



The factor structure of psychiatric comorbidity among Iraq/Afghanistan-era veterans and its relationship to violence, incarceration, suicide attempts, and suicidality

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ABSTRACT

The present research examined how incarceration, suicide attempts, suicidality, and difficulty controlling violence relate to the underlying factor structure of psychiatric comorbidity among a large sample of Iraq/Afghanistan-era veterans ($N=1897$). Diagnostic interviews established psychiatric diagnoses; self-report measures assessed history of incarceration, difficulty controlling violence, suicide attempts, and suicidality. A 3-factor measurement model characterized by latent factors for externalizing-substance-use disorders (SUD), distress, and fear provided excellent fit to the data. Alcohol-use disorder, drug-use disorder, and nicotine dependence were indicators on the externalizing-SUD factor. Posttraumatic stress disorder and depression were indicators on the distress factor. Panic disorder, social phobia, specific phobia, and obsessive-compulsive disorder were indicators on the fear factor. Incarceration was exclusively predicted by the externalizing-SUD factor. Difficulty controlling violence, suicidality, and suicide attempts were exclusively predicted by the distress factor. Contrary to hypotheses, the path from the externalizing/SUD factor to difficulty controlling violence was not significant. Taken together, these findings suggest that the distress factor of psychiatric comorbidity is a significant risk factor for suicidality, suicide attempts, and difficulty controlling violence and could help to explain the frequent co-occurrence of these critical outcomes among returning Iraq/Afghanistan veterans.

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1. Introduction

Iraq/Afghanistan-era veterans are at increased risk for a range of psychiatric conditions, including posttraumatic stress disorder (PTSD), depression, and alcohol misuse (Hoge et al., 2004; Calhoun et al., 2008; Elbogen et al., 2013). High rates of psychiatric comorbidity are also common among veterans (Orsillo et al., 1996; Thomas et al., 2010), which is consistent with factor analytic studies demonstrating that common psychiatric disorders load onto three higher-order factors: (1) an externalizing/substance-use disorder (SUD) factor characterized by alcohol and drug disorders, nicotine dependence, and antisocial personality

disorder; (2) a distress factor characterized by depression and generalized anxiety disorder; and (3) a fear factor characterized by social phobia, simple phobia, and panic disorder (Krueger, 1999; Eaton et al., 2011).

Other studies have examined how PTSD relates to the higher-order factor structure of psychiatric comorbidity (Cox et al., 2002; Slade and Watson, 2006; Miller et al., 2008). In general, these studies have found support for a three-factor solution in which PTSD loads exclusively onto the distress factor. For example, among a large sample (1325) of male Vietnam veterans, Miller et al., 2008 found evidence for a three-factor model in which the distress factor was characterized by PTSD and major depression, the fear factor was characterized by panic disorder and Obsessive-compulsive disorder (OCD), and the externalizing factor was characterized by alcohol-use disorder, substance-use disorder, and antisocial personality disorder. The current study aimed to extend this important line of research by examining how the

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three-factor model of psychiatric comorbidity might relate to areas of high public health relevance among Iraq/Afghanistan-era veterans, including incarceration, violence, suicide attempts, and suicidality.

1.1. Incarceration, violence, suicide attempts, and suicidality among veterans

There is growing recognition that criminal behavior and incarceration are significant problems among returning Iraq/Afghanistan Veterans (Elbogen et al., 2012). While both SUDs and PTSD have been related to incarceration (Calhoun et al., 2005; Erickson et al., 2008; Elbogen et al., 2012), SUDs appear to be psychiatric conditions that present the greatest risk for incarceration among both non-Iraq/Afghanistan-era (Erickson et al., 2008) and Iraq/Afghanistan-era veterans (Elbogen et al., 2012). Thus, we expected that the externalizing-SUD factor would be the psychopathology factor most strongly associated with incarceration.

Violence is also a significant problem among returning veterans (Beckham et al., 2000; Elbogen et al., 2008; MacManus et al., 2012). A recent study found that both PTSD (odds ratio (OR)=4.8) and alcohol misuse (OR=3.1) had significant effects on physical violence among veterans following deployments to Iraq (MacManus et al., 2012). This finding is consistent with prior research associating violence with both PTSD and externalizing-SUD disorders among Vietnam veterans (Beckham et al., 2000; Taft et al., 2005; Elbogen et al., 2008). Thus, we hypothesized that both the externalizing-SUD and distress factors would have significant effects on difficulty controlling violence.

