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ICD-11 Complex PTSD in US National and Veteran Samples: Prevalence and Structural Associations with PTSD

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Abstract

The eleventh edition of the *International Classification of Diseases (ICD-11)* is under development and current proposals include major changes to trauma-related psychiatric diagnoses, including a heavily restricted definition of posttraumatic stress disorder (PTSD) and the addition of complex PTSD (CPTSD). We aimed to test the postulates of CPTSD in samples of 2695 community participants and 323 trauma-exposed military veterans. CPTSD prevalence estimates were 0.6% and 13% in the community and veteran samples, respectively; one-quarter to one-half of those with PTSD met criteria for CPTSD. There were no differences in trauma exposure across diagnoses. A factor mixture model with two latent dimensional variables and four latent classes provided the best fit in both samples: classes differed by their level of symptom severity but did not differ as a function of the proposed PTSD versus CPTSD diagnoses. These findings should raise concerns about the distinctions between CPTSD and PTSD proposed for *ICD-11*.

Keywords

complex posttraumatic stress disorder; ICD; factor mixture model; taxonomy

Since the initial appearance of the posttraumatic stress disorder (PTSD) diagnosis in the *Diagnostic and Statistical Manual-III (DSM-III)*; American Psychiatric Association [APA],

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Author Contributions MJM, TMK, MWM, DK, HSR, BPM, RCR, and EJW developed the study concept and contributed to the study design. Data collection was overseen by MWM, BPM, DK, HSR, and EJW. Data analysis and interpretation were performed by EJW, HSR, and CLB. EJW and MWM drafted the paper and all authors provided critical revisions. All authors approved the author order and the final version of the paper for submission.

1980) a controversy has surrounded the question of whether the *DSM* definition adequately captures the full range and scope of trauma-related psychopathology. Critics have argued that it misses a distinct but important clinical syndrome identified originally in survivors of prolonged childhood sexual trauma, termed complex PTSD (CPTSD). CPTSD was first described by Herman (1992a, 1992b) as a post-trauma syndrome characterized by problems in the domains of interpersonal relationships, somatization, affect regulation, dissociation, and sense of self. A variation of this construct, called “disorders of extreme stress, not otherwise specified” (DESNOS), was proposed for inclusion in *DSM-IV* (APA, 1994) and CPTSD was then considered by the workgroup responsible for changes to PTSD in *DSM-5* (APA, 2013). However, in both instances, the CPTSD proposal was rejected due to concern about the utility of the diagnosis and its distinction from other disorders, principally, PTSD and borderline personality disorder (Friedman, Resick, Bryant, & Brewin, 2011; see also: Bryant, 2012; Goodman, 2012; Herman, 2012; Lindauer, 2012; Resick, Bovin et al., 2012; Resick, Wolf et al., 2012; Roth, Newman, Pelcovitz, van der Kolk, & Mandel, 1997). In *DSM-IV* and *DSM-5*, some of the symptoms of CPTSD were described in the “associated features” section of the PTSD chapter and *DSM-5* highlights dissociative symptomatology in two of the core symptoms (amnesia and flashbacks) and in a new dissociative subtype (Wolf, Miller et al., 2012); pervasive negative mood, distorted negative cognitions (e.g., self blame), and reckless behavior, which may align with some conceptualizations of CPTSD, were also added to the *DSM-5* diagnostic criteria (Friedman, 2013.)

The *DSM* is not the only psychiatric diagnostic classification system used throughout the world. The *International Classification of Diseases (ICD)*, developed by the World Health Organization (WHO), and now in its 10th edition (*ICD-10*; WHO, 1992) is widely used outside of North America. *ICD-10* includes two-trauma related diagnoses: a PTSD diagnosis that is similar to the *DSM-IV* definition and a second diagnosis that is located among the personality disorders termed “enduring personality change after catastrophic experience” (EPCACE). *ICD-11* is now under development and the workgroup overseeing the trauma-related diagnoses recently published a series of papers outlining proposed revisions (Maercker et al., 2013a, 2013b). The proposal described a new category of mental health diagnoses termed Disorders Specifically Associated with Stress which would include a narrowly defined (six-symptom) PTSD diagnosis and a new CPTSD diagnosis that would be conditional on the presence of PTSD; EPCACE would be eliminated from the *ICD*. More specifically, Maercker et al.’s (2013a, 2013b) proposal defines CPTSD as the presence of PTSD plus at least one symptom in each of three CPTSD symptom clusters: affect dysregulation, negative self-concept, and interpersonal disturbances (Maercker et al., 2013a, 2013b). These symptoms would be conceptualized as enduring, stable, and caused by exposure to severe and/or protracted traumatic events (Maercker & Perkonig, 2013; Maercker et al., 2013a, 2013b). Maercker et al. specified that the affect dysregulation criterion would include emotional reactivity, dissociation, anger, aggression, and emotional numbing. Negative self-concept would be defined by negative beliefs about the core value of the self along with feelings of guilt and shame. Interpersonal disturbances would include avoidance of relationships, estrangement, and lack of emotional intimacy in relationships (Cloitre, Garvert, Brewin, Bryant, Maercker, 2013, Maercker et al., 2013b). PTSD would be defined by just six symptoms (instead of the 20 listed in *DSM-5*): two reexperiencing

symptoms (flashbacks and nightmares), two active avoidance symptoms, and two heightened sense of threat symptoms (startle and hypervigilance). The diagnosis would require one symptom from each cluster plus functional impairment.

The primary aim of this study was to test the postulates of CPTSD outlined by Maercker et al. (2013a, 2013b) by examining the prevalence of CPTSD and its psychometric associations with the *ICD-11* PTSD diagnosis. In our view, it is important for the proposed changes to undergo empirical examination and scientific vetting prior to the publication of *ICD-11* because adopting an unvalidated diagnosis has potential to negatively impact scientific advances and clinical care of trauma survivors worldwide. From a policy standpoint, the *ICD* has the potential to become the primary diagnostic classification system, including in the United States, as the United States Health Insurance Portability and Accountability Act (HIPPA) mandates use of *ICD* codes for all services; at present, the use of *ICD-10* codes will legally required as of October, 2015 (Protecting Access to Medicare Act of 2014) and the United States Government will implement *ICD-11* when it is finalized. This could mean that access to trauma-related mental health treatment and reimbursement for care will rely on diagnostic criteria that are markedly different from the existing ones and that have not been sufficiently tested. Parsimony and accuracy are the sine qua non of any diagnostic classification system and at present, it is unclear that CPTSD captures psychopathology that is meaningfully distinct from PTSD. Therefore, the overall aim of this study was to evaluate the *ICD-11* proposal for the addition of a distinct CPTSD diagnosis and to thereby contribute to the empirical basis of a classification system that is poised to be widely used.

