Dissociation and Posttraumatic Stress Disorder: A Latent Profile Analysis

by

Christy Aleene Blevins

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Approved by

Frank W. Weathers, Chair, Professor, Department of Psychology
Malissa A. Clark, Assistant Professor, Department of Psychology
Christopher J. Correia, Professor, Department of Psychology
Tracy K. Witte, Assistant Professor, Department of Psychology

Abstract

The relationship between dissociation and posttraumatic stress disorder (PTSD) has been well-established in the scientific literature. However, the exact nature of this relationship remains the subject of debate. Recent evidence has suggested the existence of a dissociative subtype of PTSD characterized by significant depersonalization and derealization symptoms. In this study the dissociative subtype was examined using latent profile analysis in a sample of 541 trauma-exposed college students. Items from the PTSD Checklist (PCL; Weathers et al., 1993) and Multiscale Dissociation Inventory (MDI; Briere, 2002) were used as latent class indicators. Results supported a three-class solution including a well-adjusted group, PTSD group, and dissociative group, the latter of which was characterized by elevated PTSD, depersonalization, and derealization symptoms. Significant differences were found among the groups on a number of measures of related psychopathology. Diagnostic and treatment implications regarding the dissociative subtype are discussed.

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Introduction

Dissociation is a disruption in the normal integration of consciousness, memory, identity, or the perception of self or the environment (American Psychiatric Association, 2000, *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition, text revision). Dissociative symptoms include but are not limited to depersonalization (e.g., a disruption in the perception of self), derealization (e.g., a disruption in the perception of the environment), and amnesia (e.g., a disruption in memory). Dissociation has been associated with a variety of mental disorders such as panic (Cox & Swinson, 2002), borderline personality disorder (Zanarini, Ruser, Frankenburg, & Hennen, 2000), and mood disorders (Mula, Pini, & Cassano, 2007). However, most historical and contemporary research has focused on the relationship between dissociation and psychological trauma, beginning with the classic work of Pierre Janet in the late 19th century, who ascribed a central role to dissociation in his investigation of posttraumatic symptomatology (Gershuny & Thayer, 1999; van der Kolk, 2007).

In the past several decades studies have consistently identified a strong association between dissociation and exposure to a wide variety of trauma types, including combat (Bremner et al., 1992), natural disaster (Cardeña & Spiegel, 1993), motor vehicle accidents (Murray, Ehlers, & Mayou, 2002), and physical and sexual assault (Chu, Frey, Ganzel, & Matthews, 1999; Briere & Runtz, 1988). In the context of life-threatening traumatic events, dissociation is considered an adaptive strategy to cope with overwhelming affect through cognitive and emotional distancing (Gershuny & Thayer, 1999). However, continued reliance on dissociation may result in a profound sense of disconnection from others (van der Kolk, van der Hart, &

Marmar, 1996) and interference in the emotional processing of trauma-related information, which may contribute to other posttraumatic sequelae, including posttraumatic stress disorder (PTSD; Foa & Hearst-Ikeda, 1996).

Dissociation, PTSD, and *DSM*

The relationship between dissociation and PTSD is well-established in the scientific literature (for a review, see Carlson, Dalenberg, & McDade-Montez, 2012). Like dissociation, PTSD is a traumatic stress response characterized by several clusters of symptoms, including persistent re-experiencing of the traumatic event, avoidance of trauma-related cues, numbing of general responsiveness, and hyperarousal (APA, 2000). Dissociation occurring during a traumatic event has been identified as a major risk factor in the development of PTSD (e.g., Ozer, Best, Lipsey, & Weiss, 2003; but see Marshall & Schell, 2002). Persistent dissociation occurring after a traumatic event also has been indicated in the development of PTSD (Briere, Scott, & Weathers, 2005; Panasetis & Bryant, 2003). In a recent review, Carlson et al. (2012) reported that 11 of 13 studies found significantly higher dissociative symptom severity in trauma-exposed individuals with versus without PTSD.

Despite the strong link between dissociation and PTSD, dissociation is included only as an associated feature of PTSD in *DSM-IV* and is not part of the diagnostic criteria per se. This decision grew out of a debate over so-called complex PTSD. A number of investigators have criticized the PTSD criteria for not adequately capturing the complex symptom presentation of some trauma survivors, particularly those exposed to prolonged interpersonal trauma (e.g., Herman, 1992; van der Kolk & Courtois, 2005). This led to an empirical investigation of complex PTSD during the *DSM-IV* field trials. First proposed by Herman (1992), complex PTSD is a broader construct that includes dissociation, somatization, impaired affect regulation, and

interpersonal problems, in addition to the core PTSD symptoms. Although the *DSM-IV* work group decided not to include complex PTSD as a separate diagnostic entity, the resulting compromise was the inclusion of several complex PTSD symptoms, including dissociation, as associated features of PTSD (Dalenberg, Glaser, & Alhassoon, 2012).

The debate about complex PTSD in the diagnostic nomenclature has resurfaced with the development of *DSM-5*, and was the focus of a recent special issue of the *Journal of Traumatic Stress* (see Weiss, 2012; Resick et al., 2012). As with *DSM-IV*, *DSM-5* does not include complex PTSD as a diagnostic category. However, a dissociative subtype has been added to the PTSD criteria to help address the heterogeneity in posttraumatic symptomatology and improve diagnostic precision (Resick et al., 2012; Friedman et al., 2011). Because prominent dissociation in the clinical presentation of PTSD has been shown to negatively impact treatment outcome (e.g., Jaycox, Foa, & Morral, 1998; Cloitre, Petkova, Wang, & Lu, 2012), the dissociative subtype was added with the hope that it would better inform treatment decisions (Lanius et al., 2010).

Studies of PTSD Dissociative Subtype

The inclusion of a PTSD dissociative subtype in *DSM-5* was based on two broad categories of evidence that correspond to Dalenberg et al.'s (2012) two main requirements for establishing a subtype. The first category of evidence includes studies examining underlying biological differences in dissociative and nondissociative groups of trauma-exposed individuals. Findings from these studies satisfy the "mechanism requirement" proposed by Dalenberg et al. (2012), which states that subtype verification requires evidence of meaningful distinctions between disorder subtypes on underlying biological mechanisms. Several studies by Lanius and colleagues (e.g., Lanius et al., 2001; 2002; 2010) found that PTSD patients who experienced

self-reported dissociative reactions in response to trauma-related imagery had a neurological and psychophysiological pattern distinct from those who self-reported predominately re-experiencing and hyperarousal reactions. Specifically, about 70% of PTSD patients reported subjective re-experiencing and had increased heart rate during the traumatic imagery provocation while the remaining 30% reported subjective depersonalization and derealization and had no change in heart rate. In these studies, self-reported dissociative reactions were accompanied by heightened activation in regions of the prefrontal cortex and subsequent inhibition of emotional processing in the limbic system. In contrast, re-experiencing reactions were accompanied by abnormally low prefrontal activation and increased activation of the limbic system (Lanius et al., 2010). Similar findings from other neurological and psychophysiological studies indicate distinct neural correlates and autonomic responses between PTSD patients responding to trauma-related cues with dissociative versus re-experiencing reactions (e.g., Hopper, Frewen, van der Kolk, & Lanius, 2007; Griffin, Resick, & Mechanic, 1997).

