

Classic and Complex Posttraumatic Stress Disorder: A Latent Profile Analysis

by

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Abstract

Some trauma survivors, especially those exposed to chronic interpersonal trauma, exhibit a wide range of psychological sequelae beyond the classic symptoms of posttraumatic stress disorder (PTSD). Foremost among these are dissociation, emotion dysregulation, relational difficulties, adversely affected belief systems, and somatic distress. It has been proposed that these additional symptoms, in conjunction with the symptoms of PTSD, represent a distinct syndrome referred to as complex posttraumatic stress disorder (CPTSD). However, the relationship of CPTSD with PTSD is unclear and the subject of considerable debate, owing primarily to ambiguity surrounding the definition of CPTSD and methodological limitations of research in this area. In the present study, CPTSD and PTSD were examined using latent profile analysis in a sample of 717 trauma-exposed undergraduates. Items and scales from the PTSD Checklist for DSM-5, Inventory of Altered Self-Capacities, Multiscale Dissociation Inventory, Beck Depression Inventory – Second Edition, and Personality Assessment Inventory were used as latent class indicators. Results supported a four-class solution, including a well-adjusted class, a dissociative class, a PTSD symptoms class, and a CPTSD symptoms class characterized by elevated PTSD, dissociation, emotion dysregulation, relational difficulties, adversely affected belief systems, and somatic distress. After comparing the classes across measures of childhood abuse and related psychopathology, the CPTSD symptoms class was found to display more severe levels of impairment. The implications of the findings for the classification of trauma-related disorders are discussed.

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Introduction

Although the deleterious effects of exposure to traumatic life events have been documented throughout recorded history, scientific investigation of psychological trauma is a relatively recent phenomenon. It was not until the mid- to late-1800s that prominent figures such as Freud, Janet, and Kardiner first began formally describing and labeling the characteristic clinical picture of trauma survivors. These early investigators observed that trauma exposure was often followed by persistent reexperiencing of the event, avoidance of trauma-related stimuli, reduction of general responsiveness to the world, and symptoms of heightened physiological arousal (van der Kolk, McFarlane, & Weisaeth, 1996). Despite their efforts, however, posttraumatic stress disorder (PTSD)—the first diagnostic category to specify a chronic trauma-related syndrome—would not be formally recognized until 1980, when it was included in the third edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-III)*; American Psychiatric Association, 1980).

The advent of PTSD required not only a scientific initiative but also the convergence of major social movements that raised awareness of the debilitating effects of combat and interpersonal violence (Friedman, Resick, & Keane, 2014). During the anti-war movement of the 1970s, when thousands of returning Vietnam veterans began seeking mental health services, clinicians found themselves unable to adequately categorize the symptom presentations of their clients—presentations which appeared consistent with the “war neuroses” previously observed in combat veterans from earlier conflicts (Scott, 1990). Similarly, the women’s movement at this time was drawing attention to the effects of sexual and physical assault against females, and laws were starting to change to reflect a new understanding that abuse within the family unit was in fact criminal and worthy of societal concern. It was also noted that the responses to interpersonal

traumas such as rape or battery appeared to be similar to the symptoms being reported by Vietnam veterans (Friedman, Resick, & Keane, 2014). These forces of change eventually led to the official recognition of PTSD as a mental disorder, which strongly benefitted mental health theory and practice by highlighting the etiological impact of traumatic exposure, stimulating basic human and animal research, inviting the development of new therapeutic strategies to mitigate trauma-response symptoms, and unifying the empirical work being done across a range of trauma types (Friedman, Resick, & Keane, 2014).

However, it was soon realized that PTSD according to *DSM-III* was limited by its narrow definition consisting of only intrusive memories, disordered arousal, and strategies for avoiding certain emotions, sensations, and meanings associated with trauma (van der Kolk, Pelcovitz, Roth, & Mandel, 1996). Moreover, it has been argued that with the development of *DSM-III* there was a shift away from theoretical approaches to classification and a movement towards a more descriptive system—an approach intended to improve diagnostic reliability and create a separation from early psychoanalytic traditions (Decker, 2007). However, in doing so, this descriptive approach led to a separation of key mental and physiological components of the trauma response into separate disorders, such as dissociative and somatoform disorders. This categorical separation required clinicians to diagnose clients suffering from both sets of symptoms with multiple disorders (Nemiah, 1998). As a consequence, PTSD is characterized by extensive comorbidity and construct overlap with other mental health disorders, such as borderline personality disorder and major depressive disorder (e.g., Breslau, 2001; Brown, Campbell, Lehman, Grisham, & Mancill, 2001; Gunderson & Sabo, 1993; Post, Zoellner, Youngstrom, & Feeny, 2011). In recent years, though, there has been a movement to better define PTSD and account for the symptom heterogeneity witnessed in many trauma survivors.

In 1992, after a significant literature review regarding the comorbidity and etiology of PTSD, Herman proposed a new stress-response disorder, labeled "complex posttraumatic stress disorder" (CPTSD; 1992a,b). Herman (1992a,b) argued that the *DSM-III* conceptualization of PTSD did not adequately cover the full range of posttraumatic symptoms and that response to trauma should be viewed as a continuum, ranging from simple stress reactions, to classic PTSD, and finally to CPTSD. Thus, CPTSD represented an expanded diagnostic concept that would be better able to describe those who had the most severe trauma reactions. Herman (1992a) defined CPTSD as a syndrome comprising six distinct symptom clusters, including negative alterations in the domains of affect regulation, consciousness, self-perception, perception of perpetrator, relations with others, and systems of meaning. Herman argued that CPTSD results from chronic, interpersonal trauma, especially with childhood onset (Herman, 1992a,b)—stressors that have long been associated with significant psychopathology (Kessler, Sonnega, Bromet, & Hughes, 1995; Copeland, Keeler, Angold, & Costello, 2007).

Continued Development of the CPTSD Construct

Since its creation, the CPTSD conceptualization has garnered considerable support. Early proponents of the construct wanted to see its eventual inclusion into *DSM* (Dalenberg, Glaser, & Alhassoon, 2012). However, before that could become a reality, an established list of CPTSD symptoms had to first be created. Based on previous literature (e.g., Herman & van der Kolk, 1987; Pelcovitz et al., 1989; Spitzer, Kaplan, & Pelcovitz, 1989), a provisional list of symptoms, was created to address the trauma symptoms not covered under the *DSM-III-R* PTSD criteria. Pelcovitz et al. (1997) sent that list to 50 content area experts on psychological reactions to extreme stress, and their feedback was sought regarding which criteria should be added or removed from Herman's original conceptualization. Then, in conjunction with Herman, van der

Kolk, and the *DSM-IV* field trial coordinators, Pelcovitz et al. turned that feedback into a revised set of criteria and finalized a list of symptoms.

The resulting diagnostic category (often used interchangeably with CPTSD) was labeled “disorders of extreme stress not otherwise specified” (DESNOS). Reflecting much of Herman’s seminal work, DESNOS comprised seven symptom clusters: somatization and negative alterations in regulation of affect and impulses, attention or consciousness, self-perception, perception of perpetrator [not required], relations with others, and systems of meaning (Peltovitz et al., 1997). The construct validity of the DESNOS proposal subsequently was investigated as part of the *DSM-IV* field trials (Kilpatrick et al., 1998). After much deliberation, the *DSM-IV* workgroup chose to exclude the new diagnosis based on a 92% comorbidity rate found between DESNOS and PTSD (Roth, Newman, Pelcovitz, van der Kolk, & Mandel, 1997). Therefore, the symptoms of DESNOS were instead added into *DSM-IV* as associated and descriptive features of PTSD, and then were subsequently removed following a committee decision leading up to the publication of the *DSM-IV-TR* (Landy, Wagner, Brown-Bowers, & Monson, 2015).

