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Title

ICD-11 PTSD and Complex PTSD in the United States: A population-based study

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Abstract

The primary aim of this study was to provide an assessment of the current prevalence rates of *ICD-11* posttraumatic stress disorder (PTSD) and complex PTSD (CPTSD) among the adult population of the United States and to identify characteristics and correlates associated with each disorder. A total of 7.2% of the sample met criteria for either PTSD or CPTSD where the prevalence rate for PTSD was 3.4% and for CPTSD was 3.8%. Females were more likely than males to meet criteria for both PTSD and CPTSD. Cumulative adulthood trauma was associated with PTSD and CPTSD, however cumulative childhood trauma was more strongly associated with CPTSD than PTSD. Among traumatic stressors occurring in childhood, sexual and physical abuse by caregivers were identified as events associated with risk for CPTSD while sexual assault (by non-caregiver) and abduction were risk factors for PTSD. Adverse childhood events (ACEs) were associated with both PTSD and CPTSD and equally so. Those with CPTSD reported substantially higher psychiatric burden and lower psychological well-being compared to those with PTSD, and with neither diagnosis.

KEY WORDS: posttraumatic stress disorder (PTSD); complex PTSD (CPTSD); cumulative trauma; childhood trauma; prevalence.

ICD-11 Posttraumatic Stress Disorder (PTSD) and Complex PTSD (CPTSD) in the United States: A population-based study

The *International Classification of Diseases and Related Health Problems* (ICD) is the official diagnostic system used worldwide. The ICD is a product of the World Health Organization (WHO) and the United States (U.S.) and all countries that are members of WHO are committed to its use. The ICD diagnostic system provides a common language for tracking diseases world-wide and is the basis for the identification of effective interventions and the deployment of resources on a global level (First, Reed, Hyman, & Saxena, 2015). In the U.S., it is the diagnostic system used by health providers in all treatment settings ranging from hospitals and community clinics to private practice. It is also the diagnostic system recognized by insurers for reimbursement of services for all categories of health problems including, for example, primary care, cardiology, gynaecology, immunology and neurology. Psychiatry is the only discipline that has an additional and separate diagnostic system, the *Diagnostic and Statistical Manual for Mental Disorders* (DSM), and providers of mental health services can use either system for diagnosis and service reimbursement.

In June 2018, the ICD released its eleventh version (*ICD-11*) which includes the diagnoses of PTSD and CPTSD (WHO, 2018). The purpose of this paper is to introduce the rationale for, and definition of, these two disorders and to provide descriptive data regarding the prevalence, associated clinical correlates, and risk factors for each disorder in a U.S. nationally representative sample. This information is intended as a resource for both clinicians and researchers who will be using these diagnoses.

The heterogeneity of posttraumatic stress responses has been well documented (e.g., Galatzer-Levy, 2014). In addition to symptoms of re-experiencing, avoidance and hypervigilance, several other types of problems have been identified, including problems related to disturbances in affect, in beliefs about oneself and others, and in relationships (Ford, 2015). The DSM-5 (APA, 2013) acknowledged these symptoms by revising PTSD to

include symptoms related to changes in mood and cognition and adding a dissociative subtype. This “big tent” approach to organizing symptoms stands in contrast with that taken by ICD-11 which has organized similar symptom sets into two distinct disorders: PTSD and CPTSD.

The formulation of ICD-11 PTSD and CPTSD was guided by the *ICD-11* conceptualization of the clinical utility of diagnoses where diagnoses should be limited in number of symptoms, be easily discriminable from one another and translate into effective and resource efficient treatment plans (Reed, 2010). *ICD-11* PTSD and CPTSD are, by definition, distinguishable by the number and diversity of symptoms clusters, and several studies thus far indicate they differ by comorbidity, level of impairment, and type of traumas that are risks factors (Brewin et al., 2017). The construct validity for the symptoms that comprise each disorder and their relative distinctiveness has been supported by several factor analyses (Brewin et al., 2017). A clinically and epidemiologically meaningful approach to the investigation of the construct validity regarding the PTSD/CPTSD distinction has been through the application of latent class analyses. Nine of 10 studies have found that trauma-exposed clinical, community and epidemiological samples fell into distinct classes by the types of symptoms they report with one group reporting only PTSD symptoms and the other Complex PTSD symptoms (see Brewin, et al., 2017). The presence of two distinct trauma populations with symptom profiles represented by the *ICD-11* diagnoses has been convincingly demonstrated. The potential benefit of having two disorders rather than a single highly heterogeneous disorder as represented by *DSM-5* is in the ability to improve patient outcomes by personalizing treatments specific to the type of trauma disorder (see Institute of Medicine, 2011). Better understanding of the characteristics of these two disorders will help shape treatment development and adaptation.

