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Prospective Study of Externalizing and Internalizing Subtypes of Posttraumatic Stress Disorder and their Relationship to Mortality among Vietnam Veterans

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Abstract

PTSD is also a complex disorder, and some studies have found that samples of individuals with PTSD contain subtypes that may relate to health outcomes. The goals were to replicate previously identified PTSD subtypes and examine how subtype membership relates to mortality. Data from the Vietnam Experience Study and a clinical sample of Vietnam veterans were combined (n = 5248) to address these research questions. Consistent with previous studies, three PTSD subtypes emerged: externalizers (n=317), internalizers (n=579), and low pathology (n=280). PTSD diagnosis was associated with increased risk of all cause and behavioral cause (e.g., homicide, suicide) mortality. Both externalizing and internalizing subtypes had higher mortality and were more likely to die from cardiovascular causes than those without PTSD. Externalizers were more likely to die from substance-related causes than those without PTSD. The value of considering possible PTSD subtypes is significant in that it may contribute to identifying more specific targets for treatment and rehabilitation in veterans with PTSD.

Keywords

PTSD SUBTYPES; MORTALITY; CAUSES OF DEATH

Researchers have long been interested in the core personality processes that might suggest individual adaptation or psychopathology. Several factor analytic studies examining the latent structure of mental illness suggest that psychiatric symptoms fall along two dimensions of externalizing and internalizing (Kendler, Prescott, Myers, & Neale, 2003; Krueger, McGue & Icono, 2001; Krueger, Caspi, Moffitt & Silva, 1998). Individuals described as externalizers tend to display their distress outwardly and are likely to react in an

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impulsive, aggressive manner and have low levels of constraint in their decision-making and behaviors (Krueger et al, 2001; Schwartz et al, 1996). In contrast, internalizers are described as individuals who display their distress inwardly and demonstrate high negative emotionality and low positive emotionality (Clark et al, 1994; Krueger et al, 2001).

It has been hypothesized that externalizing and internalizing are core personality processes that influence the form and expression of psychiatric symptoms (Miller et al, 2003; Miller et al, 2004). Consistent with this hypothesis, recent research has documented a relationship between internalizing and externalizing and specific covariation of psychiatric illness symptoms (Iacono et al, 2003; Kirz et al, 2001; Krueger et al, 1998). For instance, Kreuger and colleagues (Krueger et al, 2001) examined psychiatric diagnostic symptoms among 1183 participants of the Minnesota Twin-Family Study. Using confirmatory factor analysis, the authors found that across the psychiatric disorders, a two-factor model proposing internalizing and externalizing factors best fit the data. Diagnoses of antisocial behavior, alcohol dependence, cannabis dependence, and drug dependence were more associated with externalizing problems, while major depressive disorder, panic disorder, simple phobia, and social phobia were more associated with internalizing problems.

More recently, this classification typology has been applied to PTSD in an attempt to account for the heterogeneity of posttraumatic symptomatology and comorbidity (Miller et al, 2003). Two primary studies (Miller et al, 2003; Miller et al, 2004) have demonstrated related subtypes of PTSD within veteran populations. In the each study, researchers utilized cluster analyses of the Multidimensional Personality Questionnaire (MPQ; Tellegen et al, 1994) or the Minnesota Multiphasic Personality Inventory (MMPI-2; Butcher et al, 1989) PSY-5 scales (Harkness et al, 2002) that include dimensions of aggression (AGG), psychoticism (PSY), constraint (CON), negative emotionality/neuroticism (NEN), and positive emotionality (Bray et al; see Table 1 for further scale description). Individuals classified as externalizers were more likely to have low constraint scores, elevations on aggressiveness, psychoticism, and emotionality/neuroticism, a substance-abuse diagnosis and a history of delinquency or antisocial personality disorder. Individuals classified as internalizers displayed high negative emotionality and low positive emotionality scores and co-morbid depression and panic symptoms. A third low-pathology subgroup was characterized by scale scores near the standardization mean. Results of these studies suggest that individuals with PTSD may have differential ways that they express their distress: externalizers may act impulsively and engage in sensation-seeking while internalizers may display more introversion and apathy.