However, since the *DSM-IV* field trials, a number of studies have found support for the separation of DESNOS from PTSD, thereby helping establish a distinct posttraumatic syndrome. For example, after assessing for both DESNOS and PTSD amongst 84 veterans, Ford (1999) discovered that 31% of the sample qualified for both conditions, 29% were diagnosed with PTSD only, 26% were classified as DESNOS only, and 13% met criteria for neither. Ford also determined that PTSD was primarily associated with combat trauma, whereas DESNOS was associated instead with early childhood trauma and war-zone atrocities (Ford, 1999). Also, in a sample of 108 female psychiatric inpatients, Zlotnick et al. (1996) found that a history of sexual abuse was associated with greater severity of DESNOS symptoms. However, this study did not

assess for the onset of sexual abuse, and interpersonal trauma history was recorded with a new self-report measure that had yet to be validated. Furthermore, after using cluster analytic methods with a sample of 60 PTSD patients, Taylor, Asmundson, and Carleton (2006) identified two clusters of participants: one cluster which broadly mapped onto the features of DEPNOS and another which resembled PTSD without the associated features. However, there were some notable theoretical inconsistencies in these results, since the DEPNOS cluster displayed less severe dissociation than did the PTSD cluster and the two clusters did not differ on exposure to chronic, interpersonal trauma (Taylor et al., 2006).

Criticisms of CPTSD

In recent years, the CPTSD debate intensified leading up to the publication of *DSM-5*. Most recently and most comprehensively, Resick et al. (2012) provided a detailed critique, critically reviewing the literature surrounding this debate. Ultimately, it was again determined by the *DSM* workgroup that CPTSD should not be added as a distinct diagnosis into *DSM-5* (Friedman, 2013). Resick et al. (2012) identified a number of different reasons for this exclusion. First, they pointed out that the generally accepted etiology of CPTSD has become increasingly ambiguous over the last two decades. For example, Courtois (2004) suggested that CPTSD may not be caused only by developmental traumas, but by any form of relational trauma, including domestic violence and attachment trauma.

Second, Resick et al. (2012) pointed out that the symptoms of CPTSD appear to be in flux and are often found to overlap with other disorders (e.g., borderline personality disorder). For example, in contrast to the seven symptom categories originally proposed for DEPNOS, Cloitre et al. (2011) recently proposed that CPTSD, in addition to possessing the classic PTSD symptoms, has only five additional symptom categories: emotion regulation difficulties,

disturbances in relational capacities, alterations in attention and consciousness, adversely affected belief systems, and somatic distress or disorganization. Emotion regulation difficulties include affect dysregulation (e.g., explosive anger, high reactivity) and behavioral dysregulation (e.g., self-harm, risk-taking). Relational capacity disruption includes any relational difficulties (e.g., chaotic relationships, preoccupation/avoidance of relationships). Alterations in attention and consciousness include attentional disturbance (e.g., difficulty completing tasks), dissociation (e.g., derealization, depersonalization), and enduring dissociation (e.g., dissociative identity disturbances). Adversely affected belief systems include any disturbances in systems of meaning (e.g., feeling despair, shame, guilt, worthlessness). Somatic distress or disorganization includes chronic pain and paralysis (Cloitre et al., 2011). Collectively these associated features are referred to as "disturbances in self-regulatory capacities" (p. 616). Similar to the methods employed for establishing the original DESNOS criteria, these categories were identified using an expert opinion survey completed by 50 PTSD and CPTSD experts (Cloitre et al., 2011).

Third, Resick et al. (2012) criticized proponents of CPTSD for equivocating about whether to include the classic PTSD symptoms within the CPTSD conceptualization. At present, the definition of CPTSD has come to be more inclusive of the PTSD symptoms. Some recent studies have even begun referring to CPTSD as a subtype of PTSD (Courtois & Ford, 2009; Cloitre et al., 2011). This combination, while not explicitly discussed in the seminal works on CPTSD (e.g., Herman, 1992 a,b), has been argued for on the grounds that the construct overlap discovered during the *DSM-IV* field trials were indicative of CPTSD needing to incorporate the PTSD symptoms (Cloitre, Garvert, Brewin, Bryant, et al., 2013). However, this contradicts studies such as Ford (1999), which found distinct DESNOS-only and PTSD-only groups—with DESNOS characterized by childhood trauma, extreme levels of intrusive reexperiencing,

impaired object relations, and the need for intensive psychiatric care but no clinically-significant PTSD. Moreover, Landy, Wagner, Brown-Bowers, and Monson (2015) suggested that PTSD according to *DSM-5* has likewise come to be more inclusive of the CPTSD symptoms. In particular, the symptom clusters D (negative alterations in cognition and mood) and E (marked alterations in arousal and reactivity), as well as the new dissociative subtype, have all been touted as being sufficiently inclusive of the central features of CPTSD (i.e., emotion dysregulation, cognitive changes, and interpersonal difficulties).

According to Dalenberg et al. (2012), a number of criteria must be fulfilled to support a new PTSD subtype. First, any construct used to define a new subtype (e.g., CPTSD) must be clearly defined and reliably measured. Second, researchers must demonstrate significant distinctions within either the functional mechanisms of PTSD (i.e., underlying biological processes) or the internal structure of PTSD. This means that if CPTSD is to be considered a distinct PTSD subtype, it should display a unique base rate of symptoms or a divergent interrelationship among its symptoms when compared to those of PTSD. Finally, these differences must prove to be clinically meaningful—CPTSD should be shown to either follow a different course than PTSD, have distinctive risk factors, differ on treatment effectiveness, or display different comorbidities (Dalenberg et al., 2012). Methods like cluster analysis and finite mixture modeling can be used to establish many of these criteria.

One such method, latent profile analysis (LPA), is a recently developed finite mixture modeling alternative to traditional cluster or factor analytic procedures. LPA resembles cluster analysis in that it is a multivariate technique which identifies subgroups of individuals using similarities found within their responses to a set of continuous observable indicators (Vermunt & Magidson, 2002). LPA is often referred to as a person-centered approach because it groups

people, rather than variables or items as in factor analysis (Pastor et al., 2007). However, this is arguably a misnomer in that LPA typically utilizes a combined approach, involving both a person-centered analysis to identify classes of individuals and then a variable-centered analysis to examine antecedent and consequent correlates of class membership (Masyn, 2013).

LPA is considered a model-based procedure in which observed data are used to estimate model parameters. More specifically, this procedure is a type of mixture modeling because it assumes data are generated by a mixture of probability distributions, one for each group of individuals (i.e., latent class). Class size and item response are the main parameters estimated in LPA, although means, variances, and covariances are also estimated for each latent class. Maximum likelihood estimation is used to generate LPA parameters, whereby several sets of parameters are evaluated based on an associated likelihood value, which indicates the probability of observing the sample data given a particular parameter set. Final parameter estimates are those associated with the highest likelihood value (Vermunt & Magidson, 2002). Compared to many other methodologies, LPA is arguably superior in that it is not sample-dependent, but rather model-based; does not require variables to be on the same scale; and provides objective statistical tests which can be used to determine model identification and comparison (Pastor et al., 2007).

Current Status of CPTSD

Presently, CPTSD remains absent from *DSM*. Nonetheless, elements of the construct can still be found within mental health taxonomy—a reflection of the ongoing debate regarding its status as a diagnostic category. With the completion of the World Health Organization's 10th revision of the International Statistical Classification of Diseases and Related Health Problems (*ICD-10*) in 1993, a provisional diagnostic category entitled "enduring personality change after

catastrophic experience" (EPCACE) was created to better encompass human response to traumatic events (Beltran & Silove, 1999). EPCACE is characterized by pervasive hostility and mistrust, social withdrawal, feelings of emptiness and hopelessness, being chronically on edge, and social estrangement. Even further reminiscent of CPTSD, *ICD-10* specified that EPCACE was precipitated by stressful events that are of an "extreme nature," so as to account for changes in personality (Beltran & Silove, 1999).