The second category of evidence includes studies using statistical procedures to classify individuals into groups based on self-reported PTSD and dissociative symptoms, and then comparing the purported groups with respect to relevant external correlates. Findings from these studies satisfy the "structural requirement" proposed by Dalenberg et al. (2012), which states that subtype verification requires evidence of meaningful distinctions between subtypes on the structure of the disorder's symptoms. One commonly used method to identify groups is the median split technique, in which individuals are categorized into "high" and "low" groups based on whether their score on a target measure falls above or below the sample median. This method is limited in that it does not address the homogeneity of individuals classified as high or low and is difficult to compare across studies because it depends on the sample median (Pastor, Barron,

Miller, & Davis, 2007). Cluster analysis is another commonly used method to examine disorder subtypes in which a set of numerical procedures is used to create groups that are not known a priori and which minimize differences within clusters and maximize differences between clusters (Dalenberg et al., 2012; Pastor et al., 2007). Although several studies have used cluster analysis to examine PTSD based on multiscale psychopathology and personality scales (e.g., Taylor, Asmundson, & Carleton, 2006), none have specifically focused on a dissociative subtype. Limitations to cluster analysis include the lack of objective procedures for determining the number of clusters and the requirement that all variables be transformed to the same scale (Pastor et al., 2007; Dalenberg et al., 2012).

Another statistical method that has been used to identify groups of disordered individuals is the taxometric approach introduced by Meehl (e.g., Meehl, 1992). As noted by Dalenberg et al. (2012), taxometric procedures evaluating the PTSD dissociative subtype test the more restrictive hypothesis that the latent structure of dissociation is dichotomous versus continuous, with the implication that a dichotomous structure supports separate classes of individuals. Waller and Ross (1997) conducted a taxometric analysis of PTSD patients using items from the Dissociative Experience Scale (DES; Bernstein & Putnam, 1986), a widely used self-report measure of dissociation, and found that a minority of PTSD patients reported elevated dissociative symptoms. The authors interpreted this finding as evidence of a dissociative taxon (and thus supporting the subtype hypothesis), although several study limitations, including the exclusion of non-PTSD patients, have been noted by other investigators as challenging this interpretation (Waelde, Silvern, & Fairbank, 2005; see also Watson, 2003). Extending the work of Waller and Ross (1997), Waelde et al. (2005) conducted another taxometric analysis of DES items in a sample of trauma-exposed veterans with varying degrees of PTSD symptom severity.

Findings from this study suggested that DES scores were best represented by a discontinuous distribution and that a distinct subgroup of veterans at the elevated end of the distribution also presented with elevated PTSD symptoms.

Latent profile analysis (LPA) is a contemporary alternative to traditional cluster analytic and taxometric procedures. Similar to cluster analysis, LPA is a multivariate technique aimed to identify subgroups of individuals based on similarities in their responses to a set of continuous observable indicators (Vermunt & Magidson, 2002). LPA is a person-centered approach in which the relationship among people is of primary interest, as opposed to variable-centered approaches in which the relationship among variables or items is of interest (e.g., factor analysis) (Pastor et al., 2007). Unlike traditional methods, LPA is a model-based procedure in which observed data are used to estimate model parameters. LPA is a type of mixture modeling which assumes data are generated by a mixture of probability distributions, one for each latent class. The main parameters estimated in LPA are class size and item response. For each latent class, means, variances, and covariances are estimated, although most LPA research focuses on classes that differ with respect to means. LPA parameters are generated using maximum likelihood estimation where several parameter sets are "tried out" and evaluated based on an associated likelihood value that indicates the probability of observing the sample data given a particular parameter set. The final parameter estimates are those associated with the highest likelihood value (Vermunt & Magidson, 2002). LPA is considered advantageous to cluster analysis and other traditional methods mainly because it is model-based and not sample dependent. Additionally, LPA provides objective statistical tests to determine model identification and comparison and does not require variables to be on the same scale (Pastor et al., 2007).

Wolf, Miller, et al. (2012) conducted the first published LPA study examining dissociation and PTSD in a sample of trauma-exposed veterans and their intimate partners. The 17 PTSD symptom and 3 dissociative symptom items from the Clinician-Administered PTSD Scale (CAPS; Blake et al., 1995) were used as latent class indicators. The best fitting class solution included three latent groups: a low PTSD/low dissociation group, high PTSD/low dissociation group, and high PTSD/high dissociation group. The dissociative group included 6% of the full sample and 12% of the subset of the sample meeting criteria for PTSD. The high PTSD and dissociative groups differed with respect to flashbacks, depersonalization, and derealization, with the dissociative group obtaining significantly higher symptom severity scores on these three items. Membership in the dissociative group also was associated with a higher prevalence of child and adult sexual trauma.

Support for a similar three-class solution was found in another LPA study with two independent samples of male and female veterans (Wolf, Lunney, et al., 2012). In the male sample, the dissociative group, which included 15% of the sample, differed from the PTSD group with higher scores on CAPS items assessing exaggerated startle, depersonalization, and derealization. No group differences were found with regard to personality disorder comorbidity or combat exposure severity. In the female sample, the dissociative group (30% of the sample) was discriminated from the PTSD group by lower scores on two CAPS items assessing reexperiencing symptoms (i.e., trauma-cued psychological distress and physiological reactivity) and higher scores on four depersonalization and derealization items from the Trauma Symptom Inventory (TSI; Briere, 1995). Compared to the PTSD group, female veterans in the dissociative group had a higher prevalence of comorbid avoidant and borderline personality disorders but not

sexual trauma exposure. The authors note that high symptom severity and base rate of sexual trauma in this sample may have obscured statistically significant group differences.

Extending empirical support for the dissociative subtype to a female civilian sample, Steuwe, Lanius, and Frewen (2012) submitted CAPS items to LPA and found a similar 3-class solution with moderate PTSD/low dissociation, high PTSD/low dissociation, and high PTSD/high dissociation groups. The dissociative group, including 26% of the sample, was discriminated from the high PTSD group by higher symptom severity scores on the two CAPS items assessing depersonalization and derealization but not on any of the items assessing core PTSD symptoms. It should be noted, however, that the CAPS item assessing psychogenic amnesia was excluded from analyses based on the rationale that it is unclear whether amnesia is a dissociative or core PTSD symptom. Group differences may have emerged on this item had it been included. Lastly, the dissociative group had higher prevalence of physical and sexual abuse, and higher comorbidity with depression and specific phobias, compared to the other two groups. This is in line with findings from Wolf, Miller, et al. (2012) and the broader literature suggesting a strong association between dissociation and interpersonal trauma (e.g., Herman, 1992).

In sum, LPA studies examining PTSD and dissociation have converged on a three-class solution characterized by low to moderate PTSD/low dissociation, high PTSD/low dissociation, and high PTSD/high dissociation groups. The dissociative group consistently included a minority of the sample across studies, ranging from 6% (Wolf, Miller, et al., 2012) to 30% (Wolf, Lunney et al., 2012). Findings were mixed with regard to which, if any, PTSD symptoms differentiated the latent groups. Compared to the high PTSD group, individuals in the dissociative group scored higher on items assessing flashbacks (Wolf, Miller, et al., 2012) and exaggerated startle (male sample; Wolf, Lunney, et al., 2012), and lower on items assessing cued emotional distress and

physiological reactivity (female sample; Wolf, Lunney, et al., 2012). No differences in PTSD symptoms were found among the PTSD and dissociative groups in Steuwe et al. (2012).

Present Study

The present study sought to replicate previous findings regarding a PTSD dissociative subtype in a sample of trauma-exposed college students. Two of the three previous LPA studies included only individuals meeting criteria for PTSD with relatively severe symptom severity. Examining a dissociative subtype with individuals endorsing posttraumatic symptoms across the full range of severity with different types of trauma exposure is warranted (Steuwe et al., 2012). Another limitation of existing LPA studies is reliance on a few dissociation items embedded in instruments primarily intended to assess PTSD. Three studies used two or three CAPS items and one study (i.e., the second study in Wolf, Lunney, et al., 2012) used four items from the TSI as latent class indicators of dissociation. Use of a dedicated and more comprehensive measure of dissociative symptoms may improve the ability of LPA to classify individuals into correct groups. Thus, to address this limitation, the present LPA study included five depersonalization and five derealization items from the Multiscale Dissociation Inventory (MDI; Briere, 2002), a focal measure of dissociative symptomatology.

