ORIGINAL ARTICLE

A Latent Class Analysis of Dissociation and Posttraumatic Stress Disorder

Evidence for a Dissociative Subtype

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Context: The nature of the relationship of dissociation to posttraumatic stress disorder (PTSD) is controversial and of considerable clinical and nosologic importance.

Objectives: To examine evidence for a dissociative subtype of PTSD and to examine its association with different types of trauma.

Design: A latent profile analysis of cross-sectional data from structured clinical interviews indexing *DSM-IV* symptoms of current PTSD and dissociation.

Settings: The VA Boston Healthcare System and the New Mexico VA Health Care System.

Participants: A total of 492 veterans and their intimate partners, all of whom had a history of trauma. Participants reported exposure to a variety of traumatic events, including combat, childhood physical and sexual abuse, partner abuse, motor vehicle accidents, and natural disasters, with most participants reporting exposure to multiple types of traumatic events. Forty-two percent of the sample met the criteria for a current diagnosis of PTSD.

Main Outcome Measures: Item-level scores on the Clinician-Administered PTSD Scale.

Results: A latent profile analysis suggested a 3-class solution: a low PTSD severity subgroup, a high PTSD severity subgroup characterized by elevations across the 17 core symptoms of the disorder, and a small but distinctly dissociative subgroup that composed 12% of individuals with a current diagnosis of PTSD. The latter group was characterized by severe PTSD symptoms combined with marked elevations on items assessing flashbacks, derealization, and depersonalization. Individuals in this subgroup also endorsed greater exposure to childhood and adult sexual trauma compared with the other 2 groups, suggesting a possible etiologic link with the experience of repeated sexual trauma.

Conclusions: These results support the subtype hypothesis of the association between PTSD and dissociation and suggest that dissociation is a highly salient facet of posttraumatic psychopathology in a subset of individuals with the disorder.

Arch Gen Psychiatry. 2012;69(7):698-705

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SYMPTOMS OF DISSOCIATION are thought to have an important role in the development and maintenance of posttraumatic stress disorder (PTSD) and related disorders. Peritraumatic dissociation is a diagnostic criterion for acute stress disorder and has been shown to prospectively predict the development of PTSD.[1,2] Dissociative symptoms can also co-occur with PTSD and are thought to interfere with the emotional activation and processing necessary for successful treatment with prolonged exposure therapy.[3,4] Although the relationship of dissociation to PTSD is of considerable clinical and nosologic importance, the nature of the association between these phenomena remains a source of controversy. One empirically testable model for this association proposes that dissociation is primarily characteristic of a distinct subset or subtype of individuals with PTSD.[5-10] The primary aim of this study was to evaluate this hypothesis using latent class analysis in a large sample of trauma-exposed veterans and their trauma-exposed partners.

The dissociative subtype hypothesis posits that dissociation is present primarily in a distinct subset of individuals with PTSD and is characterized by blunted or inhibited emotional and physiologic responses to internal and external trauma-related stimuli.[10] Previous studies using taxometric analysis,[9] examination of the distribution of dissociative symptoms,[8] and signal detection analysis[7] have provided preliminary support for this hypothesis. For example, Waelde et al[9] performed

taxometric analyses on items from the Dissociative Experiences Scale (DES)[11] drawn from a sample of trauma-exposed Vietnam veterans. Their results provided evidence for a discontinuous distribution of DES scores and a distinct subgroup, or taxon, of individuals at the severe end of that distribution who also exhibited elevated levels of PTSD.

The aim of this study was to replicate and extend these findings using latent class analysis, a contemporary approach to the multivariate evaluation of typologic hypotheses. Latent profile analysis (LPA) is a form of latent class analysis used in the evaluation of continuous (ie, dimensional) observed scores that partitions cases in a data set into latent, or unobserved, categorical classes. Thus, LPA defines homogeneous subgroups of individuals in a sample based on broad characteristics that are not directly measured. In this study, clinical interview–based data on the 17 core *DSM-IV* PTSD symptoms and 3 items reflecting dissociation from the associated features section of the Clinician-Administered PTSD Scale (CAPS)[12] were analyzed.