Furthermore, according to Maercker et al. (2013), the upcoming *ICD-11* will include a separate diagnosis of complex PTSD and EPCACE will be removed. According to Maercker et al. (2013), this CPTSD diagnosis, conceptualized as developing in response to multiple severe or prolonged traumatic events, will first include the six proposed *ICD-11* PTSD symptoms, i.e., two avoidance symptoms, two hyperarousal symptoms (i.e., startle and hypervigilance), and two reexperiencing symptoms (i.e., flashbacks and nightmares). In addition, CPTSD will include "enduring disturbances" in emotion regulation, the sense of self (i.e., experiencing a diminished and defeated sense of self), and in interpersonal relationships. In anticipation of *ICD-11* release, proponents of the CPTSD addition to *ICD-11* have begun to garner support for the construct, in part through the use of finite mixture modeling techniques (i.e., Cloitre et al., 2013; Cloitre et al., 2014; Elklit, Hyland, & Shevlin, 2014; Knefel, Garvert, Cloitre, & Lueger-Schuster, 2015).

To date, only a few studies have used finite mixture modeling methods to investigate the broad construct of posttraumatic stress. For example, Steenkamp et al. (2012) used a latent class analysis to investigate PTSD heterogeneity. They identified three classes: a no disturbance class (61.4%), an intermediate disturbance class (25.6%) and a pervasive disturbance class (12.5%). The pervasive disturbance class was characterized as having a greater severity of symptoms, especially a greater endorsement of emotional numbing (Steenkamp et al., 2012). Similarly,

Wolf, Miller, Reardon, Ryanchenko, et al. (2012) used latent class analysis to investigate the legitimacy of the new dissociative subtype of PTSD. They also found a 3-class solution that included a low PTSD severity class, a high PTSD severity class characterized by elevations across all 17 central PTSD symptoms, and a dissociative class characterized by severe PTSD symptoms combined with elevated derealization, depersonalization, and flashbacks.

More importantly, though, even fewer finite mixture modeling studies have investigated the nosology of CPTSD. The first such study, Cloitre et al. (2013), utilized a latent profile analysis (LPA) to determine whether separate PTSD and CPTSD classes could be found in a sample of treatment-seeking individuals ($n = 302$), and if so, whether the classes differed on trauma history and severity of impairment. Following the proposed *ICD-11* criteria for PTSD/CPTSD (Maercker et al., 2013), Cloitre et al. defined PTSD as consisting of only reexperiencing, avoidance, and sense of threat symptoms, and CPTSD as consisting of the PTSD symptoms plus associated features of affect dysregulation, negative self-concept (i.e., worthlessness, guilt), and interpersonal relationship disturbances. The LPA identified three classes: a CPTSD class (36.1% of the sample) characterized by elevated PTSD symptoms and significant affect dysregulation, negative self-concept, and interpersonal problems; a PTSD class (31.8%) characterized by elevated PTSD symptoms only; and a class with elevations on neither PTSD nor the associated features (32.1%). Cloitre et al. concluded that CPTSD, while related to PTSD, may differ structurally based on symptom endorsement. It was also found that trauma history, particularly childhood abuse, was predictive of CPTSD and that participants in the CPTSD class experienced greater functional impairment than did the PTSD class (Cloitre et al., 2013). In another study, Elklit, Hyland, and Shevlin (2014) utilized a latent class analysis (LCA) to investigate the presence of the same *ICD-11* PTSD/CPTSD constructs and found a

comparable three-class solution—a CPTSD class (10.4%), a PTSD class (25.2%), and a low PTSD/CPTSD class (64.4%).

To address the criticism that CPTSD is nothing more than PTSD and comorbid borderline personality disorder (BPD; e.g. Resick et al., 2012), Cloitre et al. (2014) sought to differentiate PTSD, CPTSD, and BPD with finite mixture modeling. Again, PTSD and CPTSD were operationalized using the proposed *ICD-11* constructs. Using LCA methodology, Cloitre et al. found a four-class solution, including a CPTSD class (27.5%), a PTSD class (25.7%), a low PTSD/CPTSD class (20.4%), and a BPD class (26.4%). They determined that although the BPD class displayed some overlap with PTSD and CPTSD, the discriminability of the classes provided support for the notion of distinguishable subgroups for CPTSD and BPD. Of the CPTSD class only 7.8% met criteria for *DSM-IV* BPD, whereas 91.9% met criteria in the BPD class. Moreover, the BPD class endorsed fewer PTSD symptoms than the CPTSD class and were found to not consistently endorse the CPTSD symptoms across the categories of emotion dysregulation, negative self-concept, and interpersonal problems. Additionally, while the CPTSD and PTSD classes did not significantly differ on seven of nine BPD symptoms, members of the CPTSD class did endorse unstable relationships and mood changes at higher rates than the PTSD class (33.8% and 41.6% for CPTSD and 8.3% and 8.3% for PTSD, respectively). Both the CPTSD and PTSD classes endorsed substantially lower rates of self-harm/suicidal behaviors compared to the BPD class (14.3% for CPTSD and 16.7% for PTSD vs. 48.7% for BPD).

Most recently, Knefel, Garvert, Cloitre, and Lueger-Schuster (2015) also investigated *ICD-11* CPTSD by conducting an LPA on data from adult childhood abuse survivors. This study also revealed a four-class solution: a CPTSD class (20.1%), a PTSD class (17.5%), a low symptoms class (43.2%), and a disturbances in self-organization (DSO) class (19.2%). However,

the researchers did not anticipate finding the fourth, DSO class. Knefel et al. suggested that this class, characterized by affective disturbances, interpersonal and self-concept problems, disturbing dreams, and excessive startle, may represent a group better characterized by other Axis I and/or Axis II disorders. In sum, these recent LCA/LPA studies have identified a CPTSD class with a distinctive symptom pattern, and thereby have provided evidence in support of the construct. However, these studies are all limited in that they rely on *ICD-11*'s relatively narrow proposed diagnostic criteria for PTSD and CPTSD.

Present Study

The present study sought to replicate and extend findings from previous LPA/LCA studies of CPTSD by examining a broader array of symptoms than those included in *ICD-11* definitions, and by comparing obtained classes on a variety of external correlates. Again, previous LPA/LCA studies have only investigated CPTSD using proposed *ICD-11* definitions for PTSD and CPTSD. To date, no study has used finite mixture modeling to investigate CPTSD in terms of its broader conceptualizations. This is noteworthy because *ICD-10* and the upcoming *ICD-11* are taxonomies with intentionally constrained constructs designed for clinical utility rather than comprehensive, descriptive psychopathology (Reed, 2010). As First, Reed, Hyman, and Saxena (2015) discussed, disorders proposed for *ICD-11*, such as CPTSD, will be organized in terms of “essential features”—the symptoms that a clinician might “reasonably expect to find in all cases of the disorder” (p. 85). However, given the current fluidity, relative infancy, and contentious nature of the CPTSD literature, it may be premature to identify which of the CPTSD symptoms should be considered essential—other more inclusive iterations of the construct are still worth examining. Therefore, an aim of the present study was to investigate CPTSD in terms of its more complete set of symptoms, as defined by the most recent expert opinion survey

(Cloitre et al., 2011). While finite mixture modeling studies of CPTSD have been conducted (e.g., Cloitre et al., 2013; Elklit et al., 2014), they primarily relied on the narrower definition of *ICD-11* CPTSD, in an intentional effort to support (or refute) the upcoming *ICD-11* and its CPTSD proposal (i.e., *ICD-11* PTSD plus emotion dysregulation, negative self-concept, and interpersonal problems). As such, there is currently a lack of information regarding the nature and replicability of the CPTSD class that might emerge from LPA/LCA studies when other symptoms long believed to be core aspects of CPTSD (e.g., dissociation, somatization) are added as indicators into the model.