To our knowledge, only one published study has taken an empirical, psychometrically-informed approach to examining the relationship between the proposed *ICD-11* PTSD and CPTSD diagnoses. Cloitre et al. (2013) operationalized CPTSD according to the *ICD-11* six-symptom proposal using a subset of items from a *DSM-IV* PTSD inventory and a measure of general psychological distress. These self-report scales were completed by treatment-seeking trauma clinic patients; the majority of whom experienced trauma related to the September 11, 2001 terrorist attacks. The authors reported moderate to strong associations across PTSD and CPTSD factors modeled using confirmatory factor analysis (CFA) and suggested that latent profile analyses (LPAs) provided support for the distinction between PTSD and CPTSD: the best class solution included a group of individuals who scored high on both the PTSD and CPTSD items (the CPTSD class), a group who scored high only on the PTSD items (the PTSD class), and a group who scored low on all the items. Membership in the CPTSD class, relative to the PTSD-only class, was associated with exposure to childhood trauma and with functional impairment leading Cloitre et al. to conclude that results were consistent with the distinction between PTSD and CPTSD as outlined in their *ICD-11* proposal.

Unfortunately, methodological limitations and problems with their approach to data analysis complicate interpretation of Cloitre and colleagues' (2013) results and limit study conclusions. Concerns include the use of items from measures that were neither developed nor validated as indicators of CPTSD, the use of standardized (as opposed to raw) scores in the latent variable analyses, which can alter results and is generally discouraged, (Kline, 2005), and inconsistency in the approach to modeling PTSD and CPTSD such that only the

CPTSD construct was modeled using distinct factors for each symptom cluster, even though both PTSD and CPTSD are conceptualized as multidimensional.¹ Finally, and most relevant to this study, the relative fit of the dimensional (i.e., CFA) and categorical (i.e., LPA) models was not compared rendering it impossible to determine which type of model would have provided better fit to the data. Given the evidence of a strong dimensional association between the PTSD and CPTSD factors from their CFA analyses, a logical next step would have been to evaluate whether latent dimensional or categorical variable(s) better capture the association between these symptoms. It would also be useful to evaluate whether a hybrid model (i.e., a factor mixture model, FMM; Lubke & Muthén, 2005) might better account for the associations between the PTSD and CPTSD items. Hybrid models include both latent classes and factors and imply that individuals may be differentiated by classes but their responses to the items are influenced by one or more underlying dimensional variables, such as one reflecting general psychopathology severity.

Dimensional, class, and hybrid models lend themselves to testing competing hypotheses about the nature of psychopathology and, when applied to diagnostic variables, each type of structural model carries different nosologic implications. Dimensional models assume that a common factor influences the likelihood that psychiatric symptoms (or diagnoses) will co-occur. Symptoms and diagnoses accounted for by the dimensional factor are often thought to have a shared etiology, pathophysiology, course, and treatment response and are conceptualized as manifestations of the same phenomenon. In contrast, a latent class model suggests that two sets of symptoms (or diagnoses) occur in discrete groups of patients and are sufficiently different from each other that having one set of symptoms does not predict the likelihood of having the other. In this case, in theory, the two classes would be expected to evidence differential etiologies, courses, and prognoses. This would suggest that it is important to differentiate the two sets of symptoms in the diagnostic taxonomy, either by delineating two separate diagnoses, or, if the two sets of symptoms co-occur only in a discrete group of individuals, with a subtype (e.g., as in the dissociative subtype of PTSD; Wolf, Miller et al., 2012). Hybrid models can account for a wide array of combined class and dimensional models but generally suggest that symptoms or disorders are differentially related to each other in distinct classes of people who may also differ from one another as a function of their location along a latent trait, such as those who exhibit below versus above-diagnostic threshold levels of symptoms (Masyn, Henderson, & Greenbaum, 2010).

In this study, we sought to evaluate the *ICD-11* CPTSD proposal by comparing the relative fit of latent trait, latent class, and hybrid models of the association between PTSD and CPTSD in two independent samples: a community sample representative of the adult U.S. population and sample of trauma-exposed veterans. In view of prior evidence for both dimensional and categorical associations between these constructs (Cloitre et al. 2013), we expected that a FMM would provide the best fit to the data. We also examined the prevalence of CPTSD and its association with trauma history. We reasoned that for the class model advanced by Cloitre and colleagues and Maercker and colleagues (2013a, 2013b) to

¹In Cloitre et al. (2013), CPTSD was modeled as three correlated factors (i.e., one for each symptom cluster), with two indicators per factor while PTSD was modeled as a single factor with correlated residuals between pairs of items from the same symptom cluster. In order to identify the model, the loadings on the CPTSD factors were fixed.

be supported, the CPTSD diagnosis should be associated with greater total trauma exposure and/or sexual/physical assault specifically (i.e., show a unique etiology as defined by severe trauma exposure). Further, the LPA should converge on a solution that: (a) resembled the one described by Cloitre and colleagues with classes differing by likelihood of PTSD versus CPTSD symptoms; and (b) was supported empirically as one of the best fitting solutions; moreover, other models should not provide equally interpretable and plausible solutions for the relationship among the two sets of symptoms.

Method

Data for this study were drawn from two internet based samples: a community sample that is representative of the adult U.S. population and a sample of trauma-exposed US military veterans. Data from both samples were collected prior to the finalization of *DSM-5* with the aim of evaluating the PTSD criteria that had been proposed for *DSM-5* (see Miller et al., 2013). Data from the two samples were analyzed separately. Details about the participants and methods are below; additional details about the samples are provided in Miller and colleagues (2013) and Kilpatrick et al. (2013). All participants included in these analyses were also included in Miller et al. (2013, 2014) and a subset of individuals in these analyses (the community sample) were included in Cox et al. (in press), Kilpatrick et al. (2013), and LeBeau et al. (in press); those studies did not evaluate the CPTSD items that are the focus of this investigation.

Participants

Participants in the community sample were adults recruited from an online probability-based panel maintained by Survey Sampling International. There were 3,756 individuals who connected to the survey URL for this study and 92% ($n = 3,457$) of these agreed to participate. A total of 2,953 completed the survey. Approximately half (52%) of the sample ($n = 1,538$) was female. The age distribution was as follows: 332 (11.3%) between ages 18-24; 563 (19.1%) between ages 25-34; 508 (17.2%) between ages 35-44; 571 (19.3%) between ages 45-54; 488 (16.5%) between ages 55-64; and 490 (16.6%) were age 65 or older. Self-reported race and ethnicity were as follows: 2,214 (75.0%) White, 363 (12.3%) Black or African American, 46 (6.6%) Native American, and 145 (4.9%) Asian/Pacific Islander; 50 (1.7%) indicated that they were of another race and 135 (4.6%) indicated that they were of two or more racial ancestries (when demographic categories are not mutually exclusive, totals may exceed 100%). Four hundred ninety-five (16.8%) described their ethnicity as Hispanic or Latino. Participants reported exposure to a wide range of traumatic events including being a victim of physical or sexual assault (53.1%), death of a family member or close friend due to an accident, violence, or disaster (51.8%), natural disaster (50.5%), accident/fire (48.3%), witnessing a physical or sexual assault (33.2%), threat or injury to a family member or close friend due to violence/accident/disaster (32.4%), and witnessing a dead body unexpectedly (22.6%). Combat or war zone exposure was endorsed by 7.8% and 89.7% reported exposure to one or more *DSM-5* Criterion A events. The modal number of *DSM-5* Criterion A events within the full sample was three, with a mean of 3.3 and standard deviation of 2.3. Diagnostic prevalence was computed in the weighted sample of 2695 cases who completed the study while the structural analyses were conducted in the

subsample of 345 participants who reported exposure to a *DSM-5*-defined trauma and met criteria for probable lifetime PTSD using the original *DSM-5* definition of the disorder (to permit comparison with prior work in this subsample and to ensure the clinical relevance of the structural analyses; see Miller et al., 2013).