This study also provided an opportunity to evaluate the relationship between trauma exposure, dissociation, and PTSD as trauma is thought to have a primary causative role in the development of PTSD and dissociation. In the case of dissociation symptoms, repeated and severe early childhood trauma has been theorized to disrupt the normal development, consolidation, and integration of personality and cognitive processes, leading to the development of dissociative symptoms and their persistence into adulthood.[13-16] Childhood emotional maltreatment (ie, psychological abuse and neglect) has also been shown to be associated with dissociation in adulthood.[17,18] However, it is unclear whether dissociation is uniquely associated with early developmental trauma as dissociation has also been reported in samples of individuals exposed to adult trauma, including combat[19,20] and major accidents.[21] Thus, a second aim of this study was to compare the associations between different types of trauma and dissociation.

One limitation of previous research in this area is that most studies have relied on self-report measures of dissociative symptoms, such as the DES.[11,22] Critics have raised concerns about the construct validity, longitudinal stability, and predictive utility of the measure.[23] Although efforts have been undertaken to improve the DES, critics have argued that revised versions (eg, the DES-Taxon[24]) still do not adequately identify individuals with dissociative disorders and may be unduly influenced by nonpathologic or normative experiences that fall along the boundary of pathologic dissociation.[25] This study used a structured clinical interview administered by trained clinicians to quantify the prevalence of dissociation, defined as a reduction in awareness of surroundings, derealization, and depersonalization, in individuals with a history of trauma so as to better examine the association between dissociation and PTSD.

The primary aim of this study was to evaluate evidence for a dissociative subtype of posttraumatic psychopathology. We hypothesized that an LPA of the core PTSD and dissociative symptoms would yield evidence of a distinct subtype characterized by elevated levels of dissociation and specific PTSD symptoms that are conceptually linked to dissociation: flashbacks (criterion B3), psychogenic amnesia (criterion C3), and emotional numbing (criterion C6). We also evaluated potential demographic and trauma exposure correlates of dissociation and predicted that individuals in the dissociative subgroup would show higher mean scores on an index of childhood sexual abuse compared with those without dissociation.

METHODS

PARTICIPANTS

Participants were 559 veterans and their spouses or intimate partners who enrolled in recent studies at US Department of Veterans Affairs medical centers. Of these individuals, 18 withdrew from study participation and 15 were terminated by study staff owing to problems conforming to interview requirements, yielding a subsample of 526 study completers (64% were male and 73% were veterans; mean age, 51.3 years [age range, 21-75 years]). One hundred sixty-six participants were cohabitating intimate partners of veterans who were recruited into the study along with their veteran partners. Individuals self-reported their race as follows: 82% white, 13% black, 8% American Indian or Alaskan native, 4% unknown, and less than 1% Asian or Pacific Islander; in addition, 13% reported their ethnicity as Hispanic or Latino. As this study focused on psychopathologic responses to trauma, only data from individuals (veterans or their partners) who reported trauma exposure, as defined by *DSM-IV* PTSD criterion A, were included in the data analyses (n=492, 93.5% of the full sample). We included veterans and their partners because doing so increased the sample size, yielded more statistical power, and improved the study generalizability by extending the work to trauma-exposed women and nonveterans.

PROCEDURE

This research was reviewed and approved by the appropriate human subjects and scientific review boards: the institutional review board (human subjects) and research and development committees at the VA Boston Healthcare System, the institutional review board at the Boston University School of Medicine, the scientific review committee at the New Mexico VA Health Care System, and the human research review committee at the University of New Mexico. Participants provided written informed consent and were compensated for their time. Study participants were recruited through medical databases, flyers, clinician referrals, and a recruitment database. The procedure involved administration of a series of self-report measures and structured diagnostic interviews, including the CAPS. Interviewers were advanced psychology graduate students, postdoctoral psychology clinicians, and licensed clinical psychologists who received extensive training before data collection. All the interviews were videotaped, and 31% of the CAPS recordings were later viewed by a blinded independent rater for purposes of quality control and evaluating interrater reliability.

MEASURES

Clinician-Administered PTSD Scale

CAPS is a 30-item structured diagnostic interview that assesses the frequency and severity of the 17 *DSM-IV* PTSD symp-

toms and 5 associated features, including 3 dissociation symptoms (reduction in awareness of surroundings, derealization, and depersonalization). CAPS was used to determine current PTSD diagnostic status using a validated *DSM-IV* scoring rule.[26] Dimensional severity scores were calculated by summing the frequency and intensity ratings for each of the 17 items. CAPS has demonstrated excellent reliability and validity.[12,27]

The internal consistency of CAPS item severity scores in this study was high (Cronbach α coefficient = .91). Interrater reliability based on secondary ratings of CAPS video recordings was good (κ = 0.65) for current PTSD diagnoses and excellent for current severity score ratings (intraclass correlation coefficient = 0.98). In addition, intraclass correlation coefficients for the 3 dissociation items were high (mean = 0.79; range, 0.72-0.87).