ICD-11 PTSD is comprised of three symptom clusters: re-experiencing of the traumatic event in the present, avoidance of traumatic reminders, and a sense of current

threat. CPTSD is comprised of six clusters: the three PTSD clusters as well as three clusters related to disturbances in self-organization (DSO): affect dysregulation, negative self-concept, and disturbances in relationships. CPTSD symptoms represent a broader spectrum of problems which acknowledge not only the role of traumatic stressors in generating horror and fear, but also the consequences that exposure to sustained, repeated or multiple types of traumatic stressors can have on self-organization. These latter symptoms have been conceptualized within a general model of psychosocial or developmental losses, where repeated or chronic trauma leads to the deterioration of emotional and relational capacities and sense of self, and in the case of children and adolescents, in the loss of opportunities for healthy psychosocial development in these domains (e.g., Ford, 2015; Hobfoll, Mancini, Hall, Canetti, Bonanno, 2011). Notably, the diagnoses of PTSD and CPTSD are made by reference to symptoms, not to type of traumatic event. Type of event is viewed as a risk factor not a requirement for each disorder. This recognizes the potential influence of predisposing factors such as personal and environmental resources (e.g., resilience, social support) or lack thereof on individual outcomes.

Overall, CPTSD is proposed as, and appears to be, a more severe and impairing disorder and one more likely to be the result of prolonged forms of trauma. Evidence from the developmental and attachment literature suggests that chronic forms of trauma during childhood, particularly sexual and physical abuse by caregivers, may be strong risk factors due to the substantial adverse effects they have on the healthy development of socio-emotional competencies and a coherent and positive sense of self in later life (Cook et al., 2005). Moreover, while the accumulation or number of different types of traumas occurring during adulthood and childhood both contribute in a “dose-response” like fashion to adulthood symptoms, the effect of childhood cumulative trauma is stronger (e.g., Cloitre et al., 2009; Briere & Rickards, 2007), particularly in relation to DSO symptoms (Briere &

Rickards, 2007). These data suggest that both the particular type of trauma, as well as the total number of childhood traumas, contribute to risk for CPTSD.

Given the recent introduction of CPTSD into the diagnostic nomenclature and the time required to develop reliable and validated measures of PTSD and CPTSD, the prevalence rates of the disorders in the U.S. are unknown and the sociodemographic, clinical correlates and risk factors which characterize these disorders remain relatively unexplored. In this study, we identify the current prevalence rates in the U.S. based on the finalized ICD criteria for the disorders and a validated self-report measure. We also investigate several sociodemographic and clinical characteristics the disorders that we expect will characterize them and distinguish them from one another. We developed several hypotheses to guide the data analyses.

First, females have been consistently observed to be at greater risk than males for *DSM* PTSD, and more generally, to mood and anxiety disorders (Olf, Langeland, Draijer, & Gersons, 2007). We hypothesized that, consistent with this general literature, the same gender effect would be observed in *ICD-11* where (1a) the prevalence of PTSD and CPTSD would be significantly higher for females compared to males, and that (1b) the increased risk of PTSD and CPTSD for females would remain when controlling for cumulative childhood trauma and sociodemographic variables.

Second, consistent with the theorized differences between PTSD and CPTSD (Maercker et al., 2013), and supported by preliminary findings (Karatzias et al., 2017; Perkonig et al., 2016), we hypothesized that (2) those with a CPTSD diagnosis would report significantly greater symptom comorbidity and poorer overall psychological well-being compared to those with a PTSD diagnosis and to those with neither diagnosis.