Finally, there is growing evidence that the rate of completed suicide among Iraq/Afghanistan-era veterans with psychiatric disorders is elevated (Kang and Bullman, 2008; Blow et al., 2012). Given prior research demonstrating that the distress factor is predictive of suicide attempts (Eaton et al., 2013) as well prior

research indicating that veterans with both PTSD and alcohol-use disorders may not endorse greater suicidality than veterans with PTSD alone (Guerra et al., 2011; Jakupcak et al., 2009), we hypothesized that current suicidality and history of suicide attempts would be most strongly associated with the distress factor of psychiatric comorbidity.

1.2. Objectives and hypotheses

The objective of the current study was to examine how the hypothesized three factor model of psychiatric comorbidity might relate to outcomes of high public health relevance among returning Iraq/Afghanistan veterans, including incarceration, violence, suicide attempts, and suicidality. We hypothesized that: (1) A three-factor model of psychopathology characterized by an externalizing-SUD factor, a distress factor, and a fear factor would provide the best fit to the data; (2) Incarceration would be predicted by the externalizing-SUD factor; (3) Violence would be predicted by the externalizing-SUD and distress factors; and (4) Suicidality and suicide attempts would be predicted by the distress factor.

2. Methods

2.1. Participants

Participants included 1897 Iraq/Afghanistan-era veterans who participated in the ongoing Veterans Affairs (VA) Mid-Atlantic Mental Illness Research, Education and Clinical Center (MIRECC) Registry Database for the Study of Post-Deployment Mental Health. To be eligible for the study, participants had to have served in the United States military after September 11, 2001 and had to have been enrolled in the VA. Participants were primarily recruited through recruitment letters that invited them to participate in the study. Participants were also recruited through advertisements and clinician referrals. As can be seen in Table 1, the sample was predominantly male (79.5%) and African-American (52%). On average, participants

Table 1
Sample characteristics.

Continuous demographic variables	Total sample (N = 1897)	Sample 1 (n = 925)	Sample 2 (n = 972)	Test statistic comparing samples 1 and 2
Age (Years)	37.3 (10.0)	37.3 (10.1)	37.5 (9.9)	$t(1895) = -0.467, p = 0.64$
Years of education	13.4 (3.5)	13.4 (3.5)	13.4 (3.6)	$t(1873) = 0.032, p = 0.98$
Tours of duty	1.5 (1.3)	1.5 (1.2)	1.5 (1.4)	$t(1859) = -0.801, p = 0.42$
Categorical demographic variables	Total sample (N = 1897)	Sample 1 (n = 925)	Sample 1 (n = 972)	Test statistic comparing samples 1 and 2
Gender (% Male)	79.5%	80.8%	78.4%	$\chi^2(1) = 1.625, p = 0.20$
Ethnicity (% Latino)	7%	8.8%	5.3%	$\chi^2(1) = 5.638, p = 0.02$
Race				
White	46.0%	48.1%	43.9%	$\chi^2(1) = 2.169, p = 0.14$
African-American or Black	52.4%	50.0%	54.6%	$\chi^2(1) = 2.596, p = 0.11$
American-Indian or Alaska Native	1.8%	1.9%	1.8%	$\chi^2(1) = 0.011, p = 0.92$
Asian	1.3%	1.4%	1.1%	$\chi^2(1) = 0.121, p = 0.73$
Hawaiian Native or Pacific Islander	0.8%	1.0%	0.7%	$\chi^2(1) = 0.500, p = 0.48$
Categorical indicator variables used in the factor analysis models	Total sample (N = 1897)	Sample 1 (n = 925)	Sample 1 (n = 972)	Test statistic comparing samples 1 and 2
LT alcohol use disorder	37.5%	38.2%	36.9%	$\chi^2(1) = 3.22, p = 0.07$
LT substance use disorder	13.0%	13.1%	12.9%	$\chi^2(1) = 0.018, p = 0.89$
LT nicotine dependence	20.2%	20.3%	20.1%	$\chi^2(1) = 0.013, p = 0.91$
LT major depression	38.8%	39.4%	38.2%	$\chi^2(1) = 0.296, p = 0.59$
LT PTSD	38.0%	39.3%	36.8%	$\chi^2(1) = 1.26, p = 0.26$
LT panic disorder	5.1%	5.0%	5.2%	$\chi^2(1) = 0.029, p = 0.86$
LT social phobia	4.4%	3.7%	5.0%	$\chi^2(1) = 1.83, p = 0.18$
LT specific phobia	3.7%	4.0%	3.6%	$\chi^2(1) = 0.206, p = 0.65$
LT OCD	2.1%	2.3%	1.9%	$\chi^2(1) = 0.424, p = 0.52$
LT suicide attempt	7.5%	7.3%	7.8%	$\chi^2(1) = 0.237, p = 0.63$
Current suicidality	8.5%	8.1%	8.9%	$\chi^2(1) = 0.325, p = 0.57$
LT incarceration	21.5%	22.2%	20.8%	$\chi^2(1) = 0.539, p = 0.46$
Difficulty controlling violence (past 30 days)	9.0%	9.9%	8.2%	$\chi^2(1) = 1.57, p = 0.21$