The application of a personality-based typology for posttraumatic response may help to explain the heterogeneity of symptom presentation in PTSD (Miller et al, 2003; Miller et al, 2004), and more importantly may be clinically informative in regards to identifying health risk behaviors, predicting associated behavioral disturbance such as aggression, and ultimately in modifying treatments to fit different presentations of PTSD. The present study was designed as an independent replication and extension of the internalizing and externalizing subtypes of PTSD documented in the Miller et al. studies (Miller et al, 2003; Miller et al, 2004; Miller et al, 2007). Further, it was designed to extend these findings through the examination of PTSD subtype and mortality. PTSD and trauma exposure have consistently been linked to high rates of morbidity, health problems, health care utilization, and mortality (Armenian et al, 1998; Boscarino, 2004; Schnurr et al, 2004a; Schnurr et al, 2004b; Boscarino, 2008), While veterans with PTSD are at higher risk for mortality, particularly related to external-causes [e.g., homicide, suicide, drug overdose, unintended injury (Boscarino, 2006a; Boscarino, 2006b)], no studies have examined whether specific personality-based PTSD subtypes are associated with mortality risk.

Based on Miller's previous work, we expected that individual Individuals classified as externalizers were more likely to have low constraint scores, elevations on aggressiveness, psychoticism, and emotionality/neuroticism, and indices of substance use. Individuals classified as internalizers were hypothesized to have high negative emotionality and low positive emotionality scores and higher depression scores. It was hypothesized that both externalizers and internalizers would be at higher risk of mortality then the low pathology and non-PTSD veteran groups based on the rational that greater psychiatric and behavioral disturbance would increase risk of mortality. Although mortality has been previously studied in PTSD populations, this is the first study to relate personality dimensions encompassed in PTSD subtypes to risk of death. The connection between subtype and health outcome may be particularly relevant in planning appropriate interventions for veterans with PTSD.

Methods

Participants

Veterans Administration PTSD Clinic Database (VA Clinic)—Data were obtained from 1253 male combat Vietnam veterans who were consecutively evaluated for PTSD at a VA specialty PTSD Clinic between March 1992–March 2003 and on whom there were both PTSD diagnostic results and MMPI or MMPI-2 data. In these evaluations, military and overseas service was confirmed at time of evaluation by review of the veteran's discharge record (DD-214). The comprehensive evaluation included structured diagnostic interviewing and self-report measures of PTSD and related symptoms. Of the 1253 veterans from the VA clinic database, 1150 (91.8%) were diagnosed with PTSD.

Vietnam Experience Study (VES) Database—Archival data from the VES were obtained from the Centers for Disease Control. The VES was a large-scale assessment study of the health of US Army Vietnam-era veterans who served between January 1965–December 1971(CDC, 1988; CDC, 1989; CDCVES, 1989). The cases utilized in the current study were those who participated in a structured telephone interview and consented to medical and psychological examination and had MMPI data (N=4,459). Information obtained in these examinations included demographics, self-report symptom measures, and diagnostic clinical interviews, outlined in detail elsewhere (CDC, 1988; CDC, 1989; CDCVES, 1989). The initial evaluation was completed between January 1985–September 1986. Of the 4459 veterans from the VES database, 327 (7.33%) were diagnosed with PTSD.

Rules examining MMPI profile validity followed the same criterion used by Miller et al. (Miller et al, 2003; Miller et al, 2004). These validity requirements included the following: F > 100 and F(p) > 80, or VRIN > 80, or TRIN > 100; these were also converted to raw score equivalents to compare across MMPI versions. The F scale consists of 60 items that were selected to detect atypical ways of answering test items. The F(p) scale is the infrequency-psychopathology scale and includes items reflecting severe psychotic symptoms, unusual habits, highly amoral attitudes and identity confusion (Greene, 2000). The VRIN (variable response inconsistency) and TRIN (true response inconsistency) scales both measure response irregularities and inconsistencies by respondents. These validity requirements resulted in an exclusion of 8% (n=464) of the sample, 20% (n=301) of the PTSD sample and 4% (n=163) of the non-PTSD sample). This resulted in a final combined dataset of 5248 veterans, 1176 with a PTSD diagnosis and 4072 without PTSD.