Third, we investigated the effects of type and quantity of traumatic exposures as risk factors for CPTSD and PTSD. Most epidemiological surveys query about the presence or absence of trauma exposures as they occur at some point during the lifespan. This survey

queried separately about all potential traumatic life events during childhood and adulthood, allowing us to systematically investigate the relative impact of childhood as compared to adulthood trauma as risk factors for each disorder. Based on the literature to date, we hypothesized that (3a) the accumulation of different kinds of adulthood traumatic exposures would impact risk in a “dose-response” fashion for both PTSD and CPTSD, as has been observed in the *DSM* PTSD literature (e.g., Breslau, Wilcox, Storr, Lucia, & Anthony, 2004; Karam et al., 2017), but that in line with developmental theory and evidence, (3b) the effect of cumulative childhood trauma would be greater for CPTSD than PTSD, and (3c) childhood sexual abuse and physical abuse would be particularly strongly associated with CPTSD.

Lastly, we assessed the impact of adverse childhood experiences (ACEs) on risk for each disorder. ACEs, which include experiences such as emotional abuse, neglect, and parental psychiatric illness, have been identified with an increased risk of a range of mental and physical health disorders (Felitti et al., 1998). Given the evidence that ACEs seem to have an effect on a broad range of disorders, we hypothesized that (3d) ACEs would result in a significant and equivalent increase in risk for both PTSD and CPTSD.

Method

Participants and procedures

The sample for this study was a nationally representative household sample of non-institutionalized adults currently residing in the U.S. All data for this study were collected in March 2017 as part of a project assessing the construct validity of *ICD-11* PTSD and CPTSD. Data were collected using an existing online research panel that is representative of the entire population of the US population and panel members were randomly recruited through probability-based sampling using random digit dialling. Inclusion criteria were that respondents be aged between 18 and 70 years at the time of the survey and have had experienced at least one traumatic event in their lifetime. In total, 3,953 people were contacted and 1,839 met the inclusion criteria and were invited to complete the survey

(participation rate = 46.3%). The survey design intentionally oversampled among females and minority populations (African American and Hispanic), each at a 2:1 ratio, as these groups are more likely to experience traumatic exposures and/or report higher rates of trauma-related diagnoses and we wanted to ensure engagement of these subgroups in the study. To adjust for this oversampling, the data were weighted in order to be representative of the entire US adult population aged 18-70. All self-report surveys were completed on-line (median time of completion = 18 minutes). Individuals received no payment for participation but were incentivised to participate through entry into a raffle for prizes. The ethical review board of the institution to which one of the authors was affiliated granted ethical approval for the study.

The weighted proportions for sex, education, race/ethnicity, relationship status, and employment status are reported in Table 1. In addition, the mean age of the sample was 44.55 years ($SD = 14.89$), and most people resided in a metropolitan area (86.1%). The majority of respondents reported an annual income above \$75,000 (48.5%), 29.8% reported an income between \$35,000 and \$74,999 (29.8%), 11.0% between \$20,000 and \$34,999, and 10.8% below \$20,000.

Measures

ICD-11 PTSD and CPTSD. The International Trauma Questionnaire (ITQ; Cloitre et al., 2018) is a self-report measure of ICD-11 PTSD and CPTSD symptoms. The ITQ first screens for a respondent's index trauma and how long ago the index trauma occurred. The ITQ includes 12 symptom indicators: two symptoms for each PTSD cluster (re-experiencing, avoidance, and sense of threat) and two symptoms for each DSO cluster (affective dysregulation, negative self-concept, and disturbances in relationships). Respondents indicate to what extent each PTSD symptom has bothered them over the past month. Three items are used to measure functional impairment associated with these symptoms. The six DSO symptoms are measured in relation to how respondents typically feel, think about themselves,

and relate to others. As with the PTSD symptoms, there are three items that measure functional impairment associated with the DSO symptoms. All items are measured using a five-point Likert scale ranging from 0 (*Not at all*) to 4 (*Extremely*). A symptom is considered present based on a score of ≥ 2 (*Moderately*). The internal reliability (Cronbach's alpha) of the PTSD ($\alpha = .89$) and DSO ($\alpha = .89$) items was satisfactory among the full sample, and among males (PTSD $\alpha = .88$, DSO $\alpha = .89$) and females (PTSD $\alpha = .88$, DSO $\alpha = .89$).