The second sample included 345 military veterans who accessed the website for the study. Of these, 323 completed the study and were included in these analyses (missing data at the item level did not exceed 21% of the 323). This sample was 61% male with a mean age of 44 (range: 23 – 85); 80% self-identified as white. Additional self-reported race and ethnicity was 16% Black, 4% American Indian or Alaskan Native, and 1% Asian; 5% endorsed Hispanic, Latino, or Spanish ethnicity. A majority (75%) had served in OEF/OIF. In addition, 15% served in the Vietnam War era, 4% during the Operation Desert Storm era, and 1% served in the Korean War or World War II eras. All analyses in the veteran sample were conducted in the 323 trauma-exposed participants who completed the on-line survey.

Procedure

The community sample was recruited via e-mail from Survey Sampling International's panel of potential participants. The panel is representative of the United States adult population and individuals in the panel receive points for completing surveys and are eligible to win raffle prizes with more valuable rewards for survey completion. The community sample accessed a link provided by Survey Sampling International that took them to a website at the Medical University of South Carolina that contained the National Stressful Events Survey programmed using the Research Electronic Data Capture system (Harris, Thielke, Taylor, Gonzalez, & Conde, 2009). They completed a brief consent form on-line and received points for completion of the study that they could redeem through Survey Sampling International.

The veteran sample was recruited from two sources. First, we mailed 700 letters to veterans in a recruitment database of individuals who expressed interest in our Center's studies; 107 letters were returned for bad addresses and 123 veterans endorsed trauma exposure and entered the survey in response to the letter. Second, we emailed 278 veterans participating in an on-going study of veterans who served in Operations Enduring and Iraqi Freedom (Veterans' Afterdischarge Longitudinal Registry; Rosen et al., 2012). Of these, 222 endorsed trauma exposure and entered the study for a combined total of 345 veterans across the two recruitment sources. Twenty-two did not complete the symptom assessment and were eliminated from these analyses leaving a final sample size of 323. The URL for the study was included in the letters and emails that were sent to the veterans; the veteran sample completed a consent form online; those who were recruited via e-mail through the on-going research protocol received \$15 for their time and effort devoted to this project and those recruited via mailed letters received no compensation. Extensive details about the participants and methods of this study were reported in Kilpatrick et al. (2013) and Miller et al. (2013).

Measures

National Stressful Events Survey (NSES; Kilpatrick, Resnick, Baber, Guille, & Gros, 2011)—The NSES is a self-report measure that was designed to assess trauma

exposure and the PTSD and CPTSD symptoms that were under consideration during the process of developing the *DSM-5* PTSD criteria. The measure includes a branching structure such that for each PTSD criterion, a stem item first asks if the participant ever experienced a given symptom, then assesses when the symptom was last experienced. Symptoms present within the last month are then rated on a scale of 1 (“not at all”) to 5 (“extremely”) to evaluate the extent to which the participant was “bothered” by the symptom in the past month. The inventory also assesses whether symptoms not explicitly linked to the trauma began or got worse following trauma exposure and includes items assessing functional impairment as well. The *ICD-11* PTSD proposal is based on a subset of the *DSM-5* PTSD symptoms so we determined *ICD-11* PTSD diagnostic status using the items assessing flashbacks, nightmares, avoidance, hypervigilance, and exaggerated startle.

The measure also includes eight items assessing CPTSD symptoms that were considered for *DSM-5*. Items assessing CPTSD followed the same branching structure and general format as the PTSD items in the NSES. An initial preface introduced the questions: “Here are some other problems that some people have after extremely stressful events/experiences. These types of problems are typically persistent, occur throughout a large part of people’s lives, and occur in different situations and in interactions with different people. Please tell us whether you have ever had any of these persistent problems, including if you have the problem currently.” Two items assessed affect dysregulation, two items assessed interpersonal problems, three items assessed negative self-concept, and one item assessed dissociation (see Table 1 for a list of the CPTSD items included in this study).² Meeting diagnostic criteria for CPTSD required *ICD-11* PTSD and at least one symptom from the affect dysregulation, interpersonal problems, and negative self-concept clusters.

To code *ICD-11* PTSD and CPTSD diagnoses, we used the current (i.e., past month) severity ratings on the NSES and required each symptom to be present at a rating of three (“moderately”) or greater to count for the diagnosis; in addition, items not explicitly linked to trauma had to have been reported to have started or gotten worse following trauma exposure. Functional impairment is a criterion of the proposed *ICD-11* PTSD diagnosis and was operationalized as endorsement of at least one of five dichotomous items assessing significant symptom-related distress or impairment in social, occupational, academic, or self-care arenas. Coefficient alpha for the past-month severity scores was .77 and .89 for *ICD-11* PTSD in the community and veterans samples, respectively. Alpha for the past-month severity scores for the 7 CPTSD items examined in this study was .78 in the community and .85 in the veteran sample. Alpha for the past month severity scores for the full scale comprised of PTSD and CPTSD items together was .84 in the community and .90 in the veteran sample. There have been no evaluations of the validity of the NSES items that were used to index *ICD-11* PTSD or CPTSD in this study, as discussed in further detail below. Total scores on the NSES, indicative of *DSM-5*-defined PTSD severity, have been

²Although dissociation is conceptualized by Maercker et al. (2013b) as part of the affect dysregulation CPTSD symptom cluster, we are unaware of any empirical data demonstrating that dissociation reflects primarily affective versus cognitive versus sensory deficits. Given this, and because we were attempting to replicate the work of Cloitre et al. (2013), who did not include dissociation, we did not include this item in our analyses.

shown to correlate strongly with an established self-report measure of *DSM-IV* PTSD (Miller et al., 2013).

Statistical Analyses

Identical analyses were conducted in both datasets. First we estimated the prevalence of current *ICD-11* CPTSD in each sample along with the proportion of individuals meeting criteria for each individual CPTSD criterion. We then compared cases meeting criteria for CPTSD versus PTSD-only on measures of cumulative trauma exposure and sexual/physical trauma exposure using *t*-tests and χ^2 tests.