Demographic profiles are listed for both groups in Table 2. A large majority of participants were white (81.34% white vs. 18.66% nonwhite), approximately half were smokers (45.42% smokers vs. 54.48% non-smokers), and two-thirds had served in-country during wartime (63.26% yes vs. 36.74% no). There were several differences between subsample datasets as

can be noted in Table 2. There were obvious differences in age at time of assessment [$F(1,5245) = 13153.6$, $p < .0001$)]. However, all veterans were Vietnam-era and therefore there were not any major discrepancies in true age. For instance, when calculating age in 1980, the following means and standard deviations were found by group: VA Clinic ($M = 33.34$; $SD = 3.86$) and VES ($M = 32.34$; $SD = 2.47$). The VES clinic sample included fewer non-white veterans ($\chi^2_{1df} = 686.106$, $p < .0001$) and on average three months more of self-reported education [$F(1,5226) = 21.66$, $p < .0001$)] than the VA Clinic sample. For smoking, the VA clinic sample had significantly more smokers than non-smokers compared to the VES dataset ($\chi^2_{1df} = 4.273$, $p < .01$), which would be expected since PTSD diagnosis is associated with smoking (Beckham, 1999). Finally, more members of the VA clinic sample had served in-country in Vietnam, which was also expected since the VES dataset included Vietnam-era veterans, not primarily combat veterans as in the VA Clinic sample ($\chi^2_{1df} = 605.075$, $p < .0001$).

Measures

Structured Interviews—For the VA clinic sample, PTSD diagnosis was determined by structured clinical interview; the PTSD module of the Structured Clinical Interview for DSM-III-R diagnosis (Spitzer et al, 1990; 15.6 % of the sample) or the Clinician Administered PTSD Scale using a criterion of at least 1 for frequency (at least once a month) and 2 for intensity (moderate impact on functioning; CAPS; 84.4% of the sample; Blake et al, 1995). The CAPS has consistently yielded reliable and valid scores in samples of traumatized adults (Weathers et al, 1999). The raters in the clinic over the study period had an average kappa of .93 for diagnosis.

In the VES sample, diagnostic interviewing was conducted using the Diagnostic Interview Schedule III (DIS-III; Robins et al, 1987). The DIS-III is a structured interview designed to assess for PTSD diagnostic status as well as other psychiatric conditions and was based on the third revision of the Diagnostic and Statistical Manual for Mental Disorders. Psychometric properties for the DIS indicate good reliability and validity (Robins et al, 1994).

Personality Assessment—The Minnesota Multiphasic Personality Inventory (MMPI; Hathaway et al, 1951) and the Minnesota Multiphasic Personality Inventory-Second Edition (MMPI-2; Butcher et al, 1989) were used to examine personality dimensions within those with PTSD (n=1176). Participants from the VA clinic were administered one of the two MMPI versions. The version administered depended on the date that they came for their initial assessment and the MMPI version that was accessible within the VA computerized administration system. For the VES sample, all participants completed the MMPI.

MMPI PSY-5 Scales: Following Miller et al (Miller et al, 2004), the Personality Psychopathology—Five scales (PSY–5; Harkness et al, 1995; Harkness et al, 2002) from the MMPI were used to assess personality dimensions for the 1176 PTSD cases. The PSY-5 Scales include dimensions of aggression (AGG), psychoticism (PSY), constraint (CON), negative emotionality/neuroticism (NEN), and positive emotionality (PEE). Table 1 describes these five scales in detail. As participants from the VA clinic sample had completed either the MMPI or MMPI-2, PSY-5 scores and other MMPI subscales were computed by only including those items that were present on both versions of the MMPI. Scale comparisons across the two versions resulted in the following number of items dropped per scale: AGG, 3; PSY, 5; CON, 2; NEN, 6; and PEE, 4. Thus, our analyses are based on raw scores rather than T-scores.

Dependent Measures: Five MMPI content and supplementary scales were selected to serve as dependent measures due to their relevance to internalizing and externalizing psychopathology. These included the PTSD (PK), Depression (D), Hostility (Ho), MacAndrews Alcoholism (MAC-R), and Hypochondriasis (Hs) scales (Greene, 2000).