Traumatic Life Events Questionnaire

The Traumatic Life Events Questionnaire[28] is a self-report measure that assesses exposure to 21 different events that meet the *DSM-IV* PTSD criterion A1 definition for a traumatic event. For each traumatic event endorsed, a follow-up question assesses whether the individual meets *DSM-IV* PTSD criterion A2. The number of times the event was experienced is also assessed on a 7-point scale ranging from "never" to "more than 5 times." The Traumatic Life Events Questionnaire exhibits good test-retest reliability over a 2-week interval (mean κ = 0.63, mean percentage agreement = 86%) and excellent content and convergent validity with interview-based measures of trauma exposure (mean percentage agreement = 92%) and is predictive of PTSD status.[28] In this study, we analyzed data only for traumatic events that met the *DSM-IV* PTSD criteria A1 and A2.

STATISTICAL ANALYSES

We first evaluated the distribution of the dissociation severity scores in the sample. Next, we used LPA to evaluate evidence for a dissociative subtype of PTSD. We submitted current (ie, past-month) item-level severity scores on CAPS to the LPA. These scores reflect the 17 core PTSD criteria and the 3 associated features of reduction in awareness of surroundings, derealization, and depersonalization. As individuals in the data set were nested in couples (meaning that not all observations were independent of one another), we specified this complex structure in the model script and used a robust covariance matrix estimator so that the standard errors would not be biased by the nonindependence of these observations.[29-31] We began by evaluating the fit of a 2-class model, and we systematically increased the number of latent classes in the model until it was evident that the addition of latent classes was not warranted. To determine this, we evaluated the following indices of comparative model fit. First, the *P* value associated with the Lo-Mendell-Rubin–adjusted likelihood ratio test[32] was evaluated; this statistic compares the fit of the specified class solution to a model with 1 less class. A $P < .05$ suggests that the specified model provides a better fit to the data relative to a model with 1 less class. In contrast, a $P \geq .05$ suggests that a more parsimonious class solution is favored (ie, fewer classes are needed to accurately reflect the data). An additional statistic, the bootstrap likelihood ratio test,[33] has been shown to outperform the Lo-Mendell-Rubin–adjusted likelihood ratio test in the selection of the correct number of classes,[34] but we were unable to evaluate this statistic as our efforts to account for the complex data structure meant that this statistic could not be produced by the statistical modeling program. We also evaluated the Bayesian information criterion,[35] which has been shown to perform well in simulation studies.[34] Lower relative values on the Bayesian information criterion indicate improved model fit. The LPA was conducted using the Mplus version 5.2 statistical modeling software.[36] After determining the best class solution, we used latent class membership as a between-subjects variable in 1-way analyses of variance (ANOVAs) and χ^2 analyses to examine demographic, trauma, and PTSD symptom differences among the latent classes.

RESULTS

RATES OF PTSD AND DISSOCIATION

Forty-two percent of the full sample (50% of the veterans and 20% of the partners) met the *DSM-IV* criteria for current PTSD, and 63% of the full sample (72% of the veterans and 38% of the partners) met the *DSM-IV* criteria for a lifetime diagnosis of PTSD. On CAPS dissociation items, 27.5% of the sample met the criteria for current reduction in awareness, 5.4% for depersonalization, and 7.2% for derealization. We evaluated the distribution of the 3 dissociation items and found that the scores on these items were not normally distributed (histograms are available from the first author). Specifically, 70% of participants received a score of 0 on the reduction in awareness item and more than 90% received a severity score of 0 on the derealization and depersonalization items.