Next, we evaluated dimensional, categorical, and hybrid models of the relationship between the *ICD-11* PTSD and CPTSD items following current best practices for these types of comparisons (e.g., Clark et al., 2013; Conway et al., 2012; Lubke, & Muthén, 2005; Witkiewitz et al., 2013). In each analysis, we included three indicators of PTSD (means of the two reexperiencing, two avoidance, and two “sense of threat” items) and three indicators of CPTSD (means of the two affect dysregulation, two negative self-concept, and three interpersonal problems items). We modeled the variables this way for several reasons: (a) to represent *ICD-11* PTSD and CPTSD symptom clusters in an equivalent fashion across the two criteria sets; (b) to avoid the use of factors composed of just two indicators because they would be under-identified (meaning that there is insufficient information to solve the simultaneous equations in the model); and (c) to be able to accurately compare the fit of the trait and class models with each other.³

The first type of structural model examined was the CFA, which implies that there is only one class of individuals in the dataset and that responses to the items and their variance and covariance are best captured by an underlying dimensional construct or constructs (i.e., factors). We compared the fit of a one-factor model in which the three PTSD and three CPTSD indicators all loaded on a single latent variable reflecting general posttraumatic psychopathology to that of a two factor model in which the three PTSD indicators loaded on one variable while the three CPTSD indicators loaded on a second correlated one. The second type of structural model performed was the LPA, which implies that once the categorical class membership is accounted for, there is no covariation (i.e., correlation) among items within a class; that is, class membership fully accounts for any within-class item associations. We used the same six indicators and examined the fit of solutions with 2-5 classes. Finally, we ran a series of FMMS reflecting different combinations of dimensional and categorical solutions ranging from one factor with two classes to two factors with four classes (the maximum number of factors and classes was determined by the preceding CFAs and LPAs; Clark et al., 2013). Following other investigators (see Clark et al., 2013; Conway et al., 2012; Witkiewitz et al., 2013), in the FMMS with one factor, we set the factor variance to zero in each class, constrained factor loadings and item intercepts to be equal across classes, and freed the factor means to vary across classes, with the last class as

³We did not follow Cloitre et al. (2013) and use correlated residuals to represent the PTSD and/or CPTSD symptom clusters as freeing these correlations in the factor model would mean that they would also need to be freed in the class models in order for equitable model comparison across the trait and class models. Including correlated residuals in the LPA would introduce dimensional elements to the class model and make clean comparisons across the dimensional and class models difficult.

the reference group (e.g., factor mean = 0). In the FMMs with two factors, the factor variances and covariances were estimated, but constrained to equality across groups so that the factor means could vary.

The factor models were evaluated with standard fit statistics (i.e., overall χ^2 , root mean square error of approximation, standardized root mean square residual, confirmatory and Tucker-Lewis fit indices) using the guidelines established by Hu and Bentler (1999). The class models were compared using the Bayesian information criterion (BIC, Schwartz, 1978; lower values indicate a preferred solution), the Lo-Mendell-Rubin adjusted likelihood ratio test (LMRA; Lo, Mendell, & Rubin, 2001), and the bootstrapped likelihood ratio test (BLRT; McLachlan & Peel, 2000), with these latter two indices, a significant p -value implies that the specified number of classes is preferred over a model with one fewer class. Simulation studies suggested that the BLRT yields more accurate results than the LMR-A (Nylund, Asparouhov, & Muthén, 2007) and thus BLRT and BIC (Nylund et al., 2007) were prioritized when comparing fit across class models. The fit of the factor, class, and FMMs were then compared using the BIC (Lubke & Neale, 2006), with lower BIC values indicative of the preferred solution. All models were also evaluated on this basis of their interpretability. All analyses were conducted with the robust maximum likelihood estimator (MLR) using Mplus 7.11 (Muthén & Muthén, 2012).

Results

Prevalence Estimates

The prevalence of current CPTSD in the community and veteran samples was 0.6% and 13.0%, respectively. Miller et al. (2014) reported that the prevalence of *ICD-11* PTSD in these samples was approximately 2.3% and 34.4% indicating that approximately one-fourth of those in the community sample and just under one-half of the veterans with *ICD-11* PTSD also met criteria for CPTSD. Of those with *ICD-11* PTSD, 58% met the Affect Dysregulation Criterion, 41% met the Negative Self Concept Criterion, and 45% met the Interpersonal Problems Criterion in the community sample while 80%, 58%, and 61% met these criteria, respectively, in the veteran sample. The prevalence of the CPTSD symptoms among those who did not meet criteria for *ICD-11* PTSD was as follows: 8% met the Affect Dysregulation Criterion, 3% met the Negative Self Concept Criterion, and 6% met the Interpersonal Problems Criterion in the community sample while 30%, 14%, and 17% met these criteria, respectively, in the veteran sample.

Comparisons Across those with *ICD-11* PTSD versus CPTSD

We next examined possible group differences among those who met criteria for *ICD-11* PTSD only ($n = 49$ in the community and 47 in the veteran sample) versus those who met criteria for *ICD-11* PTSD and CPTSD ($n = 17$ in the community and 42 in the veteran sample). Independent t -tests revealed that the groups did not differ on the total number of lifetime traumatic experiences (in the community sample: M for PTSD only = 4.36, $SD = 2.12$ versus M for CPTSD = 5.01, $SD = 2.49$, $t[64] = -1.036$, $p = .30$, Cohen's $d = 0.28$; in the veteran sample: M for PTSD only = 5.53, $SD = 3.82$; M for CPTSD = 4.95, $SD = 3.51$; $t[87] = .74$, $p = .46$, Cohen's $d = 0.16$). In the community sample, there was no difference in

the prevalence of reported sexual trauma history as a function of meeting criteria for PTSD alone (56%) versus CPTSD (60%), $\chi^2 (1, n = 66) = .07, p = .84, \Phi = .03$. There was also no difference in the prevalence of reported physical trauma history as a function of the PTSD versus CPTSD diagnosis (61% vs. 73%, respectively), $\chi^2 (1, n = 66) = .75, p = .51, \Phi = .11$. In the veteran sample, individuals with CPTSD were no more likely to endorse exposure to pre-military physical/sexual assault, military sexual trauma, or post-military physical/sexual assault (45.2%) compared with individuals with *ICD-11* PTSD alone (44.7%), $\chi^2 (1, n = 89) = .003, p = .96, \Phi = .006$. There were also no differences between the two groups in either sample with respect to sex, minority status, or age (details available from first author).

Structural Analyses

In the subset of the community sample ($n = 345$) who reported exposure to a *DSM-5*-defined trauma and met criteria for probable lifetime PTSD using the original *DSM-5* definition of the disorder (see above), the one-factor CFA yielded poor model fit while the two-factor CFA yielded good model fit (see Table 2). All indicators loaded strongly (standardized β ranged from .63 - .86) and significantly (at the $p < .001$ level) on their respective latent variables and the PTSD and CPTSD factors were strongly correlated with one another ($r = .68, p < .001$). We next proceeded to test the categorical/class models, testing between two- and five- class solutions and stopping at five because the best loglikelihood value for the model and for the bootstrapped likelihood ratio test was not replicated in the model with five classes (see Table 2), suggesting that a local maximum may have been reached and that the model was attempting to extract too many classes (McLachlan & Peel, 2000). As shown in Figure 1, Panel A, the three class model yielded a solution that was similar to that reported by Cloitre and colleagues (2013): it included a low severity class (69.7% of the sample), a class defined by high PTSD symptoms and lower severity CPTSD symptoms (comprising 14.2% of the sample), and a class defined by high PTSD and CPTSD symptoms (16.1% of the sample). However, this was not the best fitting class solution; the four-class model was selected as the best fitting one because it achieved the lowest BIC (see Table 2) and produced classes with good class distinction, with each class comprising between 5-65% of the sample. The BIC for the three- and four-class models were superior (lower) to that for the dimensional two-factor model.