To address variations in the two MMPI versions and scales of interest to the current study, only items that were identical across the two MMPI versions were retained. The following four scales had identical content and, therefore, were not modified: D, Ho, Hs, and F. For the remaining MMPI scales, we discarded any items that were not on both versions. Correlational analyses revealed that the modified scales from the MMPI demonstrated strong correlations with the original scales (M = .984; range = .961 – .998). Similarly, strong correlations were found for the modified MMPI-2 scales, including the PSY-5 scales (M = .972; range = .942 – .989) in comparison to the original scales.

Death Records—For participants evaluated in the VA clinic, the Department of Veterans Affairs Beneficiary Identification Record Located Subsystem (VA BIRLS) death file was used to determine mortality status through March 31, 2004. For those veterans who were listed as deceased in BIRLS, actual death certificates were obtained from the National Death Index, a computerized index of death records from state agencies. For the VES sample, death records were obtained using one of three mortality databases: the National Death Index Plus (NDI Plus), the Social Security Administration Death Master File (SSADMF), or the VA BIRLS death file. Mortality status was checked through December 31, 2000 for this sample.

Causes of Death: Death records were coded for specific causes of death based on the International Classification of Diseases, Tenth Revision (Organization, 2004). The following causes of death were classified as behavioral: accidents, intentional (i.e., homicide, suicide) and both immediate (i.e., overdose) and chronic (i.e., cirrhosis) effects of substance abuse. The following were classified as disease-process deaths: cardiovascular, cancer, HIV/Hepatitis and other. We were unable to obtain death certificate information or unable to code the information received for 20 of the 307 deceased veterans.

Analyses

A k-means cluster analysis of the MMPI PSY-5 scales with *a priori* specification of three clusters was used to examine the replicability of previous findings of PTSD subtypes (Kirz et al, 2001; Krueger et al, 1998). Differences between PTSD subtypes and comparisons to the non-PTSD group on MMPI scales were tested with analysis of variance (ANOVAs) with a two-tailed alpha rate of $p < .01$.

Logistic regression analysis of survival data using Cox proportional hazards modeling was used to examine the relationship between 1) PTSD diagnosis and all cause mortality; 2) PTSD subtypes and all cause mortality; 3) PTSD diagnosis and behavioral causes of death; and 4) PTSD subtype and behavioral causes of death. The time reference included time from assessment to death or time from assessment to mortality record search in the regression. All models were adjusted for age, race, and smoking status. Race was dichotomized by minority status (yes/no) in the logistic regressions. Non-PTSD status was used as a reference category for PTSD subtype. For the PTSD subtypes, additional pairwise contrasts tested the effect of each PTSD subtype versus each of the other PTSD subtypes. Additional analyses (results not shown) were conducted that included dataset (VES versus VA Clinic) and an interaction term of dataset type with PTSD subtype to examine whether any of the observed relationships differed by dataset type. Neither the interaction between PTSD subtype and dataset nor the main effect for dataset type were significant in any of the analyses,

supporting our decision to combine these data. Because of the small cell sizes among the specific causes of death, preliminary logistic regression analyses (without covariates) were used to examine the relationship between PTSD subtype and specific causes of death (e.g., accidents, intentional, cardiovascular disease).

Results

The cluster analysis of the MMPI PSY-5 scales are presented in Table 3. One-way ANOVAs revealed significant group differences between Cluster 1 (low pathology), Cluster 2 (externalizers), and Cluster 3 (internalizers) on the five scales. Participants classified as low pathology demonstrated relatively low raw scores on the AGG, PSY, and NEN scales and relatively high scores on CON and PEE compared to the other two groups. In contrast, the externalizers scored lowest on CON and highest on AGG, consistent with hypotheses. Internalizers scored highest on NEN and lowest on PEE, again consistent with previous findings. Externalizers and internalizers did not score significantly differently on the PSY scale, but both scored higher in comparison to the low pathology group.

Examination of other MMPI Scales

We examined the relationship between PTSD subtype and several MMPI scales including PTSD (PK), Depression (D), Hostility (Ho), MacAndrews Alcoholism (MAC-R), and Hypochondriasis (Hs), (see Table 4). One-way ANOVAs ($\alpha = .0001$) demonstrated that there were statistically significant group differences for all the scales: PK [$F(3,5244)= 2639.01$, $p<.0001$)], D [$F(3,5244) = 1996.95$, $p < .0001$)], Ho [$F(3,5243) = 600.75$, $p < .0001$)], MAC- R [$F(3,5244) = 96.75$, $p < .0001$)], and Hs [$F(3,5244) = 1989.83$, $p < .0001$). Follow-up contrasts demonstrated that the non-PTSD group had the lowest scores on all of these MMPI scales. Externalizers scored higher on the Ho, MAC-R, and Hs scales compared to other groups, while the internalizers scored higher on the PK and D scales in comparison to other groups.