A second aim of the present study was to examine differences among the groups identified in the LPA. Group differences in the overall severity and pattern of PTSD and depersonalization/derealization symptoms were examined using profile analysis, a procedure based on repeated measures multivariate analysis of variance (MANOVA). Profile analysis allows for the evaluation of both a level effect (main effect for group) as well as a departure from parallelism (group by item interaction). Given the current lack of consensus regarding which PTSD symptoms differentiate the dissociative group, this symptom level examination is

warranted. A final aim of the present study was to examine group differences on several external measures assessing a range of related psychopathology and personality features. Based on available theoretical and empirical evidence, the following hypotheses were posited:

Hypothesis 1: An LPA of PCL and MDI items will best support a three-class solution, yielding low PTSD/low dissociation (well-adjusted), high PTSD/low dissociation (PTSD), and high PTSD/high dissociation (dissociative) groups.

Hypothesis 2: A Group X Item profile analysis of the PCL will demonstrate a significant level effect, such that relative to the well-adjusted group the PTSD and dissociative groups will have higher overall PTSD severity. A significant departure from parallelism also is expected, such that relative to the PTSD group the dissociative group will have higher scores on PTSD symptoms most conceptually related to dissociation, especially flashbacks and amnesia.

Hypothesis 3: A Group X Item profile analysis of MDI items will demonstrate a significant level effect, such that relative to the PTSD and well-adjusted groups the dissociative group will have higher dissociative severity. A significant departure from parallelism also is expected, such that relative to the PTSD group the dissociative group will have higher scores on MDI items describing more severe forms of depersonalization/derealization (e.g., out of body experiences), but comparable scores on MDI items describing less severe depersonalization/derealization and items that overlap with PTSD emotional numbing symptoms.

Hypothesis 4: Based on an empirical review of the literature examining the associations among PTSD, depersonalization/derealization, and related constructs (e.g., McDevitt-Murphy, Weathers, Adkins, & Daniels, 2005; Blevins, Weathers, & Mason, 2012), it is hypothesized that a) relative to the well-adjusted group the PTSD and dissociative groups will have higher overall levels of comorbidity; b) relative to the PTSD group the dissociative group will have higher

scores on scales measuring constructs closely related to dissociation, including borderline personality features, somatization, and facets of the schizophrenia spectrum; and c) the PTSD and dissociative groups will not differ on scales measuring constructs less associated with either dissociation or PTSD, including mania and antisocial personality features.

Method

Participants and Procedure

Participants were 541 undergraduates enrolled in psychology courses at a large public university in the southeastern United States. The study was approved by the university institutional review board. Participants were recruited for participation via the university's online experimental management system using an advertisement that described the study as involving the assessment of stressful life events. For inclusion in the final analyses, participants were required to endorse at least one event meeting *DSM-IV* PTSD Criterion A1on the Life Events Checklist (LEC), the self-report trauma assessment of the Clinician-Administered PTSD Scale (CAPS; Blake et al., 1995). Criterion A1 specifies exposure to an event that "involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others" (APA, 2000).

Measures were administered via Qualtrics, an online survey administration software. After providing informed consent, participants completed a self-report battery including a brief demographics form, the LEC, and several measures of PTSD and dissociation. A subset of participants also were administered a multiscale measure of psychopathology and personality traits. All participants were compensated with extra credit for completing the study. A subset of the current sample has been reported in a previous study (Blevins et al., 2012).

Measures

Indicators of latent class. PTSD symptom severity was assessed using the specific version of the PTSD Checklist (PCL; Weathers et al., 1993). The PCL is a 17-item self-report measure with items corresponding to the 17 *DSM-IV* symptoms of PTSD. Respondents indicate how much they have been bothered by each symptom in the past month on a five-point likert scale (1 = *not at all*, 5 = *extremely*). The PCL is one of the most widely used self-report measures of PTSD symptom severity and has demonstrated excellent psychometric properties (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996; Ruggiero, Del Ben, Scotti, & Rabalais, 2003). Dissociation was assessed using five depersonalization and five derealization scale items of the Multiscale Dissociation Inventory (MDI; Briere, 2002). The MDI is a 30-item measure with six scales assessing different aspects of dissociation including depersonalization, derealization, disengagement, emotional constriction, memory disturbance, and identity dissociation. Respondents indicate symptom frequency in the past month on a five-point likert scale (1 = *never*, 5 = *very often*). Available reliability and validity evidence for the MDI supports its psychometric merit (Briere, 2002; Briere, Weathers, & Runtz, 2005; Blevins et al., 2012). The decision to include only those 10 MDI items assessing depersonalization and derealization as latent class indicators was based on several factors, including better comparison with previous subtype studies, all of which defined dissociation using depersonalization and derealization items, and correspondence with *DSM-5* proposed criteria for a PTSD dissociative subtype, which specifies the presence of prominent depersonalization or derealization (APA, 2010).

Correlates of class membership. As previously mentioned, the LEC was used to assess trauma exposure. The LEC includes a list of 17 categories of potentially traumatic events and respondents indicate whether they have experienced, witnessed, learned about, or were never

exposed to each event category. The LEC has demonstrated acceptable psychometric properties in an undergraduate sample (Gray, Litz, Hsu, & Lombardo, 2004).

The Dissociative Experiences Scale (DES; Bernstein & Putnam, 1986) and Cambridge Depersonalization Scale (CDS; Sierra & Berrios, 2000) were administered as additional, external measures of dissociation to compare latent classes. The DES is a 28-item self-report measure of identity and memory disturbances, absorption, and depersonalization. Respondents indicate the frequency of each symptom from 0% to 100% in increments of 10%. Several factor analytic studies of the DES have converged on a three-factor structure including amnesia, absorption, and depersonalization factors (for a review, see Stockdale, Gridley, Balogh, & Holtgraves, 2002). The present study included DES total and subscale scores as external correlates. The CDS is a 29-item self-report measure based on a broader conceptualization of depersonalization that includes not only feelings of unreality and detachment but also emotional numbing, loss of feelings of agency, changes in body experience, and perceptual distortions. Respondents indicate frequency (0 = *never* to 4 = *all the time*) and duration (1 = *few seconds* to 6 = *more than a week*) for each symptom. Although previous factor analytic studies proposed four- and five- factor models for the CDS, a recent structural study found support for a more parsimonious two-factor model with an unreality factor similar to *DSM* definitions of depersonalization and derealization and a numbing factor describing attenuated physical and emotional sensations and changes in memory and sense of time (Blevins, Witte, & Weathers, 2013). The unreality and numbing subscales derived from the CDS two-factor model were analyzed in the present study.

A subset of participants (n = 252) also were administered the Personality Assessment Inventory (PAI; Morey, 2007), a 344-item multiscale inventory assessing a broad range of psychopathology and personality traits. Respondents rate each item on a 4-point likert scale

(*False* to *Very True*). The PAI scales have consistently demonstrated high internal consistency, reliability, and convergent and discriminant validity (Morey, 2007). The following PAI clinical scales were analyzed as correlates of class membership: Somatic Complaints (SOM), Anxiety (ANX), Anxiety Related Disorders (ARD), Depression (DEP), Mania (MAN), Paranoia (PAR), Schizophrenia (SCZ), Borderline Features (BOR), Antisocial Features (ANT), Alcohol Problems (ALC), and Drug Problems (DRG).