We then proceeded to test the FMMs with 2-4 classes combined with 1-2 factors. Of these models, the best fitting (see Table 2) was the four-class model with two latent variables (one reflecting the dimensionality of the PTSD items and one reflecting that of the CPTSD items); the BIC associated with this solution was lower than that for any latent trait or class model, suggesting that the hybrid dimensional/categorical approach best captured the structural associations among the indicators. The pattern of item means by most likely class assignment was examined (see Figure 1, Panel B) and this revealed that the classes differed from one another by severity, ranging from low to high severity across all PTSD and CPTSD indicators, but did not suggest a differential pattern of endorsement across the PTSD versus CPTSD items. The classes ranged in size from 7% ($n = 25$) to 71% ($n = 245$) of the sample. The overall correlation between the PTSD and CPTSD factors was $r = .56 (p < .001)$, but of course this was weaker within each class because each class had limited variance with respect to symptom severity (which would attenuate the correlation).

In the veteran sample, the one-factor CFA model yielded fit statistics that were just outside the cut-off for acceptable fit while the two-factor model was consistent with good model fit (the fit of all models is shown in Table 3). In the two factor model, all items loaded strongly (standardized β s from .74 - .85) and significantly (all $p < .001$) on their respective latent variables and the PTSD and CPTSD latent variables correlated with each other at $r = .80$ ($p < .001$). The latent profile analyses yielded a near identical pattern of fit indices as reported for the community sample. The three-class solution yielded classes that resembled those reported by Cloitre et al. (2013): 55.6% of the sample had low symptom severity on the PTSD and CPTSD indicators, 27.7% of the sample had moderate scores on the PTSD indicators but relatively lower scores on the CPTSD indicators, and 16.7% of the sample had high symptom severity scores on both the PTSD and CPTSD indicators (see Figure 2, Panel A). Of the class models, the four-class solution was preferred; the five-class solution achieved a lower BIC value than the four-class one but was rejected because it identified a group that comprised just 3% ($n = 11$) of the sample. As in the community sample, the three- and four-class solutions yielded superior (lower) BIC values relative to the two-factor model.

As in the community sample, the FMMs converged on the four-class model with two factors as this model had the lowest BIC of all models that were tested as well as interpretable results. Figure 2, Panel B, shows the pattern of sample indicator means as a function of latent class assignment and demonstrates that, as with the community sample, the latent classes showed parallel patterns of symptom endorsement that differed from one another by mean level along the dimensional and correlated latent variables. Class composition ranged from 7% ($n = 24$) to 70% ($n = 224$). The two factors were correlated at $r = .70$ ($p < .001$) across the classes.

Discussion

This study examined the relationship between the revised PTSD and new CPTSD diagnoses proposed for *ICD-11* and took a psychometrically-informed approach to testing the *ICD-11* workgroup's assertions about the relationship between the two constructs (Cloitre et al., 2013; Maercker et al., 2013a, 2013b). Results from two different samples with diverse trauma exposure histories failed to support fundamental assumptions of the *ICD-11* proposal—CPTSD was neither associated with greater trauma exposure, nor with exposure to physical or sexual assault specifically, and the final model did not distinguish trauma-exposed individuals on the basis of the two proposed diagnoses. Across both samples, the best-fitting structural model, selected on the bases of both empirical and interpretive criteria, suggested that groups differed from one another in terms of their level of severity along both the latent PTSD and CPTSD dimensions, but did not differ in terms of the type of psychopathology that was endorsed (i.e., PTSD versus PTSD and CPTSD), as proposed by Maercker et al. and Cloitre et al. Moreover, PTSD and CPTSD factors were strongly correlated with each other, further arguing against the discrete disorders model. This suggests that the distinction being proposed for *ICD-11* may be artificial and its adoption could introduce redundancy and a lack of parsimony and diagnostic accuracy into the proposed new *ICD-11* category termed Disorders Specifically Associated with Stress. Moreover, implementation of the proposed *ICD-11* criteria could yield confusion across

clinical and research arenas as diagnoses for a given individual would likely differ across *DSM* and *ICD* and it would be unclear the extent to which the results of research based on one system would generalize to the other.

Cloitre et al. (2013) theorized that PTSD and CPTSD reflect different *kinds* of post-traumatic psychopathology such that some trauma survivors show severe PTSD but no CPTSD whereas others show severe levels of both symptom sets. Based on this, they proposed to separate PTSD and CPTSD in the diagnostic nomenclature; this would imply that meeting the criteria for the PTSD diagnosis would not predict whether CPTSD criteria are also met. This was partially supported by Cloitre and colleagues' findings in that results of categorical LPAs provided evidence for discrete PTSD and CPTSD groups though results of a dimensional CFA suggested that the two sets of symptoms were highly correlated with each other. We took the additional step of comparing the relative fit of the categorical versus dimensional models and also evaluated hybrid FMMs. Our findings showed that had we only performed the LPA and stopped at a three-class solution, results would have closely replicated Cloitre et al.'s, finding of a qualitative distinction between patients with and without CPTSD. However, as shown in Figures 1 and 2, when we also modeled symptom dimensions in the FMM, the pattern of results changed dramatically. Instead of differentiating individuals by endorsement of PTSD versus CPTSD symptom sets (as in Panel A of both figures), the classes differentiated individuals by level of symptom severity across both proposed diagnoses (see Panel B of both figures). In other words, those with high severity PTSD symptoms also had high severity CPTSD symptoms while those with low severity PTSD symptoms exhibited low severity CPTSD symptoms and it was level of symptom severity that differentiated the groups, not the proposed PTSD versus CPTSD symptom sets. This is a good reminder that LPA (and latent class analysis) will always return class based solutions so, prior to drawing conclusions about the underlying structure of a construct, such results should be compared with other viable alternatives.

Results of analyses estimating the prevalence of CPTSD and its association with trauma exposure also failed to support Maercker et al. (2013a, 2013b) and Cloitre et al.'s (2013) hypotheses about the etiological distinctions between CPTSD and PTSD. We found no evidence that trauma exposure history differed across the PTSD and CPTSD diagnoses. The prevalence of exposure to physical and sexual assault histories, including that occurring prior to military service (e.g., in childhood and/or adolescence) in the veteran sample, was similar in those diagnosed with PTSD versus CPTSD and there was no difference in the number of reported traumatic experiences across the two groups in either sample. Other studies have also failed to find a differential pattern of a trauma exposure across putative "simple" versus complex PTSD groups (e.g., Allen, Huntoon, & Evans, 1999; Miller & Resick, 2007; Taylor, Asmundson, & Carleton, 2006). Thus, although the notion that early and protracted trauma yields a unique manifestation of symptoms is widely accepted, empirical studies, including this one, have offered mixed support for the hypothesis that the CPTSD construct adequately captures that phenomenon.