Prediction of Death

Approximately 5.8% (n=307) of the 5248 included in the final sample (PTSD n=1176; Non-PTSD n=4072) were deceased at the time of follow-up including 6.1% of the PTSD low pathology group, 9.5% of PTSD externalizers, 7.8% of PTSD internalizers, and 5.3% of those without PTSD.

PTSD diagnosis was significantly related to all cause mortality [HR=1.54 (95% CI = 1.12–2.12; $\chi^2_{1df} = 6.88$, $p < .01$)], after controlling for covariates. Significant covariates in the all cause mortality model included older age [HR=1.07; (95% CI=1.04–1.10; $\chi^2_{1df} = 26.48$, $p < .0001$)], minority status [HR=1.52; (95% CI = 1.15–2.00; $\chi^2_{1df} = 8.80$, $p < .01$)], and smoking [HR=2.39; (95%CI = 1.88–3.05; $\chi^2_{1df} = 49.96$, $p < .0001$)]. Similarly, PTSD diagnosis was associated with increased risk of behavioral cause mortality [HR=2.28; (95% CI= 1.35–3.87; $\chi^2_{1df} = 9.37$, $p < .01$)] with smoking as the only significant covariate in the model [HR=2.42 (95% CI=1.35–3.87; $\chi^2_{1df} = 15.68$, $p < .0001$)].

PTSD subtype and mortality results indicated that age [HR = 1.07; (95% CI= 1,04–1.09; $\chi^2_{1df} = 21.88$, $p < .0001$)], minority status [HR = 1.51; (95% CI = 1.14–1.99; $\chi^2_{1df} = 8.50$, $p < .005$)], smoking [HR = 2.39; (95% CI=1.88–3.04; $\chi^2_{1df} = 49.75$, $p < .0001$)], and PTSD subtype ($\chi^2_{3df} = 9.77$, $p < .05$) were significantly associated with risk of mortality. Contrasts revealed significant differences between PTSD subtypes: externalizers [HR = 1.87; (95% CI=1.20–2.92; $\chi^2_{1df} = 7.67$, $p < .01$)] and internalizers [HR = 1.68; (95% CI= 1.09–2.58; $\chi^2_{1df} = 5.63$, $p < .05$)] had significantly higher hazard ratios compared to non-PTSD

veterans. The low pathology PTSD subtype was not statistically different from those without PTSD. There were no significant differences between externalizers and internalizers.

PTSD subtype was also significantly associated with behavioral cause mortality (χ^2_{3df} = 10.14, $p < .05$), with only smoking as a significant covariate [HR=2.42; (95% CI= 1.56–3.75; χ^2_{1df} = 15.64, $p < .0001$)]. Contrasts indicated both externalizers [HR = 2.66; (95% CI = 1.26–5.63; χ^2_{1df} = 6.564, $p < .05$)] and internalizers [HR = 2.56; (95%CI = 1.19–5.50; χ^2_{1df} = 5.78, $p < .05$)] had significantly higher hazard ratios compared to non-PTSD veterans. No differences were detected in behavioral cause mortality between the low pathology subtype versus non-PTSD veterans or between externalizers and internalizers.

Prediction of Specific Cause of Death

Table 5 outlines specific causes of death for the non-PTSD group and each of the three PTSD clusters. Analyses yielded significant findings for two specific causes of death. PTSD cluster was associated with both cardiovascular (χ^2_{3df} = 14.17, p <.01) and substance-related deaths (χ^2_{3df} = 7.88, p <.05). Follow-up contrasts for cardiovascular deaths revealed significant differences between externalizers and non-PTSD veterans (OR=2.28; 95%CI= 1.15–4.50; χ^2_{1df} = 5.62, $p < .05$) as well as internalizers and non-PTSD veterans (OR=2.33; 95% CI=1.38–3.93; χ^2_{1df} = 9.948, $p < .01$). For substance-related causes of death, follow-up contrasts revealed a significant difference between externalizers vs. non-PTSD veterans (OR=4.20; 95% CI; 1.53–11.55; χ^2_{1df} = 7.74, $p < .01$), with externalizers more likely to die for substance-related deaths than non-PTSD veterans.