LPA OF PTSD AND DISSOCIATION SYMPTOMS

The LPA was performed on the severity scores for the 17 *DSM-IV* PTSD symptoms and the 3 dissociation items. The 2- and 3-class models converged fully, but the 4-class model resulted in a failure to replicate the best log-likelihood value, despite increasing the number of random start values for this analysis. This finding suggests that a local maximum was reached (ie, the best overall solution for the analysis was not obtained), that the parameter estimates may be unreliable, and that the model had attempted to extract too many classes.[33] Based on this, we rejected the 4-class model, and the 2- and 3-class models were compared more closely. As seen in **Table 1**, the Lo-Mendell-Rubin–adjusted likelihood ratio test *P* value for the 3-class model was not significant (suggesting that the 3-class model was not superior to a 2-class model); however, other indicators suggested the superiority of the 3-class model. Specifically, the 3-class model yielded a lower Bayesian information criterion, higher entropy, and good discrimination among the classes. Given this pattern of results and evidence that the Bayesian information criterion is better than the Lo-Mendell-Rubin–adjusted likelihood ratio test at informing the best class solution,[34] we retained the 3-class model as the best-fitting one. In this model, 51% of participants were classified into group 1, 43% into group 2, and 6% into group 3. The mean probability of class membership was excellent and suggested good discrimination among the classes (0.98 for class 1, 0.98 for class 2, and 0.99 for class 3).

The **Figure** shows the profile of CAPS items as a function of the 3 latent classes. Class 1 tended to have very low scores on all symptoms, and classes 2 and 3 had higher

Table 1. Fit of Competing Models

Model	Log Likelihood	BIC	Entropy	LMR-A *P* Value
2 Class	−21 135.515	42 649.137	0.94	<.001
3 Class	−20 568.202	41 644.680	0.96	.35
4 Class	−20 311.698[a]	41 261.839	0.96	.67

Abbreviations: BIC, Bayesian information criterion; LMR-A, Lo-Mendell-Rubin–adjusted likelihood ratio test.
[a]The best log-likelihood value was not replicated despite increasing the number of random starts, which can be an indication that too many classes were extracted or that a local maximum was reached and the parameter estimates may not be reliable or replicable.