A second aim of the present study was to validate the classes identified in the LPA by comparing them on PTSD and CPTSD symptom patterns and associations with external correlates, including childhood trauma exposure and a range of related psychopathology. Based on available theoretical and empirical evidence, the following hypotheses were posited:

Hypothesis 1: A latent profile analysis of the classic PTSD symptoms and additional features of CPTSD will provide evidence supporting a three-class solution to the model.

Hypothesis 2: The three-class solution will comprise a CPTSD class (characterized by elevated PTSD and elevated emotion regulation difficulties, disturbances in relational capacities, adversely affect belief systems, alterations in attention and consciousness, and somatization), a PTSD class (characterized by elevated PTSD only), and a well-adjusted class that is not elevated on PTSD or associated CPTSD features.

Hypothesis 3: Relative to the PTSD and well-adjusted classes, the CPTSD class will demonstrate (a) higher rates of childhood emotional, physical and sexual abuse and neglect; and (b) higher levels of distress and functional impairment as defined by stimulus-seeking, substance use, suicidal ideation, and stress.

Method

Participants and Procedure

Participants were 717 undergraduates, at least 19 years old or older and enrolled in psychology courses at a large public university in the southeastern United States. The study was approved by the university's institutional review board. Participants were recruited for participation via Sona Systems, the university's online research 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-5* PTSD Criterion A. Participants first answered a series of yes/no questions regarding whether or not they had experienced various traumatic events and then were asked to describe their worst event in a brief narrative. The list of event types included the events from the Detailed Assessment of Posttraumatic Stress (DAPS; Briere, 2001), supplemented with additional events to provide full coverage of *DSM-5* Criterion A. Two clinicians independently reviewed event narratives to determine if they met *DSM-5* Criterion A. Disagreements were resolved through discussion and consensus.

Measures were administered via Qualtrics, an online survey administration software. After providing informed consent, participants completed the online self-report battery which included a short demographics form, the DAPS, and several measures of PTSD and features associated with CPTSD. A subset of the sample ($n = 378$) also completed the Personality Assessment Inventory (PAI; Morey, 1991), following completion of the initial battery. Participants were compensated with extra credit for use in their psychology courses. Participants were predominantly female (72.9%) and White (non-Hispanic; 87.3%) or African American (6.6%), and ranged in age from 19 to 62 years old ($M = 20.23$, $SD = 2.48$).

Measures

After responding to the demographics form, participants completed the measures described below. Order of administration was randomized, with the exception of the DAPS, which always came first because of the need to identify the worst event before administering PTSD symptom items, and the PAI which always appeared last, so as to not discourage participants with its length early in the battery.

Detailed Assessment of Posttraumatic Stress (Briere, 2001) is a 104-item self-report measure that assesses trauma exposure and the core symptoms of PTSD as defined by *DSM-IV*. Respondents first answer a series of yes/no questions regarding whether or not they have been exposed to various traumatic events at any time in their lives. They then describe various characteristics of the most upsetting event they have experienced using a five-point scale (1 = *None or Not at all* to 5 = *Very much*). Last, respondents indicate the frequency that they have experienced trauma-related thoughts, feelings, and behaviors in the last month, using a five-point scale (1 = *Never* to 5 = *4 or more times a week*). DAPS scale scores have been shown to be internally consistent and to have good convergent and discriminant validity (Briere, 2001).

Indicators of latent class. Indicators of latent class were selected based on the primary symptom clusters of CPTSD previously discussed. Specifically, the symptoms chosen to be indicators of latent class were PTSD severity, emotion regulation difficulties, disturbances in relational capacities, adversely affected belief systems, dissociation, and somatization. The following measures were chosen to represent the CPTSD symptom clusters.

PTSD Checklist-5 (PCL-5; Weathers, Litz, Keane, Palmieri, et al., 2010) was used in this study to measure PTSD symptom severity. The PCL-5 is a 20-item self-report measure that assesses each of the 20 *DSM-5* symptoms of PTSD. Respondents identify an index event and

then refer to this event as they complete the items. Respondents indicate how much they were bothered by each PTSD symptom in the past month, using a five-point scale (1 = *not at all* to 5 = *extremely*). The PCL for *DSM-IV* has been used extensively across a wide variety of trauma populations and PCL scores have been shown to possess high levels of internal consistency and strong convergent and discriminant validity (see Wilkins, Lang, & Norman, 2011, for a recent review). Initial studies using the PCL-5 suggest that it is also a promising measure, since PCL-5 scores have been found to be internally consistent and to possess good convergent and discriminant validity (Hoge, Riviere, Wilk, Herrell, & Weathers, 2014; Keane et al., 2014). The internal consistency for the PCL-5 scores in the present study was high (Cronbach's $\alpha = .95$).

Multiscale Dissociation Inventory (MDI; Briere, 2002) was used in this study to assess for dissociation. The MDI is a 30-item self-report measure of dissociation that contains six scales assessing a wide range of dissociative symptoms (disengagement, depersonalization, derealization, emotional constriction, memory disturbance, and identity dissociation). Dissociation was assessed in the present study by administering the entire MDI and then analyzing the depersonalization (MDI-DP) and derealization (MDI-DR) scales. These two forms of dissociation were selected because they form the basis for the *DSM-5* dissociative subtype of PTSD and because they are commonly associated with PTSD (e.g., Blevins, Weathers, & Witte, 2014). Respondents indicate symptom frequency in the past month on a five-point scale (1 = *never* to 5 = *very often*). MDI scale scores have been shown to be internally consistent and to have good convergent and discriminant validity in clinical, community, and university samples (Briere, 2002; Briere, Weathers, & Runtz, 2005; Blevins, Weathers, & Mason, 2012). The internal consistency for the MDI-DP and MDI-DR scale scores in the present study was high ($\alpha = .88$ and $.88$, respectively).

Inventory of Altered Self-Capacities (IASC; Briere & Runtz, 2002) was used in this study to assess for emotion regulation difficulties and disturbances in relational capacities. The IASC is a 63-item, multi-scale self-report measure that assesses deficits in a range of functional self-capacities. The IASC contains seven primary scales related to the construct of self-capacities. Emotion regulation difficulties and disturbances in relational capacities were assessed in the present study by administering the entire IASC and then analyzing the affect dysregulation (IASC-AD) and interpersonal conflicts (IASC-IC) scales. Respondents indicate the frequency of various experiences during the past 6 months using a five-point scale (1 = *never* to 5 = *very often*). Initial psychometric work suggests that the IASC is a promising measure, since IASC scale scores have been shown to have high levels of internal consistency and possess good convergent and discriminant validity in clinical, community, and university samples (Briere & Runtz, 2002). The internal consistency for the IASC-AD and IASC-IC scale scores in the present study was high ($\alpha = .94$ and $.90$, respectively).