Discussion

This study provides an independent replication of previous work identifying personality-related PTSD subtype findings in a much larger sample of veterans (Kirz et al, 2001; Krueger et al, 1998). It also provides a replication of previous work identifying PTSD diagnosis as a risk factor for all cause mortality and behavioral cause mortality (Armenian et al, 1998; Boscarino, 1997; Boscarino, 2004; Boscarino, 2006a; Boscarino, 2006b).

Consistent with previous research (Miller et al, 2003; Miller et al, 2004), the low pathology group in this study had mean scores on MMPI scales near the normative mean. Relative to the other subtypes, the low pathology group appeared to have scores reflective of more stable emotional and social functioning despite their PTSD diagnosis. In contrast, the externalizers and internalizers differed in clinically significant ways. The externalizing group demonstrated elevated scores on scales measuring aggression, hostility, substance misuse and decreased scores on constraint. The internalizing group produced the highest scores on scales measuring negative affect, PTSD, depression, hypochondriasis, and the lowest on positive affect scores. Therefore, the externalizers and internalizers appeared to deviate in more extreme directions from the low pathology group, suggesting greater psychopathology and distress. This study makes a unique contribution to the literature by extending personality-related subtype findings in PTSD to mortality. Results indicated externalizers and internalizers, but not the low pathology subgroup, were at higher risk for all cause and behavioral cause mortality compared to non-PTSD veterans. Results provided preliminary evidence that particular causes of death may be linked to PTSD subtypes; compared to non-PTSD veterans, both externalizers and internalizers were more likely to die from cardiovascular causes and externalizers were more likely to die of substance-related causes.

Limitations of this study to be addressed in future work include: 1) relatively small sample sizes for difference causes of death: 2) inability to determine whether subtype personality dimensions were present prior to trauma exposure or if externalization or internalization

tendencies are simply adaptations and coping attempts following trauma exposure; and 3) lack of generalizability to other trauma populations or women.

It will be important to continue exploring the connection between PTSD and personality dimensions, addressing the aforementioned limitations as well as other aspects of subtypes. For example, a wealth of research data (e.g., Beckham et al, 2002; Beckham et al, 2000) suggest that hostility, a common presenting symptom in PTSD, may be related to health outcome and mortality. In this study, externalizers and internalizers had significantly higher hostility scores than other groups, which may partially explain the association between externalizing and mortality associated with cardiovascular disease.

PTSD subtype findings potentially have meaningful assessment and treatment implications. Comprehensive clinical assessment that includes evaluation of PTSD subtype membership reflecting how the veteran copes with trauma and current life stressors could be beneficial for treatment planning. Identification of particularly at-risk individuals could also assist in targeting those most at risk for behavioral or all cause mortality with more intensive treatment. Understanding variations in PTSD symptom presentation, a longstanding observation among clinicians, may provide researchers and clinicians a unique opportunity for identification, prevention and reduction of health risks among this vulnerable trauma population.

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Table 1

MMPI PSY-5 Scales and their Interpretation

PSY-5 Scale	Interpretation
AGG	*High AGG*: enjoyment of control, domination, and use of fear to influence others; may use overt aggression to control *Low AGG*: submissive and nonassertive
PSY	*High PSY*: cannot accommodate as well, unrealistic beliefs, misperceptions, not in contact with reality *Low PSY*: can realize model of world not working and can revise their model of the world to fit their environment
CON	*High CON*: emotionally and behaviorally controlled, tend to follow rules and order *Low CON*: disorganized, impulsive risk-taker, tendency towards rule-breaking and criminality
NEN	*High NEN*: tense, anxious, disposition towards negative mood and conflictual interactions with others *Low NEN*: emotionally stable, less reactive to stress
PEE	*High PEE*: energetic, interested in social contact, capacity to experience positive emotions *Low PEE*: withdrawn, anhedonic