Analytic Strategy

Data analyses were conducted in three phases. In the first phase, the 17 PCL items and 10 MDI depersonalization and derealization items were submitted to latent profile analysis (LPA) using the Mixture Modeling procedure in Mplus Version 6.1. Robust Maximum Likelihood (MLR) was selected as the estimation procedure given the skew of PCL and MDI items in this sample and the robustness of MLR to violations of non-normality (Brown, 2006). For this phase of analysis, missing data were addressed using full information maximum likelihood (FIML). Missing data patterns indicated an acceptable rate of covariance coverages (ranging from 98.0% to 99.8%) given the study sample size (Enders & Bandalos, 2001).

Initial decisions regarding which class models to examine were informed by findings from three previous LPA studies examining a dissociative subtype of PTSD, all of which found support for a three-class model. Thus, a three-class model was specified and compared to models with two and four classes. The following relative model fit indices were evaluated: Bayesian information criterion (BIC; McLachlan & Peel, 2000), with lower values indicating better model fit, and the *P*-values associated with the Vuong-Lo-Mendell-Rubin adjusted likelihood ratio test (LRT-A; Lo, Mendell & Rubin, 2001) and bootstrapped likelihood ratio test (BLRT; Nylund, Asparouhov, & Muthén, 2007). Statistically significant *P*-values for LRT-A and BLRT suggest

that the specified model provides better data fit compared to a model with one less class. In addition to the relative fit indices, class models were compared with regard to entropy, an index of classification quality, the uniqueness of each profile, and theoretical considerations.

In the second phase of data analysis, latent class membership was used as a between-subjects variable in profile analysis (Tabachnick & Fidell, 2013) to compare overall group differences in PCL and MDI depersonalization and derealization severity scores. Profile analysis, which is based on repeated measures multivariate analysis of variance (MANOVA), tests for a level effect (main effect for group) and departure from parallelism (group by item interaction). In this study, a significant level effect would indicate group differences in overall PTSD or depersonalization/derealization symptom severity, and a significant departure from parallelism would indicate group differences in the pattern of PTSD or depersonalization/derealization symptoms.

In the third phase of data analysis, significant level effects or departure from parallelism among the groups on PCL and MDI depersonalization items were followed up with a series of one-way analysis of variance (ANOVA) and pairwise comparisons. In addition, ANOVAs and follow-up pairwise comparisons were conducted to examine group differences among the latent classes on a number of external correlates, including dissociation scales not included in the LPA (i.e., DES, CDS, and other MDI scales) and PAI clinical scales and subscales. Both profile analyses and ANOVAs were conducted using SPSS Version 20 following the guidelines of Meyers, Gamst, and Guarino (2013) and Tabachnick and Fidell (2013). Variables with missing data at these analytic phases were addressed by multiple imputation. Overall level of missing data was minimal. Thirty-nine percent of cases were missing data on at least one variable, and missing data were considered missing completely at random. Following guidelines in Bodner

(2008), twenty-four complete datasets were generated and pooled. Profile analysis and one-way ANOVA results discussed below are based on the pooled dataset.

Results

Descriptive Statistics

The majority of the sample was female (67%) and Caucasian (80%) or African American (13%). Ages ranged from 18 to 32 years (M = 20.21; SD = 1.64). Based on responses to the LEC, trauma types represented in the sample included sudden violent or unexpected death (30%), transportation or other serious accident (22%), physical or sexual assault (18%), life-threatening illness or injury (10%), natural disaster (7%), and other (13%). Sixty-four percent of participants reported experiencing the traumatic event, 27% reported witnessing it, and 18% reported learning about it.

Latent Profile Analysis

To begin, two-, three-, and four-class LPA models using PCL and MDI depersonalization and derealization items were examined. All three models converged and the best log-likelihood value was replicated. Fit statistics for the models are displayed in Table 1. Compared to the two-class model, the three-class model yielded a lower BIC and significant *P*-value for BLRT, suggesting that the three-class model provided a better data fit than the two-class model. Inconsistent with BLRT, the *P*-value for LMR-A was not significant for the three-class model. Given findings from a recent simulation study which indicated that LMR-A was less reliable than BLRT and BIC in identifying the correct class solution (Nylund et al., 2007), more weight was given to the latter fit indices in determining relatively better data fit between the two- and three-class models. When comparing the three- and four-class models, fit indices seemed to

favor the four-class model, which had a slightly lower BIC and significant *P*-value for BLRT. Both models yielded high entropy values, which reflect good discrimination among the latent groups. However, inspection of class profiles indicated that the four-class model added a very small latent class that varied only in severity from the three-class model. In addition, the three-class model is congruent with previous empirical studies which have consistently supported the superior fit of the three-class model. In sum, the pattern of results most strongly supported the three-class model, which was retained as the best class solution.

Mean probability of class membership for the three-class model (0.99 for class 1, 0.96 for class 2, and 0.98 for class 3) suggested excellent discrimination among the classes. Sixty-two percent of the sample was grouped in class 1, 26% in class 2, and 12% in class 3. Based on visual inspection of the LPA profiles and results from the profile analyses (discussed below), class 1 was labeled "Well-adjusted," with low scores on PTSD and dissociative items; class 2 was labeled "PTSD," with high scores on PTSD items and low scores on dissociative items; and class 3 was labeled "Dissociative," with high scores on both PTSD and dissociative items.

PTSD Symptom Profile Analysis

First, Bartlett's Test of Sphericity was conducted to evaluate whether PCL items were sufficiently correlated to proceed with the profile analysis. Results indicated sufficient correlation among all items (approximate X^2= 2973.35, p<.001). Box's *M* Test also was conducted to evaluate the assumption of equality of covariance among the dependent variables. A significant Box's *M* test (p<.001) indicated a violation of this assumption; therefore, Pillai's trace, which is robust to homogeneity of variance violations, was used to assess all multivariate effects. Figure 1 and Table 2 display mean PCL item scores for the three groups. Results from

the profile analysis revealed a significant level effect for latent group ($F(1, 534) = 453.00$, $p<.001$), as well as a significant departure from parallelism ($F(16, 522) = 4.15$, $p<.001$).

Next, univariate ANOVAs and post hoc pairwise comparisons were conducted to further evaluate group differences in PTSD severity and symptom pattern. The majority of PCL item scores violated the homogeneity of variance assumption as assessed by Levene's test. Therefore, ANOVA results were cautiously interpreted by using a more stringent family-wise alpha level of $p<.001$, at which level all univariate ANOVAs were statistically significant (see Table 2). For those variables with homogeneous variances, post hoc comparisons were conducted using Tukey Honestly Significant Difference (HSD) test. For those variables with unequal variances, post hoc comparisons were conducted using Tamhane's T2 test. Both tests control for potential increases in Type I error rates and are recommended when conducting multiple pairwise comparisons (Meyers et al., 2013).

In support of Hypothesis 2, post hoc comparisons indicated the overall F tests were significant due to the PTSD and dissociative groups evidencing higher PTSD severity scores compared to the well-adjusted group. However, in contrast to Hypothesis 2, no significant group differences were found in individual PTSD symptom scores between the PTSD and dissociative groups, and the effect sizes for these comparisons were small (*d*s ranging from .00-.34).

Depersonalization and Derealization Profile Analysis

Prior to conducting the second profile analysis, MDI items were identified as sufficiently correlated (Bartlett's Test of Sphericity, approximate $X^2= 1299.90$, $p<.001$) and as having unequal covariance across groups (Box's *M* Test, $p<.001$). Hence, Pillai's trace again was used to evaluate multivariate effects. Figure 2 and Table 3 display group means on MDI

depersonalization and derealization item scores. Results revealed a significant level effect ($F(1, 536) = 614.67$, $p<.001$) and significant departure from parallelism ($F(9, 528) = 7.91$, $p<.001$).