Note: PTSD=Posttraumatic stress disorder; OCD=Obsessive-compulsive disorder; LT=lifetime prevalence.

were 37.4 (S.D.=10.0) years of age, had 13.4 (S.D.=3.5) years of education, and had completed 1.5 (S.D.=1.3) tours of duty. The most common lifetime diagnoses observed in the sample were major depressive disorder (38.8%), PTSD (38.0%), and alcohol-use disorder (37.5%). Approximately 43% ($n=823$) of the sample had two or more comorbid psychiatric disorders.

2.2. Procedures

After a complete description of the study was provided to participants, written informed consent was obtained. Following informed consent procedures, participants completed a structured diagnostic interview and a battery of self-report measures at one of several VA Medical Centers in the Mid-Atlantic region of the United States, typically in a single day. Institutional Review Board approval was obtained from the participating medical centers prior to data collection.

2.3. Measures

The *Structured Clinical Interview for DSM-IV-TR Axis I Disorder* (SCID-I) was used to determine lifetime psychiatric diagnoses (First et al., 2002). Trained master's- and doctoral-level research personnel administered the SCID-I to participants. Research personnel received extensive training and ongoing supervision on SCID-I administration. Reliability among 22 research personnel who scored a series of seven SCID-I-based training videos was good. The average Fleiss' kappa for current psychiatric disorders examined in the present research was 0.94 (range 0.71–1.00); the average Fleiss' kappa for lifetime psychiatric disorders examined in the present research was 0.92 (range 0.71–1.00).

The *Beck Scale for Suicide Ideation* (BSI) was used to assess current suicidality and lifetime history of suicide attempts (Beck and Steer, 1991). A cut-off score of 3 or higher (Brown et al., 2000; Guerra et al., 2011) was used to categorize participants on suicidality (0=no suicidality; 1=suicidality present), as previous research has demonstrated that psychiatric outpatients who scored 3 or higher on the BSI were approximately seven times more likely than psychiatric outpatients who scored 2 or lower on the BSI to actually commit suicide during a 20-year prospective study (Brown et al., 2000). Approximately 8.5% of veterans were classified as having current suicidality using this approach. In addition, 7.5% reported a prior suicide attempt on item 20 of the BSI (which is not included in the calculation of the total score). The BSI mean score was .87 (S.D.=3.13; range 0–32) in the current study. Internal consistency was 0.84.

A *Violence and Incarceration Questionnaire* specifically created for the Registry was used to obtain information about participants' history of incarceration and violence. Specifically, participants were asked "Have you ever been in jail or prison

in your life?", and "During the past 30 days, have you had trouble controlling violent behavior (that is, hitting someone)?" to assess history of incarceration and violence. Approximately 21.5% of the sample reported having been incarcerated at some point during their life, and 9.0% reported difficulty controlling their violent behavior during the past 30 days. The violence question utilized in the current sample has been shown to be a significant predictor of self-reported interpersonal violence among Vietnam veterans in the past year (Crawford et al., 2007).

2.4. Data analytic plan

In order to have two independent samples to run the proposed data analyses the Random Sample of Cases function in SPSS 20 was used to randomly divide the total sample ($N=1897$) into two samples ($n=925$ and $n=972$) prior to analyzing the data. The two samples did not differ significantly on age, $t(1895)=-0.47$, $p=0.64$, years of education, $t(1873)=0.03$, $p=0.98$, gender, $\chi^2(1)=1.625$, $p=0.20$, or race (White vs. non-White), $\chi^2(1)=2.169$, $p=0.14$, although they did differ on ethnicity, $\chi^2(1)=5.638$, $p=0.02$, such that there was a higher percentage of Latinos in sample 1 (8.8%) compared with sample 2 (5.3%). Chi-square analyses revealed no group differences on any of the variables examined in the models (Table 1).

Confirmatory factor analysis (CFA) was initially used to compare the fit of the hypothesized 3-factor model (Fig. 1) with two competing models in sample 1: (a) a general distress model in which all of the indicators were loaded onto a single factor; and (b) a 2-factor internalizing–externalizing model in which alcohol-use disorder, substance-use disorder, and nicotine dependence were modeled as indicators on the externalizing-SUD factor, and major depression, PTSD, panic disorder, social phobia, specific phobia, and obsessive-compulsive disorder were modeled as indicators on a general internalizing factor.