AGG = Aggression; PSY = Psychoticism; CON = Constraint; NEN = Negative Emotionality/Neuroticism; PEE = Positive Emotionality

Table 2

Participant Characteristics at Initial Evaluation

	PTSD Clinic Sample (n = 961)	VES Sample (n = 4287)
Age at Time of Assessment	50.46	37.84
Race	White 51.52%	White 87.94%
	Black 45.45%	Black 11.36%
	Other 3.03%	Other 0.70%
Years of Schooling	12.94	13.32
Smoking	48520%	44.76%
In-Country Wartime Experience	98.20% Yes	55.56% Yes
	1.80 No	44.44% No

Table 3

K-Means Cluster Analysis Findings for PTSD Participants (n=1176)

PSY 5 Scale	Groups				
	Cluster 1 (n=280)	Cluster 2 (n=317)	Cluster 3 (n=579)	*F*	Contrasts
	Low pathology	Externalizers	Internalizers		
AGG	7.19	9.94	8.23	90.71*	1<2,1<3,2>3
PSY	3.93	8.11	8.93	194.00*	1<2,1<3
CON	14.84	12.07	16.11	119.12*	1>2,1<3,2<3
NEN	9.31	17.92	18.36	714.40*	1<2,1<3,2<3
PEE	18.10	16.37	7.07	1109.60*	1>2,1>3,2>3

* $p < .01$

Note. For the low pathology group (n = 280), 122 (44%) were from the PTSD clinic sample and 158 (56%) from the VES sample. For the externalizer group (n = 317), 218 (69%) were from the PTSD clinic sample and 99 (31%) were from the VES sample. Finally, for the internalizer group (n=579), 537 (93%) were from the PTSD group and 42 (7%) were from the VES group.

Table 4

Mean Raw Score on MMPI Clinical and Supplemental Scales Based on Group Membership

MMPI Scale	Low Pathology (1) (n = 280)	Externalizers (2) (n= 317)	Internalizers (3) (n = 579)	No PTSD (4) (n =4068)	*F*	Contrasts
PTSD (PK)	15.47	30.00	36.13	9.11	2639.01	3>2>1>4
Depression (DEP)	23.85	29.45	38.23	19.67	1996.95	3>2>1>4
Hostility (Ho)	21.80	34.22	32.77	19.98	600.75	2>3>1>4
MacAndrews (MAC-R)	21.97	25.53	20.93	21.62	96.75	2>1,4>3
Hypochondriasis (Hs)	11.34	18.68	22.26	5.87	1989.83	3>2>1>4

$p < .01$

Table 5

Number (Percentages) of Deaths by PTSD Subtype/Group.

		PTSD		Non-PTSD (n=4072)	Contrasts
Cause of Death	**Low Pathology (n=280)**	**Externalizers (n=317)**	**Internalizers (n=579)**		
All Cause	17 (6.07%)	30 (9.46%)	45 (7.77%)	215 (5.28%)	2>4; 3>4
All Behavioral Cause	7 (2.50%)	9 (2.84%)	12 (2.07%)	64 (1.57%)	2>4; 3>4
Accident	3 (1.07%)	2 (0.63%)	3 (0.52%)	25 (0.61%)	
Intentional Death	2 (0.71%)	2 (0.63%)	6 (1.04%)	23 (0.56%)	
Chronic Effects of SA	2 (0.71%)	5 (1.58%)	3 (0.52%)	16 (0.39%)	2>4
All Medical Cause	8 (2.86%)	18 (5.68%)	33 (5.70%)	136 (3.34%)	
Cardiovascular	3 (1.07%)	10 (3.15%)	19 (3.28%)	59 (1.45%)	2>4; 3>4
Cancer	3 (1.07%)	4 (1.26%)	9 (1.55%)	47 (1.15%)	
HIV/Hepatitis C	1 (0.36%)	1 (0.32%)	2 (0.35%)	14 (0.34%)	
Other Medical	1 (0.36%)	3 (0.95%)	3 (0.52%)	16 (0.39%)	
Unknown	2 (0.71%)	3 (0.95%)	0 (0%)	15 (0.37%)	

Note. For the Other Medical category, deaths included other medical causes such as COPD, hepatic failure, etc. SA = substance abuse