Beck Depression Inventory – Second Edition (BDI-II; Beck, Steer, & Brown, 1996) was used in this study to assess for adversely affected belief systems (e.g., feeling permanently damaged, ineffective, and ashamed), as defined by Cloitre et al. (2011). The BDI-II is a 21-item measure of depression symptoms (e.g., loss of pleasure, suicidal thoughts, and changes in sleeping patterns). Adversely affected belief systems was assessed in the present study by administering the entire BDI-II and then combining and analyzing items 5 (i.e., guilt) and 14 (i.e., worthlessness). The resulting combination was labeled negative self-concept (BDI-NSC), a description that has been used previously in LPA studies of CPTSD (e.g., Cloitre et al., 2013). Respondents on the BDI-II indicate the degree to which they have been bothered by each symptom during the past two weeks on a four-point scale (0 to 3). The BDI-II is one of the most

widely used self-report measures for depression, having been used on a range of populations. BDI-II scores have been shown to possess excellent internal consistency and have good convergent and discriminant validity (e.g., Steer, Rissmiller, & Beck, 2000; Steer & Clark, 1997; Whisman, Perez, & Ramel, 2000). The internal consistency for the BDI-II scores in the present study was high ($\alpha = .92$).

Personality Assessment Inventory (PAI; Morey, 1991) is a 344-item self-report measure used to assess symptoms of a broad range of psychopathology and personality traits. A subset of participants in the present study ($n = 378$) were administered the PAI. Respondents indicate if each item is an accurate description of themselves using a four-point scale ($F = False, not at all true$; $ST = Slightly true$; $MT = Mainly true$; $VT = Very true$). PAI scale scores have consistently demonstrated high levels of internal consistency, and excellent convergent and discriminant validity (Morey, 2007). The following PAI scales were used as indicators of latent class in the present study:

Somatization (SOM-S) subscale was used to measure any somatic distress experienced by the participants. SOM-S is an 8-item subscale that measures physical complaints such as headaches, back problems, or pain. Elevations on this scale are consistent with individuals who are preoccupied with the type of somatic complaints often associated with somatization or conversion disorders (Morey, 2003).

Depression-Cognitive (DEP-C) scale was used, in addition to the BDI-II, to ensure adequate construct coverage of adversely affected belief systems. DEP-C is an 8-item scale that measures beliefs related to one's inadequacies, powerlessness, or helplessness in dealing with the demands of the environment. Elevations may be indicative of someone who has low self-efficacy

and a sense of personal incompetence (Morey, 2003). The internal consistencies for the SOM-S and DEP-C scale scores in the present study were adequate ($\alpha = .65$ and $.78$, respectively).

Auxiliary (Predictor) Variables. Predictor variables allow for the investigation of whether additional factors (e.g., a history of child abuse) can be used to help significantly predict what type of participants end up in what classes, illuminating the origins of class membership (Asparouhov & Muthén, 2013). Because it has been suggested that CPTSD is linked to histories of early childhood trauma (e.g., Herman, 1992a), scales from the following measure provided predictor variables for the present study:

Childhood Trauma Questionnaire (CTQ; Bernstein, Fink, Handelsman, Foote, & et al., 1994) is a 28-item, self-report measure used to identify adolescents and adults who have histories of childhood abuse and/or neglect. The CTQ contains five primary scales which assess for: physical abuse, sexual abuse, emotional abuse, physical neglect, and emotional neglect. Respondents indicate the level of maltreatment they experienced growing up by utilizing a five-point scale (1 = *never true* to 5 = *very often*). The CTQ has been used extensively in the assessment of childhood trauma and CTQ scale scores have been shown to be internally consistent, possess stable test-retest reliability, and have good convergent and discriminant validity (e.g., Bernstein & Fink, 1998; Paivio & Cramer, 2004). The internal consistency for the CTQ scale scores in the present study was adequate ($\alpha = .58$ to $.94$).

Auxiliary (Distal) Variables. Distal variables assist in determining if observed class differences matter and actually lead to significantly different outcomes (e.g., greater functional impairment; Asparouhov & Muthén, 2013) The following PAI scales were used as distal variables in the present study and were chosen for their ability to adequately cover the construct of general functional impairment:

Stimulus-Seeking (ANT-S). The ANT-S scale is an 8-item subscale that assesses for a person's willingness to take risks and engage in behaviors which have a tendency to be reckless and potentially dangerous (Morey, 2003).

Alcohol and Drug Problems (ALC; DRG). The ALC and DRG scales are 12-item scales assessing a history of behaviors and consequences related to drug and alcohol use, abuse, and dependence (Morey, 2003).

Suicidal Ideation (SUI). The SUI scale is a 12-item scale that assesses for thoughts and ideas related to death and suicide. Item content ranges from hopelessness, and vague thoughts of dying, to thoughts representing distinct plans (Morey, 2003).

Stress (STR). The STR scale is an 8-item scale that assesses the degree of life stressors currently or recently in a person's life. Such stressors range from financial hardships to difficulties related to employment and other day-to-day circumstances (Morey, 2003). The internal consistencies for all PAI scale scores in the present study were acceptable ($\alpha = .64$ to $.81$).

Analytic Strategy

Data from the present study were analyzed by following the recently established three-step approach to latent class estimation, as outlined by Asparouhov and Muthén (2013). In the first step, the established latent class indicators are used to estimate the best-fitting latent class model. In the second step, the latent class posterior distribution is used to calculate most likely class membership, while accounting for classification uncertainty. Last, the most likely class membership is then used on the variables not included in the latent model (i.e., external correlates) to examine any significant class differences (Asparouhov & Muthén, 2013). In the

present study, all external correlates were specified as either continuous predictor or distal outcome variables with unequal means and variances in each class.

The chosen scales from the PCL, MDI, IASC, and PAI were calculated by summing the raw scores from each scale's respective items. These individual sum scores were then used to represent the associated constructs of CPTSD as the latent class indicators for the model. All LPA models were then estimated in Mplus Version 7.3 (Muthén & Muthén, 1998-2012) with Mixture Add-on. Full information maximum likelihood (FIML) was used to handle missing data for all latent class indicators, with adequate covariance coverage found (48.5% to 98.6%). Compared to other methods, it has been shown in a number of simulation studies that FIML is a superior method for handling missing data (Enders, 2010).

An exploratory approach to the LPA was taken in that no a priori assumptions were made while searching for the best-class solution. A sequential process was then applied, first specifying the one-class model and then increasing the number of classes until a best-fitting class solution could be established. A number of fit indices were used for model-fit comparison: Bayesian information criterion (BIC; McLachlan & Peel, 2000), the bootstrapped likelihood ratio test (BLRT; Nylund, Asparouhov, & Muthén, 2007), and the Vuong-Lo-Mendell-Rubin adjusted likelihood ratio test (LMR-A; Lo, Mendell & Rubin, 2001). Lower BIC values are suggestive of better fit and significant BLRT and LMR-A values suggest that the specified model provides better fit than the model with one fewer class. Classification quality was also assessed by comparing class entropy values, with better quality and classification uniqueness associated with values closest to 1.0 (Muthén, 2004). Once the best-fitting model was determined, five predictor variables were included (emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect) and five distal variables (stimulus-seeking, alcohol problems, drug problems,

suicidal ideation, and stress). The latent class variable was regressed on the five predictor variables and then logit values and odd ratios were used to make comparisons between the classes. Classes from the best-fitting model were then also compared on all distal variables, using a series of pairwise tests used to identify any significant differences in functional impairment. To measure effect size, Cohen's *d* was calculated and interpreted using the following guidelines: .20 for small effect, .50 for medium effect, and .80 for large effect (Cohen, 1988).

Results

Latent Profile Analysis

Initially, 1- to 6-class models were evaluated (see Table 1). For each model, the best log-likelihood value was replicated and converged. All models were re-run with at least twice the random starts to ensure that the best log-likelihood was replicated and to rule out the potential of having identified only a local maximum. Compared to the 2-class model, all subsequent models yielded lower BIC values and significant p-values for the BLRT—this indicated a more complex solution than just a 2-class model. Per the recommendation of Nylund et al. (2007), the best-fitting model was then narrowed down to 3- and 4-class solutions, since the 4-class solution yielded the first non-significant p-value for the LMR-A, an indication that one should stop increasing the number of classes.