Since the variables were categorical lifetime diagnoses (recoded as "0=no diagnosis", "1=lifetime diagnosis"), mean- and variance-adjusted weighted least squares (WLSMV) estimation was used to estimate the models using the Mplus 5.21 software package (Muthén and Muthén, 2007). Missing data was minimal (approximately 2% overall) and parameters were estimated via WLSMV. We report the model chi-square statistic (χ^2) along with its degrees of freedom (d.f.) and p -Value for every model examined as well as multiple fit indices, including the Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI), the Tucker–Lewis Index (TLI), and the Weighted Root Mean Square Residual (WRMR). In general, models demonstrating close fit to the data should have RMSEA values close to or below 0.06, CFI and TLI values close to or above 0.95, and WRMR values close to or below 0.90 (Brown, 2006; Hu and Bentler, 1999). The fit of each of the measurement models (i.e., the 1-, 2-, and 3-factor models) was assessed in samples 1 and 2 and evaluated using the criteria described above. Chi-square

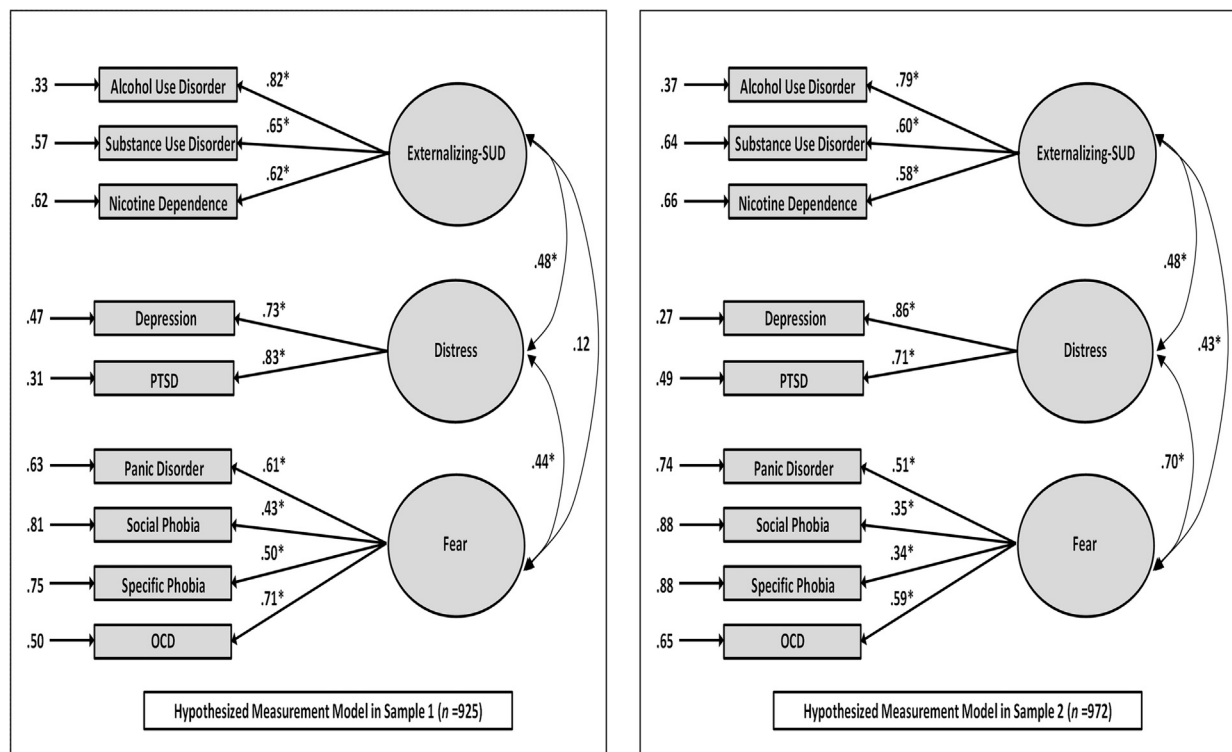


Fig. 1. Hypothesized Measurement Models in Samples 1 and 2. All parameters shown are fully standardized. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Overall model fit was excellent in both sample 1, $\chi^2(19)=22.049$, $p=0.28$, RMSEA=0.01, CFI=0.99, TLI=0.99 and WRMR=0.73, and sample 2, $\chi^2(19)=24.491$, $p=0.18$, RMSEA=0.02, CFI=0.99, TLI=0.98 and WRMR=0.77.

difference tests were used to test for statistically significant differences ($p < 0.05$) between models (Brown, 2006). Once the optimal measurement model was established in sample 1, structural equation modeling (SEM) was used to test the fit of the hypothesized model (Fig. 1). Path coefficients and modification indices were inspected to determine if any modifications would improve model fit or make the model more parsimonious. Finally, the models examined in sample 1 were re-analyzed in sample 2 to assess the stability of the findings.