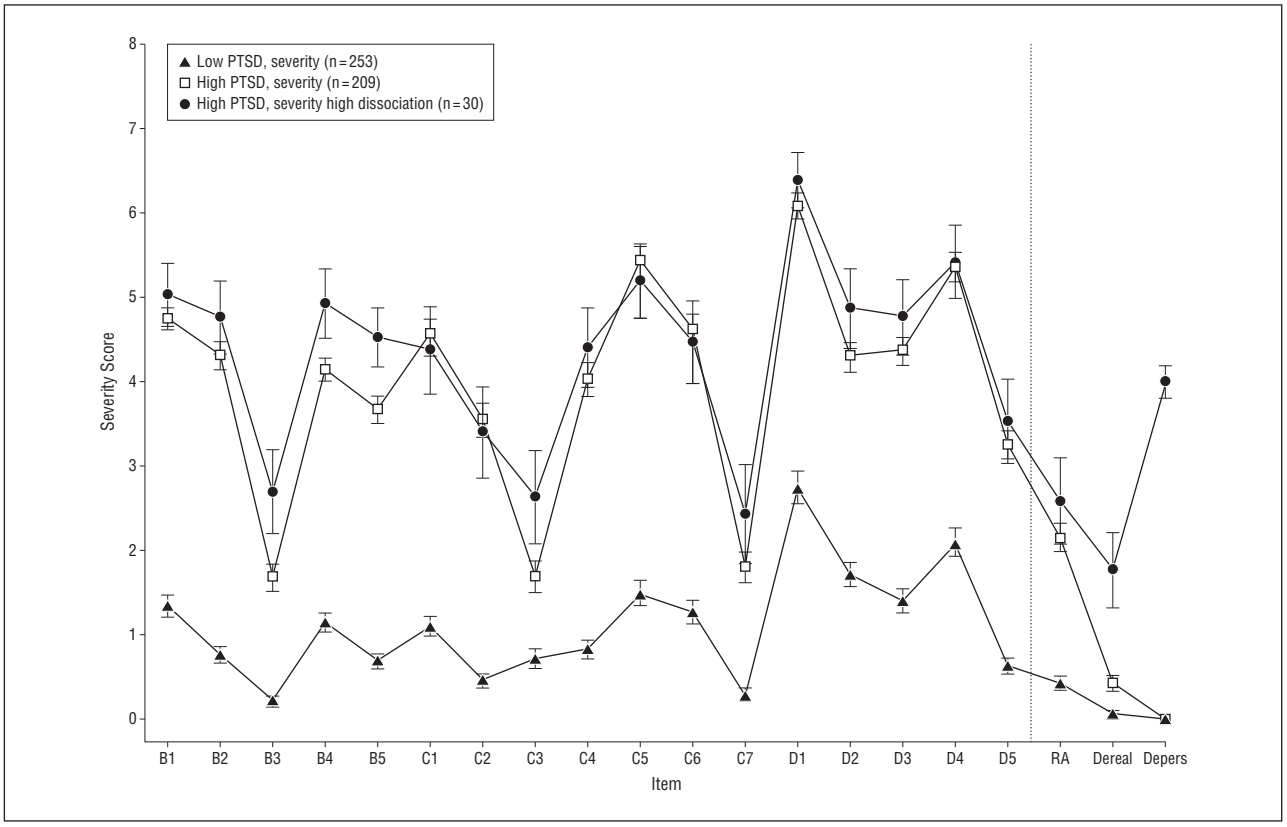

Figure. The pattern of mean posttraumatic stress disorder (PTSD) and dissociative symptom severity scores on Clinician-Administered PTSD Scale items as a function of latent class. Mean scores on PTSD criterion B3 and on the derealization (dereal) and depersonalization (depers) items differed significantly between the 2 high PTSD severity groups. There was a trend to suggest a significant difference between the 2 high PTSD severity groups on PTSD criteria C3 (P=.10) and B5 (P=.05). Error bars represent SE. RA indicates reduction in awareness.

scores on all the PTSD symptoms and seemed to primarily differ from one another in that class 3 scored higher on items reflecting derealization and depersonalization. Based on this pattern of results, we identified class 1 as the "low-PTSD" group, class 2 as the "high-PTSD" group, and class 3 as the "high-PTSD/high-dissociation" group. Almost 12% of individuals with a current diagnosis of PTSD were assigned to the latent dissociative group.

DIFFERENCES IN PTSD SYMPTOMS AS A FUNCTION OF LATENT CLASS MEMBERSHIP

We then used final class membership as a between-subjects variable in ANOVAs and χ^2 analyses evaluating differences in PTSD symptoms as a function of latent class membership. The ANOVAs evaluating mean symptom severity differences on each of the CAPS items as a function of latent class membership were all significant at the $P<.001$ level. Follow-up pairwise comparisons using Tukey tests revealed that most of the overall F tests were statistically significant as a function of the 2 high-PTSD groups evidencing higher mean severity on each item relative to the low-PTSD group. There were 3 instances in which pairwise comparisons revealed differences between the 2 high-PTSD groups. Specifically, the dissociative group evidenced a mean (SD) score on PTSD criterion B3 (flashbacks) (4.93 [2.27]) that was greater than that of the high-PTSD group (1.67 [2.28]), which was, in turn, greater than that of the low-PTSD group (0.21 [0.83]; overall $F_{2,489}=56.32$, $P<.001$). The dissociative group also had higher mean (SD) scores on derealization (1.76 [2.44]) relative to the high-PTSD group (0.42 [1.22]), with the latter group scoring higher than the low-PTSD group (0.06 [0.53]; overall $F_{2,481}=35.13$, $P<.001$). The dissociative group also evidenced higher mean (SD) ratings on depersonalization (4.0 [1.0]) relative to the high-PTSD group (0.01 [0.14]) and