This decision was further supported by a visual inspection of the classes, as the 2-class model differed only in severity and the 5- and 6-class models were difficult to interpret and possessed either a class with only 3.2% ($n = 23$) of the sample, or two classes with only 3.2% ($n = 23$) and 3.3% ($n = 24$) of the sample, respectively. Both the 3- and 4-class solutions yielded high entropy values. Although the p-value of the LMR-A for the 3-class model was significant, the 4-class model was found to have both a lower BIC and significant BLRT—an indication of

better model fit from two fit statistics considered more robust and dependable than the LMR-A (see Nylund et al., 2007). The 4-class model included four distinct classes partially congruent with previous empirical findings. Thus, while fit indices were partially ambiguous, a consideration of profile interpretability identified a 4-class model as being the most strongly supported pattern of results. The 4-class model was therefore retained for further analyses.

A plot of the z-transformed means for each of the latent class indicators is presented in Fig. 1. The z-score values differentiate the latent classes, and are interpreted as the degree of severity to which members of a particular class endorsed that symptom. Class 1 accounted for 71% of the sample and is distinguished by having low PCL-5 scores and low MDI-DP and MDI-DR scores, with minimal elevations on the IASC-AD, IASC-IC, BDI-NSC, DEP-C, and SOM-S scales. Based on their profile of presenting concerns, this class was labeled the well-adjusted class. Class 2 accounted for 6% of the sample and is distinguished by low PCL-5 scores and high MDI-DP and MDI-DR scores, with slight elevations on the IASC-AD, IASC-IC, BDI-NSC, DEP-C, and SOM-S scales. Based on their profile of endorsements, this class was labeled the dissociative class. Class 3 accounted for 19% of the sample and is distinguished by having high PCL-5 scores and low MDI-DP and MDI-DR scores, with slight elevations on the IASC-AD, IASC-IC, BDI-NSC, DEP-C, and SOM-S scales. Based on their profile of presenting concerns, this class was labeled the PTSD class. Last, Class 4 accounted for 4% of the sample and is distinguished by its high PCL-5 scores and high MDI-DP and MDI-DR scores, with significant elevations on the IASC-AD, IASC-IC, BDI-NSC, DEP-C, and SOM-S scales. Based on their symptom profile this class was labeled the CPTSD class.

Class Differences in Childhood Trauma History

Emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect were included as covariates to examine differences across the LPA classes on these variables. Logistic regression analyses were conducted in which the categorical latent class variable was regressed on the continuous abuse and neglect variables taken from the scales of the CTQ. Table 2 presents the associations that emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect have with participant classifications. The CPTSD class was chosen as the normative comparison group. Three covariate comparisons were made: (a) the likelihood of being in the PTSD class versus the CPTSD class, (b) the likelihood of being in the dissociative class versus the CPTSD class, and (c) the likelihood of being in the well-adjusted class versus the CPTSD class.

The emotional abuse logistic regression coefficient (logit) for the PTSD class indicates that, when compared to the CPTSD class, participants with greater histories of emotional abuse were more likely than participants with minimal emotional abuse histories to be in the CPTSD class (logit = $-.10$, $p = .03$). Similarly, the emotional abuse logistic regression coefficients for the dissociative (logit = $-.20$, $p = .03$) and well-adjusted (logit = $-.25$, $p < .01$) classes also indicate that, when compared to the CPTSD class, participants with greater histories of emotional abuse were more likely to be in the CPTSD class. Finally, there was a difference in sexual abuse history when comparing the CPTSD class to the well-adjusted class, as participants in the well-adjusted class demonstrated less severe histories sexual abuse than those in the CPTSD class (logit = $-.30$, $p < .01$).

Class Differences in Symptoms of Related Psychopathology

Classes were compared across a number of PAI scales pertaining to related psychopathology and functional impairment. As presented in Table 3, all overall χ^2 tests were significant at $p < .01$, with the exception of ANT-S ($p = .02$). In support of Hypothesis 3b, pairwise comparisons indicated that the CPTSD class generally displayed significantly higher severity scores on measures of related psychopathology, compared to the well-adjusted, PTSD, and dissociative classes. Specifically, compared to the well-adjusted class, the CPTSD class demonstrated greater severity across all impairment measures, with moderate/large effect sizes ($d = 0.51$ to 1.97). The CPTSD class also displayed significantly greater severity scores than the PTSD class on ANT-S, ALC, SUI, and STR ($d = 0.43, 0.60, 1.24,$ and 0.70 , respectively). The CPTSD and PTSD classes unexpectedly did not significantly differ on DRG ($d = .30$). The CPTSD class also unexpectedly did not differ on ANT-S, ALC, or DRG, when compared to the dissociative class ($d = 0.17, 0.03,$ and 0.19 , respectively). However, the CPTSD class did display higher SUI and STR scores, with a moderate effect ($d = 0.73$ and 0.54 , respectively), compared to the dissociative class. The PTSD class had higher severity scores than the well-adjusted class on ALC, SUI, and STR but did not differ on ANT-S or DRG. Last, the dissociative class was generally found to have significantly greater impairment than the PTSD class, with small to large effect sizes, on ALC ($d = 0.56$), DRG ($d = 0.48$), and SUI ($d = 0.41$). Of note, the pattern of results from secondary analyses using listwise deletion with only those individuals who completed the PAI was unchanged from analyses using FIML.

Discussion

This study sought to extend previous work on CPTSD by first using LPA to investigate the existence and distinctiveness of CPTSD in a trauma-exposed college student sample. First,

contrary to the hypothesized three-class solution found in previous studies (e.g., Cloitre et al., 2013), the present LPA identified a four-class solution including well-adjusted, dissociative, PTSD symptoms, and CPTSD symptoms classes. The well-adjusted class was low across all symptoms. The dissociative class displayed significant dissociation, with minimal PTSD and minimal additional CPTSD symptoms. The PTSD class displayed significantly elevated PTSD scores and minimal elevations on all associated CPTSD symptoms. The CPTSD class displayed high PTSD and high CPTSD features. Second, the hypothesis that class membership for the CPTSD class would be predicted by a history of childhood abuse was supported, with greater emotional abuse particularly leading to a greater likelihood of CPTSD class membership. Last, as expected, the CPTSD class displayed markedly greater levels of distress and impairment (especially suicidal ideation and stress) compared to all other classes, with the exception of the dissociative class which, compared to the CPTSD class, demonstrated greater or equal substance use impairment.

Thus, the present study partially replicated some of the findings from previous LPA work. Previous studies, though limited in number, have found both 3- and 4-class solutions, as the best-fitting models. While the present study did not replicate a 3-class solution, three of the four classes found do map onto previously identified classes. Similar to Cloitre et al. (2013) and Elklit et al. (2014), the present study found similar low symptom (low PTSD, low CPTSD symptoms), PTSD (high PTSD, low CPTSD symptoms), and CPTSD (high PTSD, high CPTSD symptoms) classes. Although prevalences of these three classes in the present study differed from those found in previous studies, such a discrepancy is likely a function of the use of a college student sample compared to the clinical samples used previously. Similar to Knefel et al. (2015), this study also unexpectedly found a fourth class (i.e., the dissociative class). However, it

is worth noting that this study is the first to provide more complete construct coverage, as it includes somatization and dissociation items—the latter of which has been previously described as a research limitation when absent from the dataset (see Cloitre et al., 2013). The inclusion of the depersonalization/derealization scales as indicators in this study likely contributed to the unique finding of a dissociative class. Moreover, it could be postulated that previous LPAs investigating CPTSD (e.g., Cloitre et al., 2013) would have also found four classes had a different argument been made when the researchers reviewed their fit statistics (e.g., see argument from Cloitre et al., 2014).