3. Results

3.1. Sample 1 ($n=925$)

As can be seen in Table 2, the general distress 1-factor solution demonstrated relatively poor fit to the data, RMSEA=0.069, CFI=0.821, TLI=0.771, WRMR=1.668, in sample 1 and significantly worse fit than the 2-factor internalizing–externalizing model, χ^2 Diff (1)=56.869, $p < 0.0001$. Examination of global fit indices suggested that the 2-factor internalizing–externalizing model provided close fit to the data, RMSEA=0.033, CFI=0.961, TLI=0.947, WRMR=0.99; however, the hypothesized 3-factor model demonstrated even closer fit to the data, RMSEA=0.013, CFI=0.994, TLI=0.992, WRMR=0.729. In addition, a chi-square difference test found that the 2-factor model demonstrated worse fit relative to the 3-factor model, χ^2 Diff (2)=18.677, $p=0.0001$. Thus, the 3-factor model was retained as the final measurement model for psychiatric comorbidity.

Having determined the optimal measurement model, the outcomes of interest (i.e., lifetime incarceration, difficulty controlling violent behavior, lifetime suicide attempts, current suicidality) were added to the model as observed endogenous categorical variables. Consistent with our proposed hypotheses, history of incarceration was regressed onto the externalizing-SUD factor, difficulty controlling violence was regressed onto both the externalizing-SUD and distress factors, and lifetime suicide attempts and current suicidality were regressed onto the distress factor. All other paths were constrained to be zero.

As can be seen in Table 2, the hypothesized structural model (model 4) continued to demonstrate very close fit to the data, RMSEA=0.013, CFI=0.993, TLI=0.991, WRMR=0.763. In addition, four of the five hypothesized paths were statistically significant, including the paths from externalizing-SUD to incarceration, $\beta=0.63$, $p < 0.001$, from distress to violent behavior, $\beta=0.54$, $p < 0.001$, from distress to suicide attempts, $\beta=0.63$, $p < 0.001$, and from distress to current suicidality, $\beta=0.60$, $p < 0.001$. The hypothesized path from externalizing-SUD to violent behavior,

$\beta=0.03$, $p=0.82$, was not, however, statistically significant. Inspection of the modification indices indicated that there were not any paths that could be added to the model that would significantly improve model fit. Accordingly, we only examined one other alternative model, in which the path from externalizing-SUD to violent behavior was constrained to be zero. As can be seen in Table 2, constraining this path to be zero did not significantly worsen model fit, χ^2 Diff (1)=0.053, $p=0.82$, so this alternative model (model 5) was retained as the final, most parsimonious model (Fig. 2).

3.2. Sample 2 ($n=972$)

To examine the stability of the findings from sample 1, the models were re-analyzed in sample 2. As can be seen in Table 2 and Figs. 1–3, the results obtained from sample 2 were highly consistent with those obtained in sample 1. In particular, the alternative structural model in which the path from the externalizing-SUD factor to violent behavior was constrained to be zero continued to provide excellent overall fit to the data, RMSEA=0.019, CFI=0.981, TLI=0.978, WRMR=0.840. Inspection of the modification indices revealed that there were no modifications that would significantly improve model fit, and a chi-square difference test revealed that constraining the path from externalizing-SUD to violent behavior to be zero did not significantly worsen model fit, χ^2 Diff (1)=0.090, $p=0.76$. Thus, in both samples, the alternative model (model 5) that eliminated the path from the externalizing-SUD factor to violence was found to be the best fitting and most parsimonious model.

4. Discussion

The first objective of the present research study was to use CFA to examine the structure of psychiatric comorbidity among a large and diverse sample of Iraq/Afghanistan-era veterans. Consistent with Hypothesis 1, a three-factor solution similar to one previously identified among male Vietnam veterans (Miller et al., 2008) was found to demonstrate close fit to the data in both samples. As expected, alcohol-use disorders, substance-use disorders, and nicotine dependence loaded onto the externalizing-SUD factor, PTSD and depression loaded onto the distress factor, and panic disorder, social phobia, specific phobia, and OCD loaded onto the fear factor. A notable strength of the current study was the diversity of the sample, as the majority of the sample (52.4%)

Table 2
Summary of the fit statistics.