Diagnosis of PTSD requires the presence of at least one symptom from each PTSD cluster and endorsement of at least one indicator of functional impairment associated with these symptoms. Diagnosis of CPTSD requires the presence of at least one symptom in each PTSD and DSO cluster plus endorsement of at least one indicator of functional impairment related to the symptoms of PTSD and DSO. The ICD-11 diagnostic rules only permit a diagnosis of PTSD *or* CPTSD; therefore, if a person meets the criteria for CPTSD, that person does not also receive a PTSD diagnosis.

Childhood and adulthood traumas, and childhood adversities. Traumas in childhood and adulthood, along with childhood adversities, were measured using a revised version of the Life Events Checklist (Gray, Litz, Hsu, & Lombardo, 2004) and the Adverse Childhood Experiences questionnaire (ACE: Felitti et al., 1998). The revised LEC used in the current study included 14 life events and respondents indicated on a "Yes" (1) or "No" (0) basis if they had been exposed to each event "before age of 18" (childhood traumas) and "at or after age 18" (adulthood traumas). Additionally, questions screening for physical assault, assault with a weapon, and sexual assault were reworded to specify that someone perpetrated these events other than a parent or a caregiver. This rewording was made to clarify that when asked about events particularly during the childhood years, that the query was specific to interpersonal traumas perpetrated by individuals other than caregivers. The same type of events perpetrated by parents or caregivers were inquired about separately in items within the ACE. The ACE contains 10 "Yes" (1) or "No" (0) items that measure exposure to traumatic

(e.g., sexual abuse, physical abuse) and adverse (e.g., parental divorce) life events in the first 18 years of life. As displayed in Supplementary Table 1, the 14 life events from the LEC-R were used to measure adulthood traumas; the same 14 life events plus two events from the ACE (sexual abuse and physical abuse by caregivers) were used to measure childhood traumas; and the remaining eight items of the ACE were used to measure ‘childhood adversities’.

Psychiatric Burden. Major Depressive Disorder (MDD) and Generalized Anxiety Disorder (GAD) were measured using the Patient Health Questionnaire Depression Scale (PHQ-8: Kroenke, Strine, Williams, Berry, & Mokdad, 2009) and the Generalized Anxiety Disorder 7-item Scale (GAD-7: Spitzer, Kroenke, Williams, & Lowe, 2006), respectively. These scales assess the symptoms of MDD and GAD in-line with the DSM criteria (the PHQ-8 excludes one item reflecting the suicidality/self-harm symptom for MDD). For both measures respondents indicate how often they have been bothered by each symptom over the last two weeks using a four-point Likert scale ranging from 0 (*Not at all*) to 3 (*Nearly every day*). PHQ-8 scores range from 0 to 24 and GAD-7 scores range from 0-21. In both cases, higher scores reflect greater symptomatology, and scores ≥ 10 are considered indicative of a diagnosis of MDD and GAD (Kroenke et al., 2009; Spitzer et al., 2006). The PHQ-8 (Manea, Gilbody, & McMillian, 2015) and GAD-7 (Kertz, Bigda-Peyton, & Björgvinsson, 2013) have demonstrated excellent psychometric properties. The internal reliability of the PHQ-8 ($\alpha = .93$) and GAD-7 ($\alpha = .94$) were excellent among the current sample.

Psychological Well-being. Psychological well-being was assessed using the five-item World Health Organization Well-Being Index (WHO-5: WHO, 1998). The WHO-5 is a widely used, internationally validated measure of positive mental health. A recent review of 213 international studies supported the reliability and validity of the scale scores (Topp, Østergaard, Søndergaard, & Bech, 2015). Respondents are asked to indicate how they have been feeling over the past two weeks to each positively-phrased statement along a six-

point Likert scale ranging from 0 (*At no time*) to 5 (*All of the time*). Scores range from 0 to 25 with higher scores reflecting greater psychological wellbeing. Scores ≤ 13 are indicative of poor mental health and the possible presence of a psychiatric disorder (Awata et al., 2007). The reliability of the WHO-5 among the current sample was excellent ($\alpha = .93$).