Results of this study suggest that the proposed CPTSD symptoms are common among individuals with PTSD, with 40-80% of those with PTSD meeting criteria for at least one of the CPTSD symptom clusters. These symptoms are undoubtedly impairing and should be

the focus of clinical interventions. Cloitre and colleagues (2010) have developed an effective phase-based PTSD treatment called Skills Training in Affect and Interpersonal Regulation (STAIR) that targets many of the symptoms listed in the *ICD-11* CPTSD proposal; this type of treatment appears to be well-matched to clinicians' views on best practices for addressing such symptoms (Cloitre et al., 2011). However, the results of our structural analyses and lack of support for hypothesized links to trauma history that are essential to CPTSD theory should raise doubts about the necessity of a separate CPTSD diagnosis to identify and treat individuals with these symptoms. In our view, findings of this study suggest that it may be more appropriate to simply conceptualize CPTSD symptoms as associated features or clinical correlates of PTSD that are most often seen in individuals with a severe form of PTSD. This would align with text in the *DSM-IV*, *DSM-5*, and *ICD-10* sections on PTSD which describe a variety of common clinical correlates of PTSD. The idea that greater PTSD is associated with greater and more diverse impairment is consistent with recent evidence on the association between trauma exposure and psychiatric disturbance (Karam et al., 2013). Specifically, using cross-national data from the World Mental Health surveys, Karam and colleagues reported that attributing PTSD symptoms to multiple (four or more) traumatic experiences, especially those of a violent interpersonal nature, was associated with greater functional impairment, greater severity of PTSD hyperarousal symptoms, more anxiety and mood disorder comorbidity, and greater symptom duration as compared to attributing PTSD symptoms to fewer traumatic experiences. This suggests that the cumulative burden of lifetime trauma has an effect on the overall severity of posttraumatic psychiatric disturbance but does not suggest that such exposure is etiologically linked to a unique type or kind of posttraumatic psychopathology.

In addition to listing associated features of PTSD, the *DSM-5* also includes a dissociative subtype of the disorder (APA, 2013). This addition to the *DSM* was based in part on psychometric studies that suggested that symptoms of derealization and depersonalization were present in a small minority of patients, that PTSD symptom severity did not strongly predict dissociation severity, and that, in latent profile analyses, these symptoms were strong markers of a unique group of individuals with PTSD who exhibited marked dissociative symptoms (Steuwe, Lanius, & Frewen, 2012; Wolf, Lunney et al., 2012; Wolf, Miller et al., 2012). In contrast, results of this study showed that CPTSD symptoms were highly prevalent among individuals with PTSD and the two constructs were strongly correlated suggesting that CPTSD is neither a discrete diagnosis relative to PTSD nor a subtype of the disorder.

Our results should be considered in light of the limitations of this study, the primary of which was that the items used to evaluate CPTSD have never been examined before and, as such, it is difficult to know if findings are specific to the performance of these items or if they reflect the CPTSD construct more broadly. This problem is difficult to avoid however, as the *ICD-11* criteria are newly proposed and there were no validated measures of them at the time this study was designed. That said, the items that we used were developed specifically to assess the CPTSD construct that was proposed for *DSM-5* and seem to be face valid representations of symptoms listed in the *ICD-11* proposal.

Second, although we included two very different samples in our analyses (who were diverse with respect to demographics and trauma histories), it is unknown to what extent these

results will generalize to other populations. In particular, analyses were conducted in US community and veteran samples whereas the *ICD* was designed to have global relevance and is most often used in non-US populations; we were unable to address the generalizability of these results to non-US populations. We were also unable to address lingering controversy regarding the relationship between CPTSD and other disorders, such as borderline personality disorder (Resick, Bovin et al., 2012), as we did not assess any other comorbidities. Finally, the study used a web-based methodology which yields less control over the execution of the study protocol and limits the sample to individuals who are able to access the internet. This concern is offset by our focus on two large samples, including one that was Nationally representative, and by our strong evidence of replication across the two samples.

We suggest that additional research is needed to determine how best to conceptualize CPTSD symptoms in relationship to PTSD, and more generally, to determine the boundaries between posttraumatic psychopathology and other mental health conditions. Both the *DSM-5* and the *ICD-11* proposals separate trauma-related disorders into their own chapter on the basis of their presumed association with stress and/or trauma. Future research involving comprehensive psychological assessments in large samples could help determine if this is appropriate. This type of research could evaluate: (a) if there is truly a distinct and organic spectrum of trauma related disorders (e.g., in the way that psychotic disorders are grouped together based on the cognitive aberrations that underlie this class of disorders); (b) if the disorders in the trauma and stressors category instead reflect a loose collection of symptoms and constructs that simply share a negative life event as part of their diagnostic criteria; or (c) if such symptoms better align with other dimensions of psychopathology that are not predicated on trauma exposure (such as the internalizing and externalizing dimensions that underlie many psychological disorders, c.f., Krueger, 1999). This type of phenotype refinement is important for studying the biology and pathophysiology of posttraumatic psychopathology (e.g., the search for genes that underlie posttraumatic symptoms necessitates a valid phenotype) and for treating such symptoms. Treatment studies of individuals with a wide variety of well assessed posttraumatic symptoms could be particularly effective in determining the extent to which psychotherapy outcome is moderated by the presence of specific symptoms or sets of symptoms (e.g., do individuals with CPTSD symptoms fare worse in psychotherapy than those without). Ultimately, the advancement of scientific knowledge aimed at understanding and alleviating the heavy burden of posttraumatic psychopathology rests on the power and strength of a sound diagnostic classification system.