Sample 1 ($n=925$)							
Model number and description	χ^2	d.f.	p	RMSEA	CFI	TLI	WRMR
1. General disturbance 1-factor measurement model	112.151	21	< 0.001	0.069	0.821	0.770	1.668
2. Basic 2-factor measurement model	40.039	20	0.0049	0.033	0.961	0.947	0.999
3. Hypothesized 3-factor measurement model	22.049	19	0.2818	0.013	0.994	0.992	0.729
4. Hypothesized structural model	43.181	37	0.2241	0.013	0.993	0.991	0.763
5. Final alternative structural model	43.231	38	0.2578	0.012	0.994	0.993	0.763
Sample 2 ($n=972$)							
Model number and description	χ^2	d.f.	p	RMSEA	CFI	TLI	WRMR
1. General disturbance 1-factor measurement model	77.378	20	< 0.001	0.055	0.883	0.842	1.447
2. Basic 2-factor measurement model	25.436	20	0.1853	0.017	0.989	0.985	0.810
3. Hypothesized 3-factor measurement model	24.491	19	0.1780	0.017	0.989	0.984	0.772
4. Hypothesized structural model	52.270	38	0.0615	0.020	0.980	0.976	0.839
5. Final alternative structural model	52.510	39	0.0728	0.019	0.981	0.978	0.840

Note: d.f.=degrees of freedom; RMSEA=Root Mean Square Error of Approximation; CFI=Comparative Fit Index; TLI=Tucker–Lewis Index; WRMR=Weighted Root Mean Square Residual.

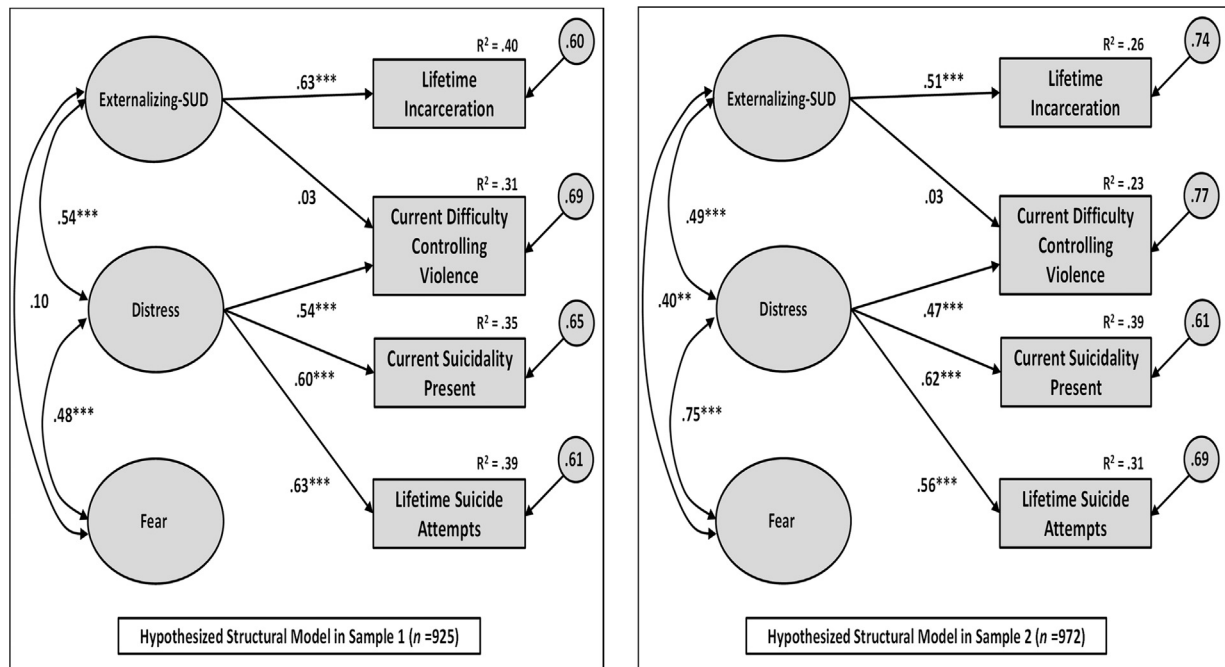


Fig. 2. Hypothesized Structural Model in Samples 1 and 2. All parameters shown are fully standardized. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Overall model fit was excellent in both sample 1, $\chi^2 (37) = 43.181$, $p = 0.22$, RMSEA = 0.01, CFI = 0.99, TLI = 0.99 and WRMR = 0.76, and sample 2, $\chi^2 (38) = 24.491$, $p = 0.06$, RMSEA = 0.02, CFI = 0.98, TLI = 0.98 and WRMR = 0.84.

