6 months of the study due to an upcoming move, surgery, or potential jail time, or were pregnant. The study was approved by the Butler Hospital Institutional Review Board (IRB) and the BMC.

Patients were identified through referral by daily review of the hospital census for inpatients receiving methadone, and by daily (Monday through Friday) review of the last 24 hours’ admissions. A registered nurse from the hospital's Substance Abuse outreach team approached patients to assess for general study eligibility and interest in opioid agonist treatment after hospital discharge. For patients interested, the nurse then contacted a study research assistant to screen the individual for final study eligibility.

Between August 2009 and October 2012, 661 individuals were clinically screened during their inpatient hospitalization. Of these, 347 did not meet eligibility criteria, most often due to legal issues (63), benzodiazepine misuse (53), receiving clinically indicated opiate analgesia (50), and daily alcohol use (27), while 141 refused participation. A total of 173 individuals were referred for final study eligibility evaluation. Of these, 22 did not want to receive buprenorphine treatment. One-hundred and fifty-one individuals consented to participation in the randomized trial and are included in the present analysis.

2.2. Measures

The Posttraumatic Checklist- Civilian Version (PCL-C) was used to assess PTSD symptoms. The PCL (Weathers et al., 1993) is comprised of 17 items that correspond to the 17 symptoms of PTSD as diagnosed by the DSM-IV-TR. It is generally administered as a self-report measure but in the present study was administered by an interviewer. The interviewer asked participants to report on their response to stressful life events from the past. Respondents rated their symptoms in the past month on a 1 (not at all) to 5 (extremely) Likert scale. Scores can range from 17 to 85. A cutoff score of 50 or higher is thought to be indicative of a positive screening for PTSD. The internal consistency (.94) and test-retest validity (.88) are adequate (Weathers et al., 1993). An adaptation of the Life Stressor Checklist- Revised (LSC-R) was used to assess life events that are very stressful (Wolfe and Kimerling, 1997). Respondents endorsed whether or not they experienced a specific event during their lifetime. For the present study we reported the life events that are considered to be Criterion A stressors for the diagnosis of PTSD. (See Table 1.) The Alcohol Use Disorders Identification Test (AUDIT-C) was used to assess hazardous drinking. It is a three-item screening measure with scores ranging from 0 to 12 (Bush et al., 1998). Endorsement of the LSC-R and AUDIT-C are reported to provide relevant characteristics of the present sample.

2.3. Analytical Methods

Descriptive statistics are presented to summarize the characteristics of the sample. Confirmatory factor analysis (CFA) models were estimated to compare alternative conceptualizations of the dimensional structure of PTSD. The hypothesized patterns of factor loadings for the alternative models are summarized in Table 2.

Mardia's (1970) test for multivariate skewness ($\chi 2 = 1500.0$, df = 969, $p < .001$) and kurtosis ($z = 12.61$, $p < .001$) rejected the hypothesis of multivariate normality. Additionally, examination of item distributions suggested potential floor and ceiling effects. Therefore, we defined the indicators as ordered-categorical and analyzed the polychoric correlation matrix. A probit link function was used to estimate the loadings of observed indicators on latent factors. Mean and variance adjusted weighted least squares (WLSMV) estimation was implemented in Mplus Version 5.1 (Muthén and Muthén, 2008) to estimate CFA models. To remain consistent with the hypothesized dimensional structures of PTSD, we did not consider model modifications such as allowing items to cross load on multiple factors or allowing correlated error terms to improve model fit.

To compare nested models, we rely primarily on $\chi 2$ – difference tests. Models are nested if one model constrains one or more parameters in a more complex model to a constant, often zero. Mplus has facilities to compare nested models using a $\chi 2$ – difference test estimated by

WLSMV (Muthén and Muthén, 2008). Non-nested models, such as the 4-factor emotional numbing and 4-factor dysphoria model cannot be compared by a difference in χ2 test, and therefore, we report other available model fit statistics; these include the Tucker-Lewis Index (TLI: Tucker and Lewis, 1973) and comparative fit index (CFI: Benter, 1990) measures of incremental model fit, the root mean square of approximation (RMSEA), and weighted root mean square residual (WRMR: Muthén and Muthén, 2001). For continuous outcomes, Hu and Bentler (1999) suggested that CFI > .95, TLI > .95, and RMSEA < .06 were consistent with good fitting models. Marsh et al., (2004) warned researchers about strict reliance on specific cut-off scores. For example, a 2008 simulation study (Chen et al., 2008) noted that RMSEA < .05 has become a conventionally accepted criterion indicating good model fit. Investigating the performance of this criterion in models with continuous outcomes, generated under multivariate normality, with samples of size 50 to 1000, Chen and colleagues found the performance of RMSEA < .05 was dependent on sample size and reported that this criterion rejected too many correctly specified models in small samples. Hu and Bentler (1999) also reported that both the RMSEA and TLI rejected too many properly specified models with small samples. We are aware of only one study that has investigated the performance of alternative fit statistics in models with categorical outcomes; Yu (2002) reported that none of the fit indices consistently had both good power and Type I error rates across all conditions, that CFI ≥ .95 had more power than TLI ≥ .95, and suggested that WRMR < 1.0 was indicative of good model fit.