ANOVAs and post hoc comparisons were then conducted to evaluate group differences in depersonalization and derealization symptoms. To address the heterogeneity of variance obtained by MDI items, pairwise comparisons were conducted using Tamhane's T2 post hoc test. All univariate ANOVAs were significant at $p<.001$ (see Table 3). In line with Hypothesis 3, post hoc comparisons revealed that the dissociative group evidenced higher severity scores on all ten depersonalization and derealization symptoms relative to the PTSD and well-adjusted groups. Pairwise comparisons between the dissociative and PTSD groups with the largest effect sizes included MDI item 2 (i.e., *Your body feeling like it was someone else's*), item 20 (i.e, *Feeling outside of yourself*), and item 21 (i.e, *Suddenly things around you not feeling real or familiar*) with $d = 2.01$, 2.12, and 2.46, respectively. Additionally, post hoc comparisons suggested mean differences in one depersonalization and three derealization symptom severity scores between the PTSD and well-adjusted groups, with the PTSD group evidencing higher scores on all four items. Effect sizes for these comparisons were moderate to large (*d*s ranging .58-.79).

Group Differences in Symptoms of Related Psychopathology

In addition to examining group differences on items used as latent class indicators, ANOVAs and post hoc comparisons were conducted to examine group differences on a number of external measures of related psychopathology. First, the three latent classes were compared on additional measures of depersonalization and other types of dissociation using the DES, CDS, and other MDI scales. Pairwise comparisons were conducted using Tamhane's T2 post hoc test. All univariate ANOVAs were significant at $p<.001$ with moderate effect sizes (see Table 4). Post hoc comparisons indicated that the dissociative group obtained higher severity scores compared

to the PTSD group on all dissociation scale and subscale scores. In addition, the PTSD group obtained higher severity scores compared to the well-adjusted group on all scales except the MDI Identity Dissociation scale.

For the subset of the sample administered the PAI (n = 243), group differences were examined on PAI clinical scales and subscales (see Table 5). Pairwise comparisons were conducted using Tukey HSD or Tamhane's T2 post hoc tests for variables exhibiting homogeneity or heterogeneity of variance across groups, respectively. As shown in Table 5, overall F tests were significant at $p<.001$ for all but the following PAI scales: Health Concerns, Grandiosity, Resentment, Antisocial Behaviors, Egocentricity, and Drug Problems. In general, pairwise comparisons indicated that the dissociative group had higher severity scores relative to the PTSD group, which had higher scores relative to the well-adjusted group. Notable mean differences between the dissociative and PTSD groups with the largest effect sizes included Depression, Borderline Personality Features, Schizophrenia, Alcohol Problems, and Somatic Complaints. The dissociative and PTSD groups did not differ on Paranoia, Hypervigilance, Affective Instability, Irritability, and Obsessive-Compulsive. In comparison to the well-adjusted group, the PTSD group evidenced higher severity scores on the majority of PAI scales. However, the PTSD group did not differ from the well-adjusted group on Phobias, Psychotic Experiences, Self-Harm, Antisocial Features, and Alcohol Problems. In sum, Hypothesis 4 was supported with the dissociative and PTSD groups demonstrating higher levels of overall comorbidity relative to the well-adjusted group, and the dissociative group demonstrating the strongest associations with constructs closely related to dissociation, such as borderline personality features.

Discussion

In this study, the relationship between dissociation and PTSD symptoms was examined using latent profile analysis. First, results from the LPA suggested a three-class solution including well-adjusted, PTSD, and dissociative groups. Next, profile analyses were conducted to examine group differences in PTSD and dissociative symptoms. PCL profile analysis results indicated a significant level effect with PTSD and dissociative groups reporting higher overall PTSD severity than the well-adjusted group. A significant departure from parallelism also was found, suggesting that PTSD symptom pattern varied by group. However, results suggested no significant differences between the dissociative and PTSD groups on individual PTSD symptoms. MDI profile analysis results indicated a significant level effect and departure from parallelism. The dissociative group endorsed higher depersonalization and derealization severity compared to the other two groups, particularly on items describing unreality and detachment from the body. Lastly, ANOVAs and pairwise comparisons were conducted to compare the groups on a number of external correlates. Individuals in the dissociative group endorsed higher overall levels of comorbidity and, in particular, higher scores on other measures of depression, borderline personality features, and facets of the schizophrenia spectrum, all forms of psychopathology previously associated with dissociation (e.g., Zanarini et al., 2000; Watson, 2001; Mula et al., 2007).

Results from the current study replicated the general findings from prior LPA studies examining the relationship between PTSD and dissociation (Wolf, Miller, et al.; 2012; Wolf,

Lunney, et al., 2012; Steuwe et al., 2012). All studies supported a three-class solution with groups similar in size and overall PTSD, depersonalization, and derealization symptom severity. Similar to Steuwe et al. (2012), findings from the current study indicated no statistically significant differences between the dissociative and PTSD groups with respect to core PTSD symptoms. In contrast, group differences in PTSD symptoms were found in the other two LPA studies. Relative to the PTSD group, the dissociative group demonstrated higher severity on flashbacks (Wolf, Miller, et al., 2012) and exaggerated startle (male sample; Wolf, Lunney et al., 2012), and lower severity on cued emotional distress and physiological reactivity (female sample; Wolf, Lunney, et al., 2012).

This discrepancy among studies has implications regarding the nature of the relationship between PTSD and dissociation. According to Dalenberg et al. (2012), subtype verification requires group differences on core symptoms of the disorder and/or underlying biological mechanisms. Group differences only in patterns of comorbidity or treatment outcome support the alternative hypothesis that PTSD and dissociation are comorbid conditions that arise independently from shared risk factors such as general psychopathology (Waelde et al., 2005). Diagnostically, this translates into the distinction between a PTSD dissociative subtype and "PTSD with marked dissociative symptoms" (Wolf, Lunney, et al., 2012). Although pairwise comparisons examined in the present study failed to support statistically significant differences in overall PTSD severity between the dissociative and PTSD groups, the PCL profile analysis indicated a significant departure from parallelism, suggesting that PTSD symptom pattern varied by group. Restriction of range in the present sample may have contributed to an attenuation of relationships among PTSD and dissociative symptoms found in other LPA studies. In addition, distinct neurological and psychophysiological patterns have been identified between PTSD

patients with and without prominent dissociation (e.g., Lanius et al., 2010), thus supporting the subtype rather than comorbidity hypothesis.

One contribution of the present study is the assessment of depersonalization and derealization using a dedicated dissociation measure. In this study, all ten MDI depersonalization and derealization items differentiated the dissociative and PTSD groups. Item scores that resulted in the largest mean differences between the dissociative and PTSD groups, and no differences between the well-adjusted and PTSD groups, included four items describing a sense of detachment from the body (i.e., MDI items 2, 8, 20, and 26) and two items describing a significant sense of unreality from or unfamiliarity with the outside world (i.e., MDI items 21 and 27). Further investigation of the discriminant ability of these items is warranted to help identify the best markers for subtype classification.

Another contribution of this study is the inclusion of external measures of dissociation to compare the latent groups. Differences were found between the dissociative and PTSD groups on all total and subscale scores from three dissociation measures (DES, CDS, and MDI scales not used as latent class indicators). Similarly, differences were found between the PTSD and well-adjusted groups on all scales except the MDI Identity Dissociation scale. Differences in the PTSD and well-adjusted groups may be related to phenomenological overlap between certain types of dissociation and certain symptoms of PTSD (e.g., between the MDI emotional constriction scale and PCL emotional numbing items). Additionally, some types of dissociative responses, such as absorption, have been conceptualized as traits normally distributed in the population, in contrast to "pathological" dissociative responses, such as depersonalization, which have been associated with psychological disorder and impairment (Waller, Putnam, & Carlson,

1996). Further investigation to clarify the relationship between specific types of dissociation and specific PTSD clusters is warranted.