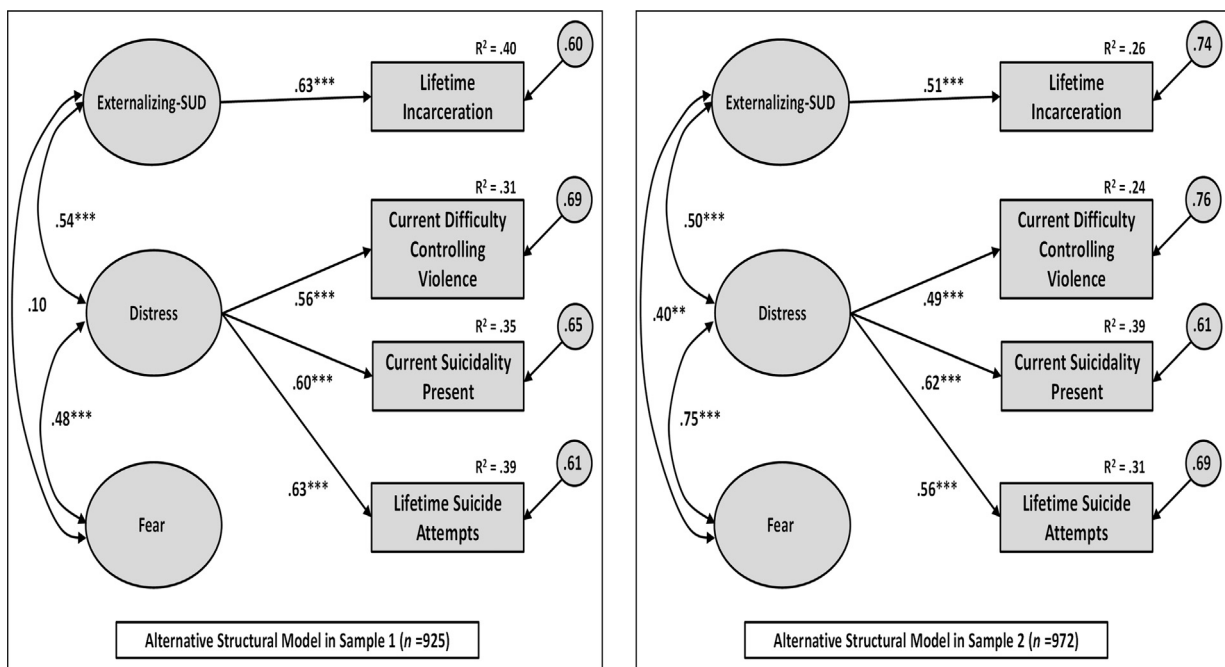


Fig. 3. Final Alternative Structural Model in Samples 1 and 2. All parameters shown are fully standardized. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Overall model fit was excellent in both sample 1, $\chi^2 (38) = 43.181$, $p = 0.26$, RMSEA = 0.01, CFI = 0.99, TLI = 0.99 and WRMR = 0.76, and sample 2, $\chi^2 (39) = 52.5101$, $p = 0.07$, RMSEA = 0.02, CFI = 0.98, TLI = 0.98 and WRMR = 0.84.

was African-American. In addition, approximately one-fifth of the sample (21.5%) of the sample was female. Thus, the fact that we were able to replicate the factor structure identified by Miller et al., 2008 suggests that the higher-order factor structure of psychiatric comorbidity among veterans may not be dependent upon era, gender, or race/ethnicity; however, additional research with other samples of veterans is still needed to confirm this hypothesis.

Our second objective was to examine how the three hypothesized higher-order latent factors might relate to outcomes of high public

health relevance among returning Iraq/Afghanistan veterans. Consistent with Hypothesis 2, we found that the externalizing-SUD factor was strongly associated with history of incarceration in the current study, accounting for 26–40% of the variance in incarceration across samples. Similarly, we found that the distress factor was strongly associated with both current suicidality and history of suicide attempts in the current study, accounting for 31–39% of the variance in these variables across samples (Hypothesis 4); however, contrary to Hypothesis 3, which proposed that both the externalizing-SUD factor and distress factor would predict difficulty controlling violence, we found

that only the distress factor was significantly associated with this key outcome, accounting for 24–31% of the variance across samples.

The latter finding is intriguing for several reasons. First, given the well-documented relationship between the externalizing-SUD dimension, antisocial personality disorder, and impulsivity problems (Miller et al., 2008) as well as prior research associating alcohol- and substance-use problems with violence among returning veterans (Elbogen et al., 2008; MacManus et al., 2012), it is surprising that violent behavior was not at least modestly associated with the externalizing-SUD dimension; however, as can be seen in Fig. 2, when violence was regressed onto both factors, the externalizing-SUD factor had almost no effect on violence ($\beta=0.03$) across samples. Moreover, constraining the path from externalizing-SUD to difficulty controlling violent behavior to be zero did not affect model fit significantly in either sample. Thus, our findings suggest that difficulty controlling violence was primarily related to the distress dimension of psychopathology among this sample of Iraq/Afghanistan-era veterans.