To compare non-nested models, we calculated the Bayesian information criterion (BIC: Schwartz, 1978) and Akaike information criterion (AIC: Akaike, 1973). Models are nested if one model constrains one or more parameters in a more complex model to a constant, often zero. To obtain these statistics we used maximum-likelihood to estimate CFA models with logit link function. The BIC and AIC are only reported when comparing non-nested CFA models. Smaller values of AIC and BIC identify preferred models. Kass and Raftery (1995) describe difference in BIC of 2 to 6 points as positive evidence, differences of 6 to 10 points as strong evidence, and differences > 10 as very strong evidence in favor of the model with the smaller BIC.

3. RESULTS

Participants averaged 40.7 (± 12.1) years of age, 65 (43.1%) were non-Hispanic Caucasian, 44 (29.1%) were African-American, 31 (20.5%) were Hispanic, and 11 (7.3%) were of other ethnic or racial origins (Table 1). Seventy (46.4%) reported recent (past 30-days) alcohol use. Mean scores on the AUDIT-C were 7.2 (± 7.9), and 62 (41.3%) had AUDIT-C scores exceeding recommended cut scores (≥ 4 for men or ≥ 3 for women). Rates of recent benzodiazepine, cannabis, cocaine, and injection drug use were 28.5%, 36.7%, 58.3%, and 78.2%, respectively.

A majority (65.6%) of participants reported experiencing at least one traumatic event in their lifetime. The mean number of events endorsed was 12 (SD = 4.11, median = 10). See Table 1 for endorsement of traumatic life events. The mean PCL score in our sample was 47.28 (SD = 17.71, Median = 48).

Fit statistics consistently indicated the single-factor PTSD model failed to adequately fit the observed data (Table 3), and commonly used fit statistics provided inconsistent evidence regarding the fit of other candidate models. The p-values for all χ2-tests are < .05, CFI values ranged from .913 to .944, TLI values are > .95 for all candidate models other than the single-factor model, the WRMR statistic was < 1.0 for all candidate models other than the single factor model, and RMSEA statistics were > .10 (generally interpreted as indicating poor model fit) for all evaluated models.

Head to head model comparisons, including one and 2-factor model for completeness, are presented in Table 4. The 2-factor re-experiencing/avoidance and numbing/hyperarousal model (II) fit the data significantly better than the one-factor PTSD model ($\chi^2_{diff} = 205.31$, df = 2, $p < .001$). AIC and BIC statistics favored model II versus the 3-factor DSMV-IVR (Model III) model. But BIC and AIC statistics consistently favored both 4-factor models over the 2-factor model (Table 4). Difference in $\chi 2$ tests for nested models and differences in AIC and BIC statistics for non-nested model comparisons are reported in Table 4. The 4-factor emotional numbing ($\chi^2_{diff} = 27.40$, df = 2, $p < .001$) and 4-factor dysphoria models ($\chi^2_{diff} = 29.73$, df = 2, $p < .001$) models both fit the data significantly better than the 3-factor DSMV-IVR model. BIC and AIC statistics provided positive evidence favoring the 4-factor dysphoria model to the 4-factor emotional numbing model. The 5-factor dysphoric-arousal and anxious arousal model fit the observed data significantly better than either the 4-factor emotional numbing model ($\chi^2_{diff} = 17.13$, df = 3, $p < .001$) or the 4-factor dysphoria model ($\chi^2_{diff} = 9.81$, df = 3, $p < .001$).

All observed items for both the emotional numbing model and dysphoria model loaded strongly (> .60) on the hypothesized latent factor and all factor loadings were statistically significant ($p < .001$). The between factor correlations were consistently strong (minimum = .67 between anxious arousal and anxiety) and statistically significant ($p < .001$). We estimated one additional CFA to test the hypothesis that the associations between the separate dimensions of the 5-factor dysphoric arousal and anxious arousal model could be adequately explained by a 2nd-order PTSD factor. The inter-correlated 5-factor model, presented in Table 4 fit the observed data significantly better than the corresponding 2nd-order PTSD 5-factor model ($\chi^2_{diff} = 29.14$, df = 4, $p = .000$).