Table 2. Trauma Exposure Differences in the 3 Latent Classes

Trauma Type[a]	Reporting Exposure, % (n = 492)	No. of Times Traumatic Event Occurred, Mean (SD)				ANOVA Results		
		Full Sample (n = 492)	Group 1: Low PTSD (n = 253)	Group 2: High PTSD (n = 209)	Group 3: High PTSD/High Diss (n = 30)	Overall *F* (*df*)	*P* Value	Pairwise Comparisons
Childhood sexual abuse	22	0.86 (1.92)	0.66 (1.65)	0.95 (2.02)	1.90 (2.81)	5.91 (2,482)	.003	3 > 2 and 1
Childhood physical abuse	35	1.73 (2.58)	1.29 (2.34)	2.28 (2.76)	1.67 (2.67)	8.32 (2,481)	<.001	2 > 1
Adult sexual abuse	15	0.37 (1.13)	0.24 (0.78)	0.44 (1.31)	0.97 (1.83)	6.34 (2,479)	.002	3 > 2 > 1
Physical abuse by partner	26	0.90 (1.83)	0.81 (1.71)	0.90 (1.83)	1.66 (2.58)	2.81 (2,485)	.06	NA
Combat	38	1.86 (2.61)	1.16 (2.20)	2.48 (2.78)	3.37 (2.92)	21.57 (2,486)	<.001	3 and 2 > 1
Armed robbery	29	0.53 (1.03)	0.46 (0.99)	0.62 (1.10)	0.47 (0.86)	1.38 (2,483)	.25	NA
Natural disaster	31	0.93 (1.66)	0.61 (1.35)	1.23 (1.85)	1.47 (2.08)	9.98 (2,485)	<.001	3 and 2 > 1
Motor vehicle accident	33	0.62 (1.11)	0.43 (0.84)	0.84 (1.33)	0.77 (1.22)	8.45 (2,485)	<.001	2 > 1
No. of different traumas	NA	7.07 (4.22)	5.91 (3.69)	8.11 (4.30)	9.70 (4.95)	23.77 (2,488)	<.001	3 and 2 > 1

Abbreviations: ANOVA, analysis of variance; Diss, dissociation; NA, not applicable; PTSD, posttraumatic stress disorder.
[a] Possible range of specific trauma exposure variables: 0 to 6. Possible range of number of different traumas: 0 to 23.

the low-PTSD group (0), which did not differ from one another (overall $F_{2,479}=3258.69$, $P<.001$).

Pairwise comparisons also revealed 2 instances in which the 2 high-PTSD groups tended to diverge from one another, although the mean differences did not reach the standard significance level of $P<.05$. Specifically, there was a statistical trend suggesting that the dissociative group scored higher on PTSD criterion B5 (trauma-cued physiologic reactivity) relative to the high-PTSD group (mean [SD]: 4.53 [1.93] vs 3.67 [2.30]; $P=.05$ by the Tukey comparison). Similarly, there was a trend suggesting that individuals from the dissociative group scored higher on PTSD criterion C3 (psychogenic amnesia) relative to the high-PTSD group (mean [SD]: 2.63 [3.03] vs 1.68 [2.70]; $P=.10$ by the Tukey comparison).

We next evaluated the extent to which rates of PTSD differed across the latent classes. The χ^2 analysis revealed no differences between the rate of current PTSD diagnosis among the 2 high-PTSD groups; however, the 2 high-PTSD groups evidenced higher rates of PTSD (80% of both groups) relative to the low-PTSD group (6%) (overall $\chi^2_{2,492}=276.42$, $P<.001$). Conversely, 11.65% of participants with a current diagnosis of PTSD were in the dissociative group. As 20% of the dissociative group did not meet the criteria for a current diagnosis of PTSD, we evaluated the severity of their symptoms and found that the mean (SD) CAPS severity score in those without PTSD in the dissociative group was 50.67 (15.38), which suggests significant PTSD symptoms even in those who did not meet the criteria for the diagnosis.

DEMOGRAPHIC AND TRAUMA EXPOSURE DIFFERENCES BETWEEN THE LATENT CLASSES

χ^2 Tests revealed demographic differences among the 3 latent classes (statistics available from the first author), but follow-up pairwise testing showed that these differences were limited to contrasts between the low- vs high-PTSD groups. No differences were noted between the 2 high-PTSD groups for sex, race, ethnicity, age (as determined by ANOVA), marital status, veteran status, era of service, military branch, involvement in mental health counseling, or use of psychiatric medications.

In contrast, differences between the 2 high-PTSD classes were found in comparisons of exposure to traumatic events that met the *DSM-IV* PTSD criteria A1 and A2 definition of a traumatic event. As seen in **Table 2**, ANOVAs revealed that individuals in the dissociative latent class reported more childhood (before age 13 years) sexual abuse and more sexual abuse as an adult (age ≥18 years) relative to the high- or low-PTSD classes. Differences between the 2 high-PTSD groups were specific to the sexual abuse variables; all other trauma exposure variables evidenced differences between the low- and high-PTSD classes only or no group differences at all.