This study has several limitations. First, participants were recruited in a nonclinical setting and therefore endorsed lower levels of PTSD and dissociative symptoms compared to a clinical sample. Related to this concern, the distribution of scores does not extend to the full possible range. Nonetheless, there does not appear to be a significant range restriction and LPA was conducted using MLR estimation, which is robust to violations of the assumption of normality. Second, data are based on self-report. Although the PCL, MDI, and other measures included in this study have demonstrated psychometric merit, a structured interview assessing PTSD and dissociative symptoms would help correct for potential response biases. Third, Type I error rate may have been inflated due to the large number of univariate ANOVAs and pairwise comparisons conducted. However, an effort was made to address this issue by using a more stringent alpha level for the ANOVAs and appropriate post hoc tests for the pairwise comparisons. Fourth, this study focused on *DSM-IV* PTSD criteria. Revisions to the PTSD criteria in *DSM-5* may influence latent class formation and result in a different pattern of group differences, an empirical question warranting future investigation.

Despite these limitations, findings from the present study contribute to the literature examining the relationship between dissociation and PTSD and support the inclusion of a PTSD dissociative subtype in *DSM-5*. Inclusion of the dissociative subtype will help clarify the heterogeneity in posttraumatic symptomatology and improve diagnostic precision (Resick et al., 2012; Friedman et al., 2011). Dissociation in the context of PTSD has been shown to interfere in the emotional processing of trauma-related information (Foa & Hearst-Ikeda, 1996; Felmingham et al., 2008) and may negatively impact treatment outcome (Jaycox et al., 1998; Cloitre et al.,

2012). Additionally, independent of PTSD, depersonalization is a distressing condition associated with interpersonal stress due to intense emotional disconnection and disturbances in early attentional and perceptual processing (Guralnik, Schmeidler, & Simeon, 2000). Although there are no empirically supported treatment guidelines for addressing dissociation in the context of PTSD, the addition of a dissociative subtype in *DSM-5* will prompt clinicians to assess for dissociative symptomatology and hopefully stimulate treatment outcome research to determine best practices for treating individuals with elevated PTSD and dissociative symptoms.

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Appendix: Tables and Figures

Table 1

Fit Indices for Competing Latent Class Models

Model	Log-likelihood	BIC	Entropy	LMR-A *P*-value	BLRT *P*-value
2 Class	-19,419.23	39,354.52	.96	<.001	<.001
3 Class	-18,677.96	38,048.20	.96	.262	<.001
4 Class	-18,226.11	37,320.71	.97	.356	<.001

Note. BIC = Bayesian information criterion; LMR-A = Lo-Mendell-Rubin adjusted likelihood ration test; BLRT = bootstrap likelihood ratio test.

Table 2

Mean Differences in PTSD Checklist Items among the Three Latent Classes

	Group 1 (n=335)		Group 2 (n=141)		Group 3 (n=65)						
PCL Item	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	η^2	d_{1-2}	d_{1-3}	d_{2-3}
1 Memories	2.0_a	0.9	3.3_b	1.2	3.1_b	1.3	100.2*	.27	1.30	1.13	0.16
2 Dreams	1.5_a	0.7	2.8_b	1.3	2.6_b	1.3	104.3*	.28	1.42	1.33	0.15
3 Flashbacks	1.5_a	0.7	2.7_b	1.3	2.7_b	1.2	104.8*	.28	1.31	1.50	0.00
4 Cued distress	2.3_a	1.1	3.9_b	1.1	3.5_b	1.3	99.8*	.27	1.46	1.06	0.34
5 Cued physical reactions	1.6_a	0.9	3.2_b	1.2	3.1_b	1.3	132.1*	.33	1.60	1.54	0.08
6 Avoid thoughts/feelings[a]	2.1_a	1.2	3.7_b	1.2	3.4_b	1.2	100.5*	.27	1.33	1.08	0.25
7 Avoid reminders	1.8_a	1.1	3.1_b	1.3	3.0_b	1.5	80.8*	.23	1.12	1.02	0.07
8 Amnesia	1.7_a	1.0	2.5_b	1.4	2.9_b	1.4	43.5*	.14	0.71	1.12	0.29
9 Loss of interest	1.2_a	0.4	2.4_b	1.2	2.3_b	1.4	123.8*	.32	1.64	1.64	0.08
10 Detachment	1.2_a	0.6	2.8_b	1.4	2.7_b	1.5	157.0*	.37	1.75	1.84	0.07
11 Numbing	1.2_a	0.6	2.8_b	1.4	2.7_b	1.5	154.8*	.37	1.75	1.84	0.07
12 Foreshortened future	1.4_a	0.7	2.6_b	1.4	2.9_b	1.4	110.5*	.29	1.25	1.76	0.21
13 Sleep	1.5_a	0.8	3.4_b	1.3	3.3_b	1.4	217.2*	.45	1.95	1.95	0.08
14 Irritability	1.3_a	0.6	3.0_b	1.3	2.8_b	1.3	189.0*	.41	1.96	1.98	0.15
15 Concentration	1.4_a	0.8	3.3_b	1.2	3.3_b	1.4	228.6*	.46	2.03	2.06	0.00
16 Hypervigilance	1.6_a	0.9	3.1_b	1.4	3.4_b	1.4	132.1*	.33	1.40	1.81	0.21
17 Startle	1.3_a	0.7	2.9_b	1.4	3.1_b	1.4	158.2*	.37	1.66	2.11	0.14

Note. PCL = PTSD Checklist. Group 1 = Well-adjusted; Group 2 = PTSD; Group 3 = Dissociative. Post hoc comparisons for items marked with [a] were made using Tukey Honestly Significant Difference. Post hoc comparisons for all other items were made using Tamhane T2.Means in the same row that do not share subscripts differ at $p<.05$ in the Tukey Honestly Significant Difference or Tamhane T2 Comparison.

*$p<.001$.

Table 3

Mean Differences in Multiscale Dissociation Inventory Depersonalization and Derealization Items among the Three Latent Classes

	Group 1 (n=335)		Group 2 (n=141)		Group 3 (n=65)						
MDI Item	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	η^2	d_{1-2}	d_{1-3}	d_{2-3}
2 Body feeling like it was someone else's	1.1_a	0.4	1.2_a	0.5	2.6_b	1.0	209.7*	.44	0.23	2.76	2.01
3 Things suddenly seeming not quite right	1.5_a	0.7	2.1_b	0.9	3.4_c	0.9	158.6*	.37	0.79	2.58	1.44
8 Hands/feet not feeling connected to body	1.1_a	0.3	1.1_a	0.5	2.1_b	1.2	108.7*	.29	0.00	1.81	1.27
9 Feeling like in a dream	1.6_a	0.8	2.1_b	1.0	3.4_c	1.0	113.8*	.30	0.58	2.16	1.30
14 Feeling mechanical	1.2_a	0.5	1.6_b	0.8	2.9_c	1.1	165.7*	.38	0.66	2.67	1.44
15 Things around strange	1.2_a	0.5	1.6_b	0.8	3.1_c	1.0	222.0*	.45	0.66	3.12	1.73
20 Feeling outside self	1.2_a	0.4	1.3_a	0.6	2.8_b	0.9	262.2*	.49	0.21	3.11	2.12
21 Things not feeling real	1.1_a	0.4	1.2_a	0.4	2.8_b	1.0	309.5*	.54	0.25	3.13	2.46
26 Feeling like you didn't belong in body	1.1_a	0.3	1.2_a	0.5	2.6_b	1.2	228.8*	.46	0.27	2.71	1.77
27 Home/work unfamiliar	1.1_a	0.4	1.2_a	0.4	2.4_b	1.1	177.8*	.40	0.25	2.27	1.72

Note. MDI = Multiscale Dissociation Inventory. Group 1 = Well-adjusted; Group 2 = PTSD; Group 3 = Dissociative. Post hoc comparisons for all items were made using Tamhane T2. Means in the same row that do not share subscripts differ at $p<.05$. *$p<.001$.