4. DISCUSSION

We evaluated a variety of theoretical models of PTSD factor structure including two, 4-factor models that have received extensive empirical support, and a recent 5-factor model in a sample of 151 men and women diagnosed with opioid dependence. The results indicated that the 3-factor model of PTSD was not a good fit of the data; both of the 4-factor models and the 5-factor model were superior as hypothesized. Contrary to our hypothesis that the emotional numbing model would be a better fit of the data, the dysphoria model was a better fit. Finally, the 5-factor model was the best fit of the data. To our knowledge this is the first confirmatory factor analysis of PTSD symptoms in an opioid-dependent sample.

Similar to the meta-analytic findings by Yufik and Simms (2011) which included only PTSD diagnosed populations, the dysphoria model appeared to be a better fit of the symptoms in our sample than the emotional numbing model. Only one study to date had examined the factor structure of PTSD symptoms in a primarily substance dependent population and the exploratory factor analysis indicated a factor structure that was similar to the emotional numbing model (Stewart et al., 1999). The differing results might be attributed to the samples. The Stewart et al sample was comprised of women only who were poly-substance abusing including alcohol.

The present study provides support for the 5-factor model postulated by Elhai and colleagues (2011a) and confirmed in a population of domestic abuse survivors (Elhai et al., 2011b), and veterans of the wars in Iraq and Afghanistan (Pietrzak et al., 2012). The 5-factor model not only separates the avoidance and numbing symptoms into separate clusters like both 4-factor models, it also separates the hyperarousal cluster into anxious arousal and dysphoric arousal. Theoretically, anxious arousal is conceptually distinct from dysphoric arousal in that anxious arousal is thought to reflect physiological, fear-based panic and dysphoric arousal is thought to be a combination of depression and anxiety symptoms (Elhai et al., 2011b).

Several implications can be drawn from these findings. First, the overall results provide further evidence for the revision of the DSM-IV criteria for PTSD from a 3-factor structure of symptoms. The proposed version of the DSM-V separates PTSD into four distinct clusters. Given these findings, the hyperarousal cluster may need to be further separated to allow dysphoric arousal to comprise its own cluster. However, it should be noted that the 5-factor model in our sample did not achieve "excellent" fit, although this may be indicative of a smaller sample size, and replication is needed. Second, PTSD is a heterogeneous disorder that is often co-morbid with substance abuse/dependence and depression. It may be that the factors of the 5-factor model of PTSD are differentially related to each of these disorders. We were not able to test this assumption. However, we speculate that persons with opioid dependence are possibly self-medicating their symptoms of PTSD and that dysphoric arousal, as opposed to numbing or anxious arousal, motivates this excessive use of opiates. Third, there was a high level of PTSD symptoms experienced in this opioid dependent population. Therefore, treatment for opioid dependence likely needs to address symptoms of PTSD and should focus on alleviating dysphoric arousal symptoms.

Several limitations to the present study must be noted. First, symptoms of PTSD were not diagnostic even though they were asked in an interview format. However, the PCL has shown good sensitivity and specificity with interview-based measures of PTSD. Second, the results may not generalize to other substance-using populations given the focus on hospitalized opioid dependent patients. Third, the sample size is relatively small. Fourth, the study was cross-sectional and stability of estimates across time cannot be determined. Fifth, a small percentage of women were present in the sample.

While these limitations exist, to our knowledge this is the first confirmatory factor analysis of PTSD symptoms undertaken in a substance dependent population. Given the high co-occurrence of PTSD and substance dependence, particularly among opioid dependent persons, we believe these results are noteworthy. Understanding the phenomenology of PTSD in various trauma-exposed populations is needed in order to better assess and in turn, treat symptoms. Replication among similar substance dependent populations will further clarify the best representation of PTSD symptom structure.

Acknowledgments

Role of Funding Source

The study was funded by NIDA and had no further role in the study design, analysis, interpretation, or write-up of the findings. This study was supported by NIDA grant R01 DA026223. Dr. Stein is a recipient of NIDA Award K24 DA000512.

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Table 1

Background Characteristics.

	n (%)	Mean (SD)	Median
Age (Years)		40.7 (± 12.1)	42.0
Gender (Male)	107 (70.8%)		
Race/Ethnicity			
Non-Hispanic Caucasian	65 (43.1%)		
African-American	44 (29.1%)		
Hispanic	31 (20.5%)		
Other Ethnic Minority	11 (7.3%)		
Recent (30-Days) Alcohol Use (Yes)	70 (46.4%)		
AUDIT-C		7.2 (± 7.9)	6.0
Recent (30-Days) Benzodiazepine Use (Yes)	43 (28.5%)		
Recent (Past 30-Days) Cannabis Use (Yes)	55 (36.7%)		
Recent (Past 30-Days) Cocaine Use (Yes)	88 (58.3%)		
Recent (Past 30-Days) IDU (Yes)	118 (78.2%)		