While not anticipated, this finding is consistent with prior research on PTSD and violence suggesting that PTSD is a strong predictor of violence and aggressive behavior (Beckham et al., 2000; MacManus et al., 2012). These findings also take on additional clinical importance as suicidality and aggression have been shown to share many of the same risk factors in studies of veterans (Hellmuth et al., 2012). Given prior work demonstrating that genetic factors account for much of the shared variance in the internalizing and externalizing dimensions of psychopathology (Kendler et al., 2003), the present findings suggest the possibility that the relationship between violence toward self and others may be due in part to shared genetic variance with the distress factor of psychopathology; however, additional research is needed to explicitly test this hypothesis.

Closer examination of our measures provides one possible explanation as to why the hypothesized link with externalizing SUD was not found. Note that the current study operationalized violence as “difficulty controlling violence during the past 30 days.” As a result, some veterans endorsing this may have had trouble with control but may not have actually acted violently during the previous 30 days. Conversely, other veterans not endorsing this may have been perfectly in control but acted violently in an instrumental or intentional manner. In other words, there is a difference between “difficulty controlling violence” and “actual violence.” Understood this way, the current data add to the literature by suggesting that, even though PTSD and SUD have been linked to violence in past research (Elbogen et al., 2008; MacManus et al., 2012), *difficulties controlling violence* may be a characteristic of PTSD, but not SUD. This has important clinical implications because this indicates that intervening to reduce violence in PTSD may need to focus more on self-regulation, whereas intervention in SUD may need to focus on more antisocial traits and characteristics (as implied by the link to incarceration in Figs. 2 and 3).

Finally, it is noteworthy that the externalizing-SUD factor had no effect on suicidality or suicide attempts in the present research. This finding is consistent with our hypotheses, which were based on prior research that suggested that comorbid substance-use disorders added relatively little incremental risk for suicidality over and above PTSD among veterans (Jakupcak et al., 2009; Guerra et al., 2011). While additional research is needed to replicate and expand upon these findings, our results suggest that the distress factor (i.e., PTSD and depression) of psychiatric comorbidity may be a significant risk factor for both suicidality and violence among returning Iraq/Afghanistan veterans and could help to explain the co-occurrence of these important outcomes. Our findings further suggest that it is the co-occurrence of PTSD and MDD (i.e., comorbid PTSD–MDD) that places veterans at

greatest risk for suicidality, suicide attempts, and violence, as the highest possible scores on the distress factor resulted from participants that met full criteria for both lifetime PTSD and MDD. Thus, clinicians should be particularly vigilant when working with veterans who meet full criteria for both of these disabling conditions.

4.1. Limitations and future directions

This study had several limitations that should be noted. First, the cross-sectional nature of the present research prevents us from drawing conclusions about the nature of the associations among the variables. Thus, prospective research is needed to address this concern. Second, while a “gold standard” clinical interview was used to establish clinical diagnoses, we relied on self-report to assess suicidality, history of suicide attempts, incarceration, and difficulty controlling violence. In addition, single items were used to index violence and incarceration. Future research could improve upon this methodology by using more objective records (e.g., chart review studies, clinical interviews) to quantify these key outcome variables as well as obtaining information about the nature of the circumstances that led to imprisonment and/or violent behavior. A third limitation is that the sample was obtained from a fairly-restricted geographic area (i.e., Mid-Atlantic region of the United States). Future studies using random sampling strategies and national databases could help to increase the generalizability of these results. A fourth limitation is that we only assessed Axis I disorders. Consequently, we could not include antisocial personality disorder as an indicator on the externalizing-SUD factor. While we think that it is unlikely that inclusion of antisocial personality disorder in the measurement model would have substantially altered the results, this possibility cannot be ruled out.

4.2. Conclusions

The present research used CFA to examine the structure of psychiatric comorbidity among a large and diverse sample of Iraq/Afghanistan-era veterans. Consistent with our hypothesis, a three-factor solution was identified as the best-fitting model. The three factors included: (1) an externalizing-SUD factor characterized by alcohol and drug disorders and nicotine dependence; (2) a distress factor characterized by PTSD and major depressive disorder; and (3) a fear factor characterized by panic disorder, social phobia, specific phobia, and OCD. SEM was used to assess the relationship between these three latent factors and incarceration, difficulty controlling violent behavior, suicidality, and suicide attempts among Iraq/Afghanistan veterans. Incarceration was exclusively predicted by the externalizing-SUD factor, whereas difficulty controlling violent behavior, suicidality, and suicide attempts were exclusively predicted by the distress factor. The latter finding suggests that the distress factor of psychiatric comorbidity may be a significant risk factor for suicidality and violence among returning Iraq/Afghanistan veterans and that additional research into the etiology of these important outcomes is warranted.

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