ASSOCIATION BETWEEN DISSOCIATION AND PTSD SEVERITY

We also examined correlations between overall PTSD severity (a summary score of the 17 PTSD items on CAPS), the PTSD symptom cluster severity scores (ie, reexperiencing, avoidance and numbing, and hyperarousal), dissociation severity (a summary score of the 3 dissociation items), and severity scores on the 3 individual dissociation items. As seen in **Table 3**, overall PTSD severity was moderately correlated with severity scores for the reduction in awareness item ($r=0.46$, $P<.001$) but showed weak associations with the derealization and depersonalization CAPS items ($r=0.27$ and $P<.001$ for both). Neither derealization nor depersonalization correlated strongly with any of the PTSD symptom clusters (strongest $r=0.27$), whereas the PTSD symptom clusters showed high levels of covariation with each other

Table 3. Pearson Correlations Among PTSD and Dissociative Symptoms

Symptom	1	2	3	4	5	6	7
PTSD severity							
B Sx	0.87						
C Sx	0.92	0.70					
D Sx	0.88	0.67	0.71				
Dissociation Sx[a]	0.50	0.42	0.46	0.46			
Reduction in awareness	0.46	0.36	0.43	0.44	0.84		
Derealization	0.27	0.23	0.26	0.23	0.68	0.30	
Depersonalization	0.27	0.27	0.23	0.22	0.54	0.13	0.33

Abbreviations: B, reexperiencing; C, avoidance and numbing; D, hyperarousal; PTSD, posttraumatic stress disorder; Sx, symptoms.
[a]The dissociation Sx variable is a summary score of the 3 individual dissociation items evaluated in this study.

(mean $r=0.69$). The dissociation severity summary score showed moderate associations (in the $r=0.42$-0.50 range) with each PTSD variable, but this seemed to be largely affected by scores on the reduction in awareness item relative to scores on the depersonalization and derealization items. This was evidenced by the greater magnitude of association between the reduction in awareness item and the dissociation summary score ($r=0.84$) relative to that for depersonalization ($r=0.54$) or derealization ($r=0.68$).

LPA OF PTSD AND DISSOCIATION SYMPTOMS IN INDIVIDUALS WITH CURRENT PTSD

Finally, we also conducted the LPA in the subset of participants who met the *DSM-IV* criteria for current PTSD (n=206). We conducted this analysis in a manner analogous to the main analyses, controlling for the nonindependence of individuals nested in the same couple. The results were unchanged from those using the full sample, and the percentage of individuals in the dissociative group was equivalent to that for individuals with PTSD when evaluated in the full sample. Specifically, the analysis of participants with current PTSD suggested that 49% of this group was classified into a moderate-PTSD group, 40% into a high-PTSD group, and 11.5% into a high-PTSD/high-dissociative group (details available from the first author).

COMMENT

This study examined the nature of the association between symptoms of dissociation and PTSD. A latent class analysis of CAPS data drawn from a sample of trauma-exposed veterans and their partners yielded evidence for a 3-class solution: a low PTSD severity class, a high PTSD severity class, and a small (n=30 or 6% of the entire sample) but distinctly dissociative class. The latter group was characterized by severe PTSD symptoms combined with significant CAPS elevations on items assessing flashbacks, derealization, and depersonalization. Individuals in this subgroup also endorsed greater exposure to childhood and adult sexual trauma compared with the other 2 groups, suggesting a possible etiologic link with the experience of repeated sexual trauma. Eighty percent of individuals in the dissociative class met the criteria for current PTSD, and this subgroup represented approximately 12% of participants with a current diagnosis of PTSD.

The findings of this study contribute to a growing body of research suggesting that dissociative symptoms are symptomatic of a distinct subtype (or taxon) of individuals with posttraumatic psychopathology. This study replicates and extends findings reported by Waelde et al,[9] who performed taxometric analyses of DES scores and found evidence for a dissociative subtype characterized by elevated levels of PTSD. As in this study, the proportion of the overall sample assigned to the dissociative taxon was small (9.5% compared with 6% in this study), although the proportion in the subsample of those with PTSD was higher in that study (32% in the study by Waelde et al; 12% in this study). One possible explanation for this difference is that the study by Waelde et al used the DES as the measure of dissociation, which has been shown to be sensitive to nonpathologic forms of dissociation. This might inflate the percentage of individuals assigned to the dissociative class relative to the present study, which was based on a clinician-rated measure of dissociation.