While unexpected based on previous LPA studies of CPTSD, the presence of a fourth, primarily dissociative class can still theoretically be explained. Dissociation, defined as a disruption of and/or a discontinuity in the normal integration of cognitive components such as consciousness, memory, identity, and perception (American Psychiatric Association, 1994), has long been associated with the types of developmental trauma also thought to cause CPTSD (e.g., Lewis Yeager, Swica, Pincus, & Lewis, 1997; Ogawa, Sroufe, Weinfeld, Carlson, & Egeland, 1997). Because dissociation was operationalized in the current study with depersonalization/derealization scale scores, this class of individuals is characterized by symptoms of depersonalization/derealization disorder. As noted by Sar (2011), a general lack of conceptual clarification and empirical investigation has made it challenging to understand the overlap between the dissociative disorders and CPTSD. Therefore, the discovery of a dissociative class is theoretically viable and empirically plausible given the limited number of mixture modeling that has been conducted on CPTSD and the typical absence of dissociation indicators used in those studies.

The present study also provided evidence of qualitative, and not just quantitative, differences between the CPTSD and PTSD classes. Critics have suggested that CPTSD may only be a severe form of PTSD existing on a dimensional scale. For instance, Wolf et al. (2014) compared the relative fit of latent trait, latent class, and factor mixture models to critically examine *ICD-11* CPTSD. A four-class model with two latent variables (i.e., dimensionality of PTSD items and dimensionality of CPTSD items) was found to be the best-fitting model and it was concluded that classes differentiated individuals by level of symptom severity and not by the proposed CPTSD/PTSD symptom sets. However, in the present study the CPTSD class differed from the PTSD class in more than just severity. For example, although the CPTSD class had similar elevations on PTSD and dissociative symptoms, the PTSD class had markedly lower elevations on dissociation than on PTSD symptoms. Moreover, the PTSD class had consistently high PTSD elevations across all four symptom clusters, whereas the CPTSD class had high elevations for the negative alterations in cognitions and mood and hyperarousal clusters, but considerably lower elevations for the reexperiencing and avoidance clusters.

As expected, the CPTSD class was found to be associated with greater interpersonal, developmental trauma (i.e., childhood abuse) compared to all other classes. Contrary to expectations though, emotional abuse was primarily the only form of childhood trauma found to significantly impact class membership. While emotional abuse has historically been difficult to define (see O'Hagan, 1995), in the present study it was operationalized as “verbal assaults on a child’s sense of worth or well-being, or any humiliating, demeaning, or threatening behavior directed toward a child by an older person” (Bernstein & Fink, 1998, p. 2). This type of abuse seems consistent with the notion that CPTSD can result from negatively impacted attachment bonds and/or the development of a coherent identity (e.g., Herman, 1992a,b). Furthermore,

similar to findings from the present study, histories of emotional abuse have been found to be associated with greater psychopathology and suicide risk (Mullen, Martin, Anderson, Romans, & Herbison, 1996) as well as poor emotion regulation and social development (O'Hagan, 1995). It has also been suggested that emotional abuse leads to greater levels of depression, anxiety, somatic complaints, and interpersonal difficulties (Tuscic, Flander, & Mateskovic, 2012). Further, compared to other forms of abuse, emotional abuse has been found to be a stronger predictor of later emotional problems (Gibb, Chelminski, & Zimmerman, 2007) and to possess a stronger relationship with poor long-term psychological functioning (Kaplan, Pelcovitz, & Labruna, 1999).

One strength of the present study is the expanded set of indicators used to define CPTSD. Compared to *ICD-11* conceptualization, the CPTSD conceptualization was broader and arguably closer to the original CPTSD conceptualization (Herman, 1992a,b; Pelcovitz et al., 1997) and to the most recent symptom consensus taken from the latest expert clinician survey (see Cloitre et al., 2011). This expansion of the investigation into CPTSD is also important because, as indicated by Wolf et al. (2014), a switch to *ICD-11* as the dominant taxonomy is both likely and impending—the immediate ramifications of which would mean the adoption of markedly different diagnoses still in need of sufficient validation. This lack of sufficient validation will be especially the case for CPTSD, as it will be novel to both the United States as well as to *ICD-11*. Therefore, studies such as the present one—which utilize a more inclusive CPTSD definition—provide an opportunity to test the boundaries of the CPTSD construct and further the field's understanding of the construct's validity prior to its introduction into accepted taxonomy. Results from the present study further support the use of a more inclusive CPTSD definition since a

distinct CPTSD class emerged and was found to include both dissociation and somatization symptom elevations—symptoms that were left out of previous LPA/LCA CPTSD studies.

Another strength of the present study is its use of the *DSM-5* criteria for defining PTSD. Using a contemporary, four-symptom cluster definition for PTSD extends the findings from the previous LPA/LCA studies (e.g., Cloitre et al., 2013) which utilized a three-symptom cluster definition. The use of a four-symptom cluster definition in this study, expands the understanding of PTSD symptoms and their relationship to CPTSD (Cloitre et al., 2011). Because the CPTSD class was characterized by elevated PTSD symptoms, results are supportive of PTSD symptoms remaining a part of the CPTSD construct. These findings also suggest that a more inclusive, four-symptom cluster definition for PTSD may be warranted when conceptualizing CPTSD.

In summary, the present study continues the important nosological work being done in the area of CPTSD and contributes additional empirical evidence to its knowledge base by also supporting the existence of a more complex construct than that which is encapsulated by PTSD and *ICD-11* CPTSD.

This study has several limitations. First, the items/scales chosen to represent CPTSD in this study have not been validated specifically for this purpose. However, a gold-standard CPTSD assessment measure does not currently exist and all scales chosen to represent the associated CPTSD features were selected based on apparent relevance to the theoretical construct. Therefore, while it is challenging to know if these findings represent an artifact of the chosen measures or “true” CPTSD, there can be a degree of confidence in the latter due to the apparent face validity present among the chosen scales in this study. Second, these findings are based solely on self-report data which can cause recall and social desirability bias among other confounds. Future mixture modeling work in this area would benefit from incorporating other

methodologies (e.g., clinician-administered measures) to increase validity. Third, while the current study did extend the literature on CPTSD by using a non-clinical, mixed civilian trauma sample, the generalizability of this sample is limited in that it was a convenience sample of college students who were predominantly young, female, and Caucasian. Last, this study employed an internet-based administration of all measures, thus limiting the amount of control during testing.

Despite these limitations, current findings support the existence of a unique CPTSD construct. The formal inclusion of this construct into mental health taxonomy would help reduce comorbidity and bring about greater parsimony within the diagnostic nomenclature. Herman (2012) suggested that increased diagnostic accuracy protects against polypharmacy and inefficient, poorly tailored psychotherapies. Regarding psychotherapy, as symptom complexity increases, traditional PTSD treatments become more difficult to implement (Foa, Keane, & Friedman, 2000). Moreover, treatments such as cognitive-behavioral therapy and eye movement desensitization and reprocessing therapy are associated with significantly greater dropout rates with clients who report having histories of childhood abuse (e.g., McDonagh et al., 2005; van der Kolk et al., 2007). To account for these difficulties and the complexity of CPTSD, new efficacious treatment modalities are beginning to be established (e.g., Courtois & Ford, 2009, 2013). These more phase-based treatment programs focus on reducing interpersonal avoidance, developing more positive self-concepts, and rapidly engaging in the review and meaning of traumatic memories (Cloitre et al., 2014). Establishing a CPTSD diagnosis could lead to more accurate assessment of these complex cases and potentially lead to more appropriate treatment and thus greater prognosis. It is noteworthy that a new CPTSD diagnosis might help protect trauma victims facing stigma when they experience significant personality disturbance—an

experience that society may not perceive to be as “legitimate” of a posttraumatic response (Herman, 1992a).