Table 4

Mean Differences in Dissociation Scales among the Three Latent Classes

	Group 1 (n=335)		Group 2 (n=141)		Group 3 (n=65)						
Scale	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	η^2	d_{1-2}	d_{1-3}	d_{2-3}
DES	16.8_a	7.2	22.6_b	9.7	38.3_c	13.4	164.7*	.38	0.72	2.53	1.43
ABS	20.6_a	9.9	28.8_b	13.5	44.8_c	14.6	126.0*	.32	0.74	2.24	1.16
AMN	11.9_a	6.3	14.7_b	9.1	26.8_c	17.1	76.1*	.22	0.39	1.66	0.99
DEP	11.7_a	4.3	14.2_b	6.3	32.5_c	18.1	196.9*	.42	0.50	2.52	1.61
MDI	1.4_a	0.3	1.7_b	0.4	2.8_c	0.5	465.9*	.63	0.90	4.12	2.54
DENG	2.1_a	0.7	2.7_b	0.9	3.5_c	0.8	98.2*	.27	0.79	1.95	0.92
ECON	1.3_a	0.5	1.8_b	0.9	3.1_c	1.0	186.7*	.41	0.78	2.96	1.39
MEMD	1.4_a	0.5	1.7_b	0.6	2.9_c	0.6	217.7*	.45	0.56	2.90	2.00
IDDIS	1.1_a	0.2	1.2_a	0.3	1.8_b	0.7	151.0*	.36	0.43	2.09	1.29
CDS	0.6_a	0.6	1.2_b	0.9	2.7_c	1.4	183.7*	.41	0.86	2.67	1.39
Unreality	0.4_a	0.4	0.8_b	0.8	2.3_c	1.3	167.4*	.38	0.73	2.98	1.52
Numbing	0.8_a	0.8	1.6_b	1.2	3.3_c	1.8	139.0*	.34	0.86	2.43	1.20

Note. DES = Dissociative Experiences Scale; ABS = Absorption; AMN = Amnesia; DEP = Depersonalization; MDI = Multiscale Dissociation Inventory; DENG = Disengagement; ECON = Emotional Constriction; MEMD = Memory Disturbance; IDDIS = Identity Dissociation; CDS = Cambridge Depersonalization Scale. Group 1 = Well-adjusted; Group 2 = PTSD; Group 3 = Dissociative. Post hoc comparisons for all scales were made using Tamhane T2. Means in the same row that do not share subscripts differ at $p<.05$.

*$p<.001$.

Table 5

Mean Differences in Personality Assessment Inventory Clinical Scales among the Three Latent Classes

	Group 1 (n=147)		Group 2 (n=67)		Group 3 (n=29)						
PAI Scale	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	η^2	d_{1-2}	d_{1-3}	d_{2-3}
SOM	49.5_a	6.9	54.3_b	10.4	60.3_b	12.1	22.1*	.16	0.59	1.36	0.55
SOM-C	47.1_a	7.7	51.2_a	12.0	60.4_b	12.9	25.5*	.18	0.44	1.52	0.75
SOM-S	49.5_a	7.7	55.0_b	9.4	61.6_c	12.1	28.2*	.19	0.67	1.41	0.64
SOM-H	51.5	9.0	54.5	12.8	55.4	11.6	3.1	.03	0.29	0.41	0.07
ANX	52.7_a	8.3	60.5_b	10.2	68.1_c	12.3	41.5*	.26	0.87	1.70	0.70
ANX-C[a]	54.0_a	10.4	60.4_b	12.6	67.4_c	13.0	21.2*	.15	0.58	1.23	0.55
ANX-A[a]	51.4_a	8.7	58.5_b	11.0	64.6_c	13.6	28.5*	.19	0.75	1.37	0.52
ANX-P	51.6_a	8.1	59.3_b	10.2	66.7_c	13.8	39.9*	.25	0.87	1.63	0.65
ARD	49.7_a	8.2	60.4_b	12.1	66.7_c	12.6	51.4*	.30	1.12	1.88	0.51
ARD-O[a]	48.1_a	10.4	53.4_b	12.0	56.4_b	13.5	10.2*	.08	0.49	0.76	0.24
ARD-P[a]	51.2_a	9.6	54.2_a	11.0	59.4_b	12.1	8.0*	.06	0.30	0.82	0.46
ARD-T	49.8_a	8.2	63.8_b	13.5	69.5_c	12.7	71.6*	.37	1.38	2.17	0.43
DEP	50.5_a	8.2	59.3_b	12.3	69.3_c	11.6	52.9*	.31	0.91	2.13	0.83
DEP-C	52.8_a	11.0	59.3_b	14.4	71.2_c	13.4	29.9*	.20	0.54	1.61	0.84
DEP-A	48.3_a	8.9	57.8_b	14.0	67.5_c	12.8	47.0*	.28	0.88	1.99	0.71
DEP-P	50.4_a	8.9	56.6_b	11.6	61.2_c	11.5	20.4*	.15	0.63	1.15	0.40
MAN[a]	51.1_a	10.2	55.6_b	10.7	62.9_c	11.4	17.0*	.12	0.43	1.13	0.67
MAN-A[a]	49.3_a	10.0	55.0_b	9.9	62.1_c	12.3	23.0*	.16	0.57	1.23	0.67
MAN-G[a]	52.9_a	10.7	53.4_{ab}	11.5	59.4_b	11.1	4.6	.04	0.05	0.60	0.53
MAN-I	50.1_a	10.3	55.2_b	13.6	59.4_b	11.9	10.6*	.08	0.45	0.88	0.32
PAR	53.6_a	8.7	59.0_b	12.1	65.2_b	11.6	19.3*	.14	0.55	1.26	0.52
PAR-R[a]	55.1_a	10.9	57.3_{ab}	11.3	59.9_a	13.6	2.8	.02	0.20	0.42	0.22
PAR-H	52.4_a	10.3	59.2_b	14.4	61.0_b	15.6	11.4*	.09	0.58	0.76	0.12
PAR-P	51.4_a	10.0	56.0_b	12.4	67.9_c	13.0	28.5*	.19	0.43	1.57	0.95
SCZ	47.5_a	9.2	52.4_b	9.9	64.6_c	12.9	24.0*	.24	0.52	1.73	1.12
SCZ-P	46.7_a	8.5	48.7_a	10.0	59.6_b	13.9	22.1*	.16	0.22	1.35	0.96
SCZ-S[a]	46.3_a	9.6	49.8_b	11.2	56.5_c	12.0	13.0*	.10	0.35	1.02	0.59
SCZ-T[a]	51.3_a	10.4	56.9_b	13.0	67.4_c	16.9	23.6*	.16	0.50	1.38	0.74
BOR	52.9_a	8.6	60.9_b	11.7	69.2_c	10.7	40.5*	.25	0.83	1.82	0.73
BOR-A	50.1_a	9.5	56.7_b	12.6	60.9_b	11.7	17.6*	.13	0.63	1.09	0.34
BOR-I[a]	54.0_a	9.4	62.4_b	10.9	68.3_c	9.5	35.4*	.23	0.85	1.52	0.56
BOR-N	53.0_a	9.5	61.1_b	13.7	66.9_c	12.9	25.8*	.18	0.74	1.37	0.43
BOR-S	52.0_a	10.8	53.5_a	13.7	65.5_b	14.3	16.1*	.12	0.13	1.18	0.86
ANT[a]	56.6_a	10.1	57.9_a	10.6	65.8_b	11.8	9.5*	.07	0.13	0.89	0.72
ANT-A[a]	55.5	10.6	55.1	10.9	59.8	10.6	2.3	.02	0.04	0.41	0.44
ANT-E[a]	54.6_a	11.3	55.7_{ab}	13.3	63.1_b	13.0	6.4	.05	0.09	0.73	0.56