Data Analysis

A weighting variable was used for all analyses to ensure the findings were representative of the US adult population aged 18-70. Pearson chi-square (χ^2) analyses were used to determine if males and females significantly differed in their rates of PTSD and CPTSD (hypothesis 1a), and binary logistic regression (BLR) was used to determine sex differences while controlling for cumulative childhood trauma and sociodemographic variables (hypothesis 1b). Odds ratios (OR) and adjusted ORs (OR_{adj}) are reported.

A one-way between groups analysis of variance (ANOVA) was used to compare mean levels of MDD, GAD, and psychological well-being across the three diagnostic groups (0 = No diagnosis, 1 = PTSD, 2 = CPTSD) (hypothesis 2). The Tukey HSD test was used for post-hoc pairwise comparisons, and the magnitude of the difference between the diagnostic groups was assessed using Cohen's *d* (values $\leq .4$ indicate small differences, between .5 and .7 indicate moderate differences, and $\geq .8$ indicate large differences).

To determine if cumulative childhood and adulthood trauma, respectively, were associated with PTSD and CPTSD diagnosis in a dose-response manner (hypotheses 3a and 3b), two BLRs were conducted. Categorical cumulative childhood (zero [18.7%], one [31.2%], two [17.4%], three [13.1%], and \geq four [19.6%]), and adulthood (zero [10.6%], one [26.7%], two [22.1%], three [15.4%], and \geq four [25.3%]) trauma variables were constructed. The reference category in both cases was 'zero traumas'. BLR was also used to determine the multivariate associations between specific childhood traumas and PTSD and CPTSD diagnosis (hypothesis 3c), as well as the multivariate association between the total ACE score and PTSD and CPTSD diagnosis (hypothesis 3d). For hypotheses 3a-3d, the BLR models

included the covariates of sex, age, educational status, race/ethnicity, marital status, area of residence, employment status, and income level.

When multiple testing occurred, Bonferroni adjustments were applied to control for Type I errors (i.e., hypothesis 2, *alpha level* = .010; hypotheses 3, *alpha level* = .025). At the variable level, missing data were low and ranged from 0.1% to 3.5%. The missing values were considered to be missing completely at random (Little's MCAR test: $\chi^2(40) = 24.96$, $p = .970$). Missing data were handled by the default listwise deletion option in SPSS for ANOVA and BLR.

Results

Hypotheses 1a and 1b: Sex differences in PTSD and CPTSD

In total, 7.2% [95% CI = 6.1%, 8.5%] of the sample satisfied the criteria for a diagnosis of *ICD-11* PTSD or CPTSD. The PTSD prevalence rate was 3.4% [95% CI = 2.6%, 4.2%] and the CPTSD prevalence rate was 3.8% [95% CI = 3.0%, 4.7%]. Differences in the diagnostic rates for PTSD and CPTSD in relation to sex, education, race/ethnicity, relationship status, and employment status are reported in Table 1. Females had significantly higher rates of PTSD, $OR = 2.53$ [95% CI = 1.44 – 4.45], and CPTSD, $OR = 1.82$ [95% CI = 1.10 – 3.01], than males and these effects remained significant - and increased in magnitude - when controlling for cumulative childhood trauma and the sociodemographic covariates: PTSD, $OR_{adj} = 2.69$ [95% CI = 1.49 – 4.86], and CPTSD, $OR_{adj} = 2.03$ [95% CI = 1.17 – 3.52].

Hypothesis 2: Diagnostic status, psychiatric burden, and psychological well-being

The one-way between groups ANOVA results are reported in Table 2. The diagnostic groups significantly differed ($ps < .001$) in their mean MDD, GAD, and psychological well-being scores. Compared to the no diagnosis group, the PTSD and CPTSD diagnosis groups reported significantly higher levels of MDD and GAD, and lower levels of psychological well-being, and all effects were 'large'. The CPTSD diagnosis group also reported

significantly higher levels of MDD ($d = .87$), GAD ($d = .53$), and lower levels of psychological well-being ($d = .86$), compared to the PTSD diagnosis.