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Appendix

Table 1

Fit Indices for LPA Models with 1-6 Classes

	1	2	3	4	5	6
No. of classes	1	2	3	4	5	6
No. of free parameters	22	34	46	58	70	82
log likelihood	-19047.95	-17761.62	-17327.63	-17114.29	-16933.10	-16742.12
BIC	38240.56	35746.79	34957.71	34609.93	34326.46	34023.40
ABIC	38170.70	35638.84	34811.65	34425.76	34104.19	33763.02
BLRT (p-value)	— ^a	0.0000	0.0000	0.0000	0.0000	0.0000
VLMR (p-value)	— ^b	0.0015	0.0007	0.4556	0.1484	0.06
LMR-A (p-value)	— ^c	0.0016	0.0008	0.4611	0.1504	0.06
Entropy	— ^d	0.96	0.97	0.96	0.91	0.92

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

^a BLRT not available for the one-class model.

^b VLMR not available for the one-class model.

^c LMR-A not available for the one-class model.

^d Entropy not available for the one-class model.

Table 2

Log Odds Coefficients and Odds Ratio for Four-class Model with Emotional Abuse, Physical Abuse, Sexual Abuse, Emotional Neglect, and Physical Neglect as Covariates.

Class	Effect	Logit	SE	t	OR
PTSD	Emotional Abuse	-0.10	0.05	-2.188*	0.90
	Physical Abuse	0.01	0.08	0.097	1.01
	Sexual Abuse	-0.07	0.05	-1.444	0.93
	Emotional Neglect	0.05	0.07	0.695	1.05
	Physical Neglect	-0.08	0.08	-1.092	0.92
Dissociative	Emotional Abuse	-0.20	0.09	-2.155*	0.82
	Physical Abuse	-0.01	0.12	-0.075	0.99
	Sexual Abuse	-0.07	0.06	-1.224	0.93
	Emotional Neglect	0.10	0.08	1.254	1.11
	Physical Neglect	0.07	0.11	0.616	1.07
Well-adjusted	Emotional Abuse	-0.25	0.06	-4.147**	0.78
	Physical Abuse	-0.02	0.08	-0.208	0.98
	Sexual Abuse	-0.30	0.10	-3.163**	0.74
	Emotional Neglect	0.01	0.07	0.16	1.01
	Physical Neglect	-0.08	0.08	-1.092	0.92

Note. CPTSD class was used as the comparison group.

* $p < .05$.

** $p < .01$

Table 3
Mean Differences in PAI Clinical Scales among Four Latent Classes

Variable	Well-adjusted	Dissociative	PTSD	CPTSD	$\chi^2(3)$	d_{1-2}	d_{1-3}	d_{1-4}	d_{2-3}	d_{2-4}	d_{3-4}
	(<i>n</i> = 508)	(<i>n</i> = 42)	(<i>n</i> = 138)	(<i>n</i> = 29)							
	M (SD)	M (SD)	M (SD)	M (SD)							
Stimulus Seeking	53.66 (14.67)	59.30 (18.04)	55.25 (16.11)	62.32 (17.95)	10.44*	0.38	0.11	0.58	0.25	0.17	0.43
Alcohol Problems	51.66 (12.67)	63.04 (14.78)	55.04 (14.24)	63.52 (14.76)	42.59**	0.88	0.26	0.93	0.56	0.03	0.60
Drug Problems	52.00 (13.68)	62.00 (16.32)	54.39 (15.74)	59.03 (15.53)	20.94**	0.72	0.17	0.51	0.48	0.19	0.30
Suicidal Ideation	49.15 (10.95)	58.48 (17.49)	52.19 (14.91)	72.20 (21.45)	46.99**	0.81	0.26	1.97	0.41	0.73	1.24
Stress	48.27 (10.46)	54.42 (12.37)	52.35 (13.25)	61.92 (16.04)	37.39**	0.58	0.37	1.26	0.16	0.54	0.70

Note. T scores derived from census-match standardization sample reported. PAI = Personality Assessment Inventory; PTSD = posttraumatic stress disorder; d = Cohen's d effect size statistic. In pairwise comparisons, 1 = Well-adjusted class, 2 = Dissociative class, 3 = PTSD class, 4 = CPTSD class.

* $p < .05$.

** $p < .01$.

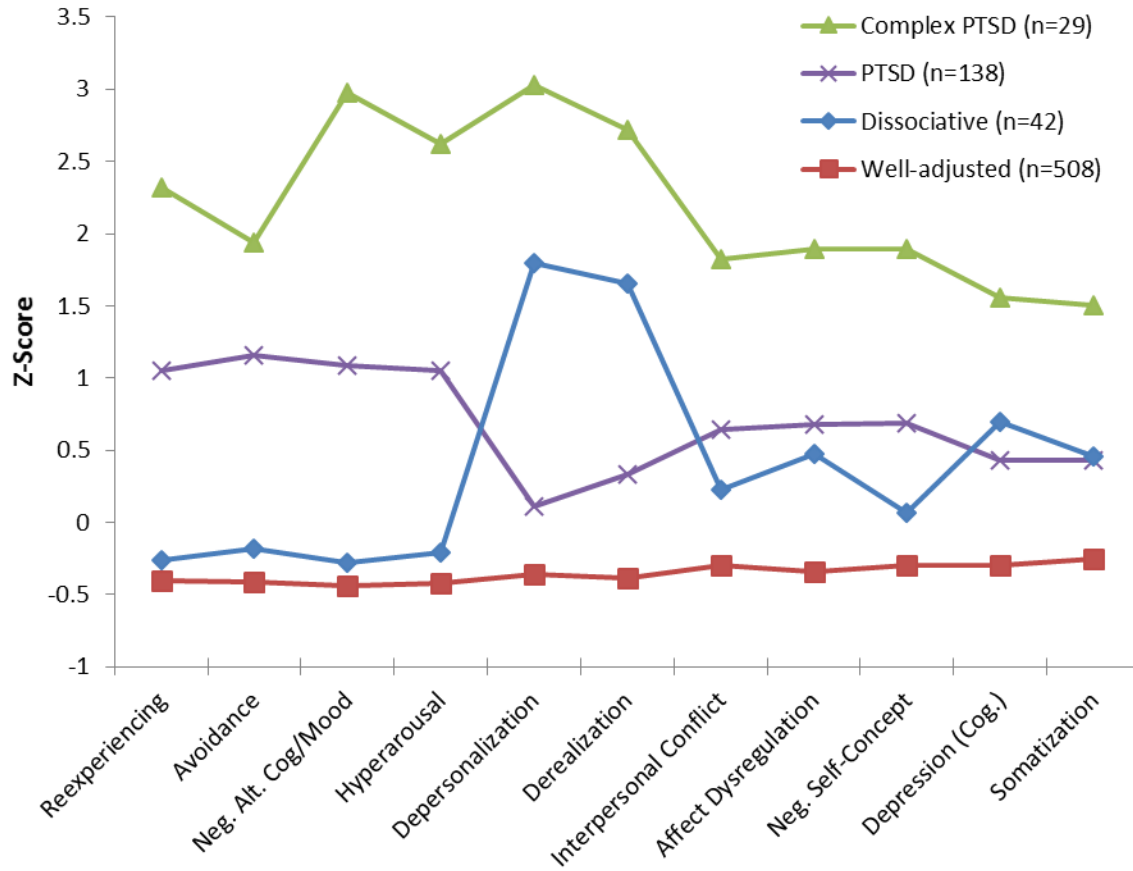


Figure 1. Z-scores of mean severity scores on the scales used as indicators by latent class.