ANT-S[a]	56.1_a	11.9	58.9_a	12.9	66.8_b	13.5	9.6*	.07	0.23	0.88	0.60
ALC	54.3_a	9.7	53.6_a	10.9	64.4_b	14.1	13.1*	.10	0.07	0.96	0.90
DRG	53.7	11.6	52.9	11.1	60.4	17.0	4.8	.04	0.07	0.53	0.57

Note. Group 1 = Well-adjusted; Group 2 = PTSD; Group 3 = Dissociative. SOM = Somatic Complaints; SOM-C = Conversion; SOM-S = Somatization; SOM-H = Health Concerns; ANX = Anxiety; ANX-C = Cognitive; ANX-A = Affective; ANX-P = Physiological; ARD = Anxiety Related Disorders; ARD-O = Obsessive-Compulsive; ARD-P = Phobias; ARD-T = Traumatic Stress; DEP = Depression; DEP-C = Cognitive; DEP-A = Affective; DEP-P = Physiological; MAN = Mania; MAN-A = Activity Level; MAN-G = Grandiosity; MAN-I = Irritability; PAR = Paranoia; PAR-H = Hypervigilance; PAR-P = Persecution; PAR-R = Resentment; SCZ = Schizophrenia; SCZ-P = Psychotic Experiences; SCZ-S = Social Detachment; SCZ-T = Thought Disorder; BOR = Borderline Features; BOR-A = Affective Instability; BOR-I = Identity Problems; BOR-N = Negative Relationships; BOR-S = Self-Harm; ANT = Antisocial Features; ANT-A = Antisocial Behaviors; ANT-E = Egocentricity; ANT-S = Stimulus Seeking; ALC = Alcohol Problems; DRG = Drug Problems. Post hoc comparisons for items marked with [a] were made using Tukey Honestly Significant Difference. Post hoc comparisons for all other items were made using Tamhane T2.Means in the same row that do not share subscripts differ at $p<.05$ in the Tukey Honestly Significant Difference or Tamhane T2 Comparison. *$p<.001$.

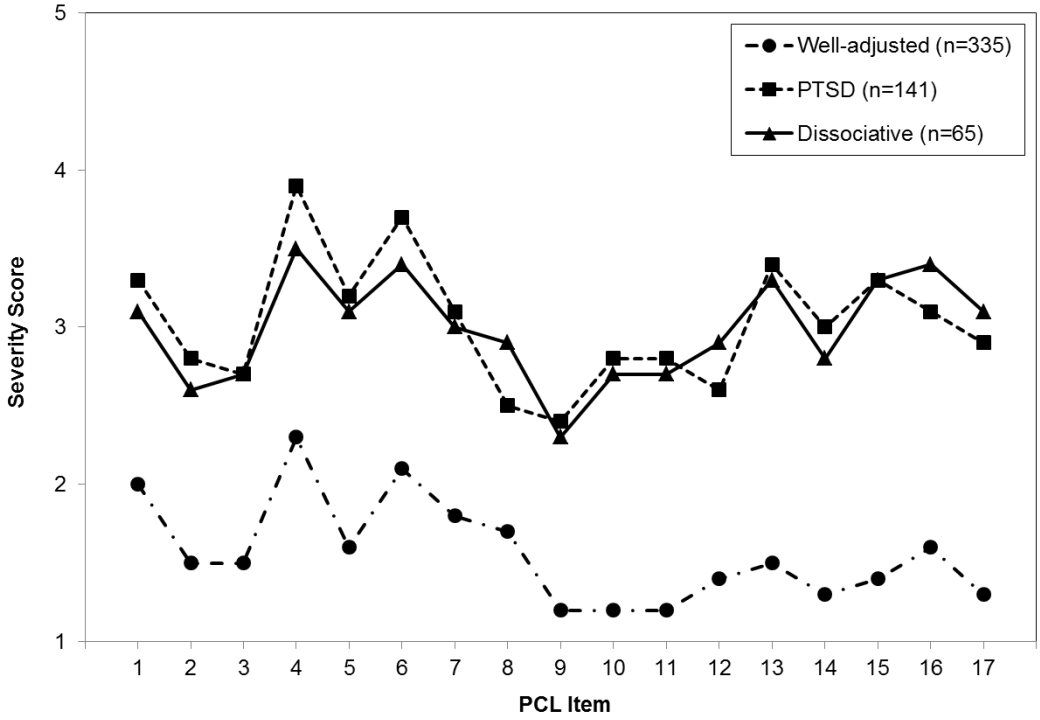

***Figure 1*. Mean severity scores on PTSD Checklist (PCL) items by latent class.**

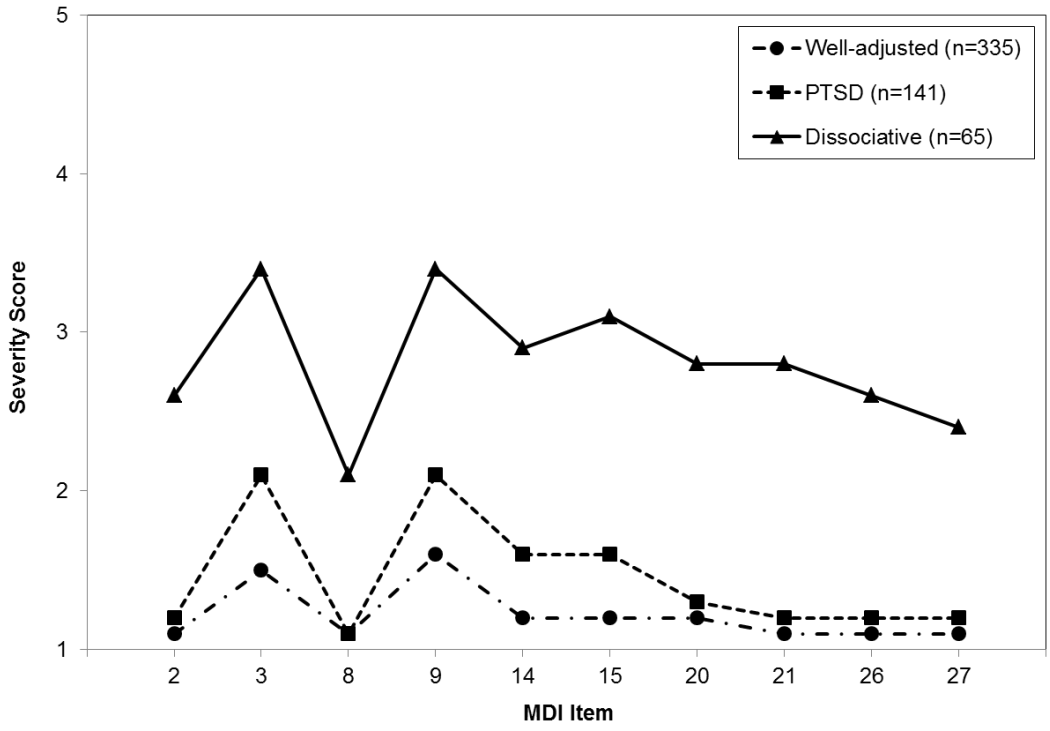

***Figure 2*. Mean severity scores on Multiscale Dissociation Inventory depersonalization and derealization items by latent class.**