Hypotheses 3a and 3b: Impact of adulthood and childhood cumulative trauma on PTSD and CPTSD diagnoses

The unadjusted and adjusted ORs for the effects of cumulative adulthood trauma and cumulative childhood trauma on PTSD and CPTSD are reported in full in Table 3. The adjusted BLR models including cumulative adulthood trauma were statistically significant for PTSD ($\chi^2(12, 1758) = 70.11, p < .001$) and CPTSD ($\chi^2(12, 1690) = 75.97, p < .001$) diagnostic status. There was evidence of a dose-response association between cumulative adulthood trauma and PTSD with the strength of the associations increasing from one ($OR_{adj} = .55, p = .364$), two ($OR_{adj} = 1.28, p = .694$), three ($OR_{adj} = 3.27, p = .045$) and \geq four ($OR_{adj} = 5.80, p = .001$) traumas. A similar dose-response association was evident between cumulative adulthood trauma and CPTSD: one ($OR_{adj} = .62, p = .490$), two ($OR_{adj} = 1.04, p = .958$), three ($OR_{adj} = 2.29, p = .193$), and \geq four ($OR_{adj} = 7.02, p = .001$) traumas.

The adjusted BLR models including cumulative childhood trauma were statistically significant for PTSD ($\chi^2(12, 1745) = 62.79, p < .001$) and CPTSD ($\chi^2(12, 1745) = 98.64, p < .001$) diagnostic status. There was no evidence of a dose-response association between cumulative childhood trauma and PTSD as the strength of the associations remained consistent after one trauma: one ($OR_{adj} = .41, p = .127$), two ($OR_{adj} = 2.28, p = .085$), three ($OR_{adj} = 2.17, p = .124$), and \geq four ($OR_{adj} = 2.63, p = .035$) traumas. A clear dose-response association was evident between cumulative childhood trauma and CPTSD: one ($OR_{adj} = 1.67, p = .562$), two ($OR_{adj} = 3.70, p = .131$), three ($OR_{adj} = 12.39, p = .002$), and \geq four ($OR_{adj} = 21.91, p < .001$) traumas.

Hypothesis 3c: Specific childhood traumatic events and their association with PTSD and CPTSD diagnoses

The unadjusted and adjusted ORs for the effect of each childhood trauma on PTSD and CPTSD diagnosis are reported in Table 4. The adjusted BLR models for PTSD ($\chi^2(37, 1745) = 99.72, p < .001$) and CPTSD ($\chi^2(37, 1745) = 168.72, p < .001$) were statistically significant. Two childhood traumatic events were significantly associated with a diagnosis of PTSD: ‘captivity’ ($OR_{adj} = 5.73, p = .015$) and ‘sexual assault perpetrated by someone other than a caregiver’ ($OR_{adj} = 2.77, p = .016$). Two childhood traumatic events were significantly associated with a diagnosis of CPTSD: ‘physical abuse by a caregiver’ ($OR_{adj} = 4.40, p < .001$) and ‘sexual abuse by a caregiver’ ($OR_{adj} = 3.89, p < .001$).

Hypotheses 3d: Impact of ACEs on PTSD and CPTSD diagnoses

The adjusted BLR models for PTSD ($\chi^2(9, 1745) = 60.30, p < .001$) and CPTSD ($\chi^2(9, 1745) = 93.10, p < .001$) were statistically significant. The total ACE score was significantly ($ps < .001$) and positively associated with PTSD, $OR_{adj} = 1.34$ [95% CI = 1.19, 1.51], and CPTSD, $OR_{adj} = 1.57$ [95% CI = 1.23, 1.54], and the effects were of a similar magnitude.

Discussion

This study provides the first report of the rates, clinical correlates, and risk factors associated with *ICD-11* PTSD and CPTSD in the U.S. general population based on the finalized criteria for *ICD-11* and a validated measure of the disorders. Results indicate a current prevalence rate of 3.4% for PTSD and 3.8% for CPTSD. Combined together the total prevalence is 7.2%. Notably, the prevalence of the two disorders combined is similar to the PTSD rates found in the two National Comorbidity Surveys conducted in the U.S. which were 6.8% (Kessler, Sonnega, Bromet, Hughes, Nelson, 2005) and 7.8% (Kessler et al., 1995). Some studies that have estimated the prevalence of *ICD-11* to *DSM* PTSD criteria have suggested that *ICD-11* produces lower rates, particularly in clinical or acute trauma populations (Brewin et al., 2017). However, these studies mainly used “proxy” measures for the *ICD-11* criteria