Analyses that examined the bivariate associations between PTSD symptom clusters and dissociation showed weak correlations between PTSD and the derealization and depersonalization items, which largely defined the dissociative subtype. In contrast, the PTSD symptom clusters showed high levels of intercorrelation. This pattern of results seems inconsistent with the notion that dissociation is an essential facet of PTSD for all or most individuals with the disorder since that hypothesis would predict that dissociation and PTSD symptoms would be more highly intercorrelated. Instead, the present results suggest that dissociation is highly salient for a subset of individuals with PTSD. Previous studies that have evaluated the evidence for a linear relationship between PTSD and dissociation have yielded mixed results, with some studies[5,37-40] showing a strong correlation between symptoms of dissociation and PTSD (ie, in the $r=0.60$ range) and other work[20] not demonstrating this association. Future research should aim to clarify the relationship between PTSD and dissociation using psychometric methods for establishing the convergent and discriminant validity of psychological constructs.

This study could not address questions about the extent to which the dissociative subtype was associated with

poorer response to PTSD treatment. Although this subtype would be expected to have difficulty accessing and processing the trauma-related memory and emotions that are common elements of successful PTSD treatment,[3,4] research designed to evaluate this hypothesis has not found support for it.[41] Specifically, work by Hagenaars et al[41] demonstrated that although individuals with PTSD and high levels of dissociation tended to score higher on PTSD severity before and after treatment relative to individuals who scored low on dissociation and were also more likely to retain the PTSD diagnosis after treatment, both groups responded equally well to PTSD treatment. In other words, there was no evidence for a group × time interaction effect; this type of interactive effect is necessary to demonstrate that individuals in the dissociative class were less responsive to PTSD treatment. However, failure to find an association between dissociation and treatment response cannot conclusively demonstrate the lack of such an association (ie, prove the null hypothesis); therefore, additional study of this issue is warranted.

Although all the dissociation items that were evaluated in this study occurred rarely in the sample, only derealization and depersonalization distinguished the dissociative group from the other groups, and we did not find an association with emotional numbing as predicted by some models of dissociation.[10] CAPS item reflecting a reduction in awareness was endorsed more frequently than the other 2 dissociative items and was associated with the high-PTSD and the dissociative groups, whereas derealization and depersonalization were characteristic of the dissociative group only. This finding suggests that it is important to distinguish between normative and pathologic dissociation. Normative dissociation has been linked to the construct of absorption[42] and is conceptualized as a cognitive trait that is distributed normally in the population. In contrast, derealization and depersonalization reflect a pathologic form of dissociation associated with psychiatric diagnoses and functional impairment.[24] In the present study, these symptoms co-occurred with flashbacks and were linked to greater reports of sexual abuse. This pattern of results is broadly consistent with Janet's[43] original conceptualization of the distinction between pathologic and nonpathologic dissociation and the etiologic role of early trauma in the former.

The findings of this study should be considered in light of its limitations. The dissociation assessment was limited to items contained in CAPS, so its scope was circumscribed compared with longer measures, and it would have been useful to evaluate the robustness of these findings using a supplementary measure of dissociation. Another limitation was that trauma was assessed retrospectively via self-report, so conclusions about causal links to dissociation should be interpreted with caution. In addition, not all participants in the study met the criteria for a current or lifetime PTSD diagnosis, and this raises questions about the specificity of these results to the PTSD population and suggests that the dissociative group may be more accurately described as a subtype of individuals with posttraumatic psychopathology. However, evidence that the same pattern of results emerged when evaluated in the subsample of individuals with current PTSD should help mitigate this concern and demonstrate the relevance of the subtype to the PTSD population specifically. Study generalizability was limited by the exclusive focus on veterans and their partners, and it is possible that the inclusion of nonindependent observations may have affected the results, despite efforts to account for this statistically. Finally, it is possible that the low base rate of dissociative symptoms in this sample restricted the range of scores on such symptoms, resulting in an attenuated relationship between dissociation and PTSD. Despite these limitations, the findings of this study provide empirical support for a small but distinct dissociative subtype of PTSD defined by marked elevations in depersonalization, derealization, and flashbacks combined with greater reports of childhood and adult sexual trauma.

Submitted for Publication: August 11, 2011; final revision received October 17, 2011; accepted October 30, 2011.
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Financial Disclosure: None reported.
Funding/Support: Funding for this study was provided by National Institute of Mental Health award RO1 MH079806 and a VA Merit Review grant (Dr Miller) and by a VA Career Development Award (Dr Wolf).

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