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References

- Allen JG, Huntoon J, Evans RB. Complexities in complex posttraumatic stress disorder in inpatient women: Evidence from cluster analysis of MCMI-III personality disorder scales. *Journal of Personality Assessment*. 1999; 73:449–471. [PubMed: 10689654]
- American Psychiatric Association. *Diagnostic and statistical manual of mental disorders*. 3rd ed. Author; Washington, DC: 1980.
- American Psychiatric Association. *Diagnostic and statistical manual of mental disorders*. 4th ed. Author; Washington, DC: 1994.
- American Psychiatric Association. *Diagnostic and statistical manual of mental disorders*. 5th ed. Author; Arlington, VA: 2013.
- Bryant R. Simplifying complex PTSD: Comment on Resick et al., 2012. *Journal of Traumatic Stress*. 2012; 25:250–251. doi:10.1002/jts.21696.
- Clark SL, Muthén B, Kaprio J, D'Onofrio BM, Viken R, Rose RJ. Models and strategies for factor mixture analysis: An example concerning the structure underlying psychological disorders. *Structural Equation Modeling*. 2013; 4:681–703.
- Cloitre M, Courtois CA, Charuvastra A, Carapezza R, Stolbach BC, Green BL. Treatment of complex PTSD: Results of the ISTSS expert clinician survey on best practices. *Journal of Traumatic Stress*. 2011; 24:615–627. [PubMed: 22147449]
- Cloitre M, Garvert DW, Brewin CR, Bryant RA, Maercker A. Evidence for proposed ICD-11 PTSD and complex PTSD: A latent profile analysis. *European Journal of Psychotraumatology*. 2013; 4 doi: 10.3402/ejpt.v4i0.20706.
- Cloitre M, Stovall-McClough KC, Noonan K, Zorbas P, Cherry S, Jackson CL, Petkova E. Treatment for PTSD related to childhood abuse: A randomized controlled trial. *The American Journal of Psychiatry*. 2010; 167:915–924. [PubMed: 20595411]
- Cox KS, Resnick HS, Kilpatrick DG. Prevalence and correlates of post-trauma distorted beliefs: Evaluating DSM-5 PTSD expanded cognitive symptoms with a national sample. *Journal of Traumatic Stress*. (in press).
- Conway C, Hammen C, Brennan PA. A comparison of latent class, latent trait, and factor mixture models of *DSM-IV* borderline personality disorder criteria in a community setting: Implications for *DSM-5*. *Journal of Personality Disorders*. 2012; 26:793–803. [PubMed: 23013346]
- Friedman MJ. Finalizing PTSD in DSM 5: Getting here from there and where to go next? *Journal of Traumatic Stress*. 2013; 26:548–556. [PubMed: 24151001]
- Friedman MJ, Resick PA, Bryant RA, Brewin CR. Considering PTSD for DSM-5. *Depression and Anxiety*. 2011; 28:750–769. doi:10.1002/da.20767. [PubMed: 21910184]
- Goodman M. Complex PTSD is on the trauma spectrum: Comment on Resick et al. (2012). *Journal of Traumatic Stress*. 2012; 25:252–253. doi:10.1002/jts.21695. [PubMed: 22729975]
- Harris PA, Thielke R, Taylor R, Gonzalez N, Conde JG. Research Electronic Data Capture (REDCap) —A metadata-driven methodology and workflow process for providing translational research informatics support. *Journal of Biomedical Informatics*. 2009; 42:377–381. [PubMed: 18929686]
- Herman, JL. *Trauma and recovery*. Basic Books; New York: 1992a.
- Herman JL. Complex PTSD: A syndrome in survivors of prolonged and repeated trauma. *Journal of Traumatic Stress*. 1992b; 5:377–391. doi:10.1007/BF00977235.
- Herman JL. CPTSD is a distinct entity: Comment on Resick et al. (2012). *Journal of Traumatic Stress*. 2012; 25:254–255. doi:10.1002/jts.21697. [PubMed: 22729976]
- Hu L, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*. 1999; 6:1–55.
- Karam EG, Friedman MJ, Hill ED, Kessler RC, McLaughlin KA, Petukhova M, Koenen KC. Cumulative traumas and risk thresholds: 12-month PTSD in the World Mental Health (WMH) Surveys. *Depression and Anxiety*. 2013; 31:130–142. [PubMed: 23983056]
- Kilpatrick, DG.; Resnick, HS.; Baber, B.; Guille, C.; Gros, K. *The National Stressful Events Web Survey (NSES-W)*. Medical University of South Carolina; Charleston, SC: 2011.

- Kilpatrick D, Resnick HS, Milanak ME, Miller MW, Keyes KM, Friedman MJ. National estimates of exposure to traumatic events and PTSD prevalence using DSM-IV and DSM-5 criteria. *Journal of Traumatic Stress*. 2013; 26:537–47. [PubMed: 24151000]
- Kline, RB. *Principles and practice of structural equation modeling*. 2nd ed. Guilford Press; New York, NY: 2005.
- Krueger RF. The structure of common mental disorders. *Archives of General Psychiatry*. 1999; 56:921–926. [PubMed: 10530634]
- LeBeau R, Mischel E, Resnick H, Kilpatrick D, Friedman M, Craske M. Dimensional assessment of posttraumatic stress disorder in DSM-5. *Psychiatry Research*. (in press).
- Lindauer RJL. Child maltreatment—clinical PTSD diagnosis not enough: Comment on Resick et al. (2012). *Journal of Traumatic Stress*. 2012; 25:256–257. doi:10.1002/jts.21698. [PubMed: 22729977]
- Lo Y, Mendell N, Rubin D. Testing the number of components in a normal mixture. *Biometrika*. 2001; 88:767–778.
- Lubke GH, Muthén B. Investigating population heterogeneity with factor mixture models. *Psychological Methods*. 2005; 10:21–39. [PubMed: 15810867]
- Lubke G, Neale M. Distinguishing between latent classes and continuous factors: Resolution by maximum likelihood? *Multivariate Behavioral Research*. 2006; 41:499–532.
- Maercker A, Brewin CR, Bryant RA, Cloitre M, Reed GM, van Ommeren M, Saxena S. Proposals for mental disorders specifically associated with stress in the International Classification of Diseases-11. *Lancet*. 2013a; 381:1683–5. [PubMed: 23583019]
- Maercker A, Brewin CR, Bryant RA, Cloitre M, Reed GM, van Ommeren M, Saxena S. Diagnosis and classification of disorders specifically associated with stress: Proposals for ICD-11. *World Psychiatry*. 2013b; 12:198–206. [PubMed: 24096776]
- Maercker A, Perkonig A. Applying an international perspective in defining PTSD and related disorders: Comment on Friedman (2013). *Journal of Traumatic Stress*. 2013; 26:1–3. [PubMed: 23417873]
- Masyn KE, Henderson CE, Greenbaum PE. Exploring the latent structures of psychological constructs in social development using the dimensional-categorical spectrum. *Social Development*. 2010; 19:470–493. [PubMed: 24489441]
- McLachlan, G.; Peel, D. *Finite mixture models*. John Wiley & Sons; New York, NY: 2000.
- Miller MW, Resick PA. Internalizing and externalizing subtypes in female sexual assault survivors: Implications for the understanding of complex PTSD. *Behavior Therapy*. 2007; 38:58–71. [PubMed: 17292695]
- Miller MW, Wolf EJ, Kilpatrick D, Resnick H, Marx BP, Holowka DW, Friedman MJ. The prevalence and latent structure of proposed DSM-5 posttraumatic stress disorder symptoms in US national and veteran samples. *Psychological Trauma: Theory, Research, Practice and Policy*. 2013; 5:501–512.
- Miller, MW.; Wolf, EJ.; Resnick, H.; Marx, BP.; Kilpatrick, D.; Friedman, M. The impact of proposed changes to ICD-11 on estimates of PTSD prevalence and comorbidity relative to DSM-5 and ICD-10 criteria. Manuscript submitted for publication; 2014.
- Muthén, LK.; Muthén, BO. *Mplus user's guide*. 7th ed. Muthén & Muthén; Los Angeles, CA: 1998-2012.
- Nylund KL, Asparouhov T, Muthén BO. Deciding on the number of classes in latent class analysis and growth mixture modeling: A Monte Carlo simulation study. *Structural Equation Modeling*. 2007; 14:535–569.
- Protecting Access to Medicare Act of 2014. 113:101–225. U. S. C. §.
- Resick PA, Bovin MJ, Calloway AL, Dick AM, King MW, Mitchell KS, Wolf EJ. A critical evaluation of the complex PTSD literature: Implications for DSM-5. *Journal of Traumatic Stress*. 2012; 25:239–249. doi:10.1002/jts.21699. [PubMed: 22729973]
- Resick PA, Wolf EJ, Wiltsey-Stirman S, Wells SY, Suvak MK, Mitchell KS, Bovin MJ. Advocacy through science: Reply to comments on Resick et al. (2012). *Journal of Traumatic Stress*. 2012; 25:260–263. doi: 10.1002/jts.21702.