Traumatic Event	**n (%)**
Serious Disaster	22 (14.6%)
Seen a Serious Accident	71 (47.0%)
Had a Serious Accident	71 (47.0%)
Seen a Robbery, Mugging, or Attack.	89 (58.9%)
Been Robbed, Mugged, or Physically Attacked.	71 (47.0%)
Have Someone Close Die Unexpectedly	96 (63.6%)
Been in Major Physical Fight	99 (65.6%)
See Family Violence Before Age 16	84 (55.6%)
Ever Physically Neglected	25 (16.6%)
Ever Emotionally Abused/Neglected	60 (39.7%)
Ever Abused\Physically Attacked by Someone You Knew	66 (43.7%)
Touched or Forced to Touch Sexually by Threat or Force	28 (18.7%)
Forced to Have Sex	28 (18.7%)

Table 2

Hypothesized Pattern of Factor Loadings for Alternative Conceptual Models of PTSD Dimensional Structure.

	MODEL					
PCL-C ITEM	**I**	**II**	**III**	**IV**	**V**	**VI**
1. Intrusive Thoughts	PTSD	RA	R	R	R	R
2. Nightmares	PTSD	RA	R	R	R	R
3. Reliving Trauma	PTSD	RA	R	R	R	R
4. Emotional Cue Reactivity	PTSD	RA	R	R	R	R
5. Physiological Cue Reactivity	PTSD	RA	R	R	R	R
6. Avoidance of Thoughts	PTSD	RA	AN	A	A	A
7. Avoidance of Reminders	PTSD	RA	AN	A	A	A
8. Trauma-Related Amnesia	PTSD	RA	AN	N	D	N
9. Loss of Interest	PTSD	NH	AN	N	D	N
10. Feeling Detached	PTSD	NH	AN	N	D	N
11. Feeling Numb.	PTSD	NH	AN	N	D	N
12. Hopelessness.	PTSD	NH	AN	N	D	N
13. Difficulty Sleeping	PTSD	NH	H	H	D	DA
14. Irritable/Angry	PTSD	NH	H	H	D	DA
15. Difficulty Concentrating.	PTSD	NH	H	H	D	DA
16. Overly Alert	PTSD	NH	H	H	H	AA
17. Easily Startled.	PTSD	NH	H	H	H	AA

Model Summary:

I. One-factor PTSD model.

II. Two-factor re-experiencing/avoidance (RA) and numbing/hyperarousal (NH) model (Buckley et al., 1998).

III. Three-factor DSM-IVR model. Factors are re-experiencing (R), anxiety/numbing (AN), and hyperarousal (H).

IV. Four-factor emotional numbing model (King et al., 1998). Factors are re-experiencing (R), anxiety (A), numbing (N) and hyperarousal (H).

V. Four-factor dysphoria model (Simms et al., 2002). Factors are re-experiencing (R), anxiety (A), dysphoria (D) and hyperarousal (H).

VI. Five-factor dysphoric-arousal and anxious arousal model (Elhai et al., 2011). Factors are re-experiencing (R), anxiety (A), numbing (N), dysphoric arousal (DA) and anxious arousal (AA).

Table 3

Model Fit Statistics for Candidate Confirmatory Factor Analysis Models Estimated by Means and Variances Adjusted Weighted Least Squares Estimation (WLSMV).

Model	Chi^2	df	CFI	TLI	RMSEA	WRMR	AIC	BIC
I	522.33	19	.558	.721	.419	3.134	6939.7	7190.4
II	113.64	36	.932	.977	.120	.915	6688.1	6947.6
III	134.21	35	.913	.970	.137	.992	6711.9	6977.4
IV	107.16	36	.937	.979	.114	.842	6666.3	6940.9
V	105.16	38	.941	.981	.108	.803	6661.7	6936.3
VI	101.04	37	.944	.982	.107	.773	6654.5	6941.2

Note: df = degrees of freedom; CFI = Comparative fit index; TLI = Tucker-Lewis index; RMSEA = Root mean square approximation error; WRMR = Weighted root mean square residual; AIC = Akaike information criteria; BIC = Bayesian information criteria

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Table 4

Comparison of Confirmatory Factor Analysis Models of the Dimensional Structure of PTSD.

Models Compared	Chi^2_{diff}	df	p =	AIC_{diff}[a]	BIC_{diff}[a]
I versus II	205.31	2	< .001		
II versus III		Not Nested		−23.8	−29.8
II versus IV		Not Nested		21.8	6.7
II versus V		Not Nested		26.4	11.3
III versus IV	27.40	2	< .001		
III versus V	29.73	2	< .001		
IV versus V		Not Nested		4.6	4.6
IV versus VI	17.13	3	< .001		
V versus VI	9.81	3	.020		

[a] AIC and BIC differences were calculated as AIC (BIC for the 1st model listed in the comparison minus the AIC (BIC) for the 2nd listed model. A negative AIC_{diff} (BIC_{diff}) favors the 1st listed model while a positive AIC_{diff} (BIC_{diff}) favors the 2nd.