- Rosen RC, Marx BP, Masarejian NN, Holowka DW, Gates MA, Sleeper LA, Keane TM. Project VALOR: Design and methods of a longitudinal registry of post-traumatic stress disorder (PTSD) in combat-exposed veterans in the Afghanistan and Iraqi military theaters of operations. *International Journal of Methods in Psychiatric Research*. 2012; 21:5–16. [PubMed: 22095917]
- Roth S, Newman E, Pelcovitz D, Van der Kolk B, Mandel FS. Complex PTSD in victims exposed to sexual and physical abuse: Results from the DSM-IV field trial for posttraumatic stress disorder. *Journal of Traumatic Stress*. 1997; 10:539–555. [PubMed: 9391940]
- Schwartz G. Estimating the dimension of a model. *Annals of Statistics*. 1978; 6:461–464.
- Steuwe C, Lanius RA, Frewen PA. The role of dissociation in civilian posttraumatic stress disorder - Evidence for a dissociative subtype by latent class and confirmatory factor analysis. *Depression and Anxiety*. 2012; 29:689–700. [PubMed: 22653764]
- Taylor S, Asmundson GJG, Carleton RN. Simple versus complex PTSD: A cluster analytic investigation. *Journal of Anxiety Disorders*. 2006; 20:459–472. [PubMed: 15979838]
- Witkiewitz K, King K, McMahon RJ, Wu J, Luk J, Bierman KL, Pingerhughes EE. Evidence for a multi-dimensional latent structural model of externalizing disorders. *Journal of Abnormal Child Psychology*. 2013; 41:223–237. [PubMed: 22936218]
- Wolf EJ, Lunney CA, Miller MW, Resick PA, Friedman MJ, Schnurr PP. The dissociative subtype of PTSD: A replication and extension. *Depression and Anxiety*. 2012; 29:679–688. doi: 10.1002/da.21946. [PubMed: 22639402]
- Wolf EJ, Miller MW, Reardon AF, Ryabchenko KA, Castillo D, Freund R. A latent class analysis of dissociation and posttraumatic stress disorder: Evidence for a dissociative subtype. *Archives of General Psychiatry*. 2012; 69:698–7. [PubMed: 22752235]
- World Health Organization. The ICD-10 classification of mental and behavioural disorders. Author; Geneva, Switzerland: 1992.

Mean Scores on ICD-11 PTSD and CPTSD Symptom Clusters in the Community Sample:
Three-Class Solution

A

Mean Scores on ICD-11 PTSD and CPTSD Symptom Clusters in the Community Sample:
Four-Class, Two-Factor Solution

B

Figure 1.

Mean Scores on ICD-11 PTSD and CPTSD Symptom Clusters in the Veteran Sample:
Three-Class Solution

A

Mean Scores on ICD-11 PTSD and CPTSD Symptom Clusters in the Veteran Sample:
Four-Class, Two-Factor Solution

B

Figure 2.

Table 1

National Stressful Events Survey Complex Posttraumatic Stress Disorder Items

Item Cluster	Stem Item
Affect Dysregulation	• Have you ever had a persistent pattern of becoming overly emotionally reactive to situations and finding it difficult to calm down afterward? NOTE: When you were overly emotionally reactive, the emotion could include any kind of feelings including anxiety, fear, anger or sadness
	• Have you ever had a persistent pattern of never letting yourself have any feelings or letting anyone else see what you were feeling?
Interpersonal Problems	• Have you ever had a persistent pattern of being in relationships that had lots of ups and downs, conflicts, misunderstandings, or mistrust?
	• Have you ever had a persistent pattern of avoiding or withdrawing from relationships because you thought they were not worth having or that they were too painful to have?
Negative Self-Concept	• Have you ever had a persistent pattern of feeling insecure about close personal relationships because you thought bad things would happen such as the person would die, be harmed in some other way, leave you, or betray you?
	• Have you ever had a persistent pattern of having difficulty knowing what you felt or describing what you felt to others?
	• Have you ever had a persistent pattern of relying on other people to guide you about what you should feel or do, or you felt that other people's opinions were more valid or important than your own opinions?

Note. Item assessing dissociation is not shown here and it was not included in analyses for this paper. See footnote # 2.

Table 2

Fit of Structural Models Evaluated in the Community Sample (n = 345)

Model	BIC	Entropy	LMRA/BLRT p-values	X ² (df)	RMSEA	SRMR	CFI	TLI
CFA: 1 fac	6009			88.66*** (9)	.16	.07	.84	.73
CFA: 2 fac	5926			25.43*** (8)	.08	.05	.96	.93
LPA: 2 class	6023	.94	.002/<.001					
LPA: 3 class	5835	.93	.02/<.001					
LPA: 4 class	5679	.95	.03/<.001					
LPA: 5 class ^a	5566	.95	.29/<.001 ^a					
FMM: 2 class, 1 fac	6024	.94	.002/<.001					
FMM: 2 class, 2 fac	5793	.93	.48/<.001 ^a					
FMM: 3 class, 1 fac	5804	.98	.002/<.001					
FMM: 3 class 2 fac	5717	.94	.45/<.001					
FMM: 4 class, 1 fac ^a	5644	.99	.05/<.001					
FMM: 4 class, 2 fac	5481	.99	.05/<.001					

Note. The best fitting solution is printed in bold font. There is no accepted effect size estimate for the X² test of model fit. BIC = Bayesian information criterion; LMRA = Lo-Mendell-Rubin adjusted likelihood ratio test; BLRT = bootstrapped likelihood ratio test; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual; CFI = confirmatory fit index; TLI = Tucker-Lewis index; CFA = confirmatory factor analysis; fac = factor; LPA = latent profile analysis; FMM = factor mixture model.

p < .01.

p < .001.

^a Indicates that the best loglikelihood value for the overall model (despite increasing the number of random starts) or the p-value associated with the BLRT test was not replicated.

Table 3

Fit of Structural Models Evaluated in the Veteran Sample (n = 323)

Model	BIC	Entropy	LMRA/BLRT <i>p</i> -values	X ² (df)	RMSEA	SRMR	CFI	TLI
CFA: 1 fac	4939			65.66 *** (9)	.14	.06	.90	.84
CFA: 2 fac	4888			19.80 * (8)	.07	.03	.98	.96
LPA: 2 class	4954	.93	.007/<.001					
LPA: 3 class	4756	.90	.20/<.001					
LPA: 4 class	4679	.92	.03/<.001					
LPA: 5 class	4579	.91	.43/<.001					
FMM: 2 class, 1 fac	4954	.93	.007/<.001					
FMM: 2 class, 2 fac	4757	.90	.17/<.001 ^a					
FFM: 3 class, 1 fac	4863	.85	.32/<.001					
FFM: 3 class 2 fac	4677	.89	.13/<.001 ^a					
FFM: 4 class, 1 fac ^a	4699	.89	.006/<.001					
FFM: 4 class, 2 fac	4531	.88	.03/<.001					

Note. The best fitting solution is printed in bold font. There is no accepted effect size estimate for the X² test of model fit. BIC = Bayesian information criterion; LMRA = Lo-Mendell-Rubin adjusted likelihood ratio test; BLRT = bootstrapped likelihood ratio test; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual; CFI = confirmatory fit index; TLI = Tucker-Lewis index; CFA = confirmatory factor analysis; fac = factor; LPA = latent profile analysis; FMM = factor mixture model.

* *p* < .05.

*** *p* < .001.

^a Indicates that the best loglikelihood value for the overall model (despite increasing the number of random starts) or for the *p*-value associated with the BLRT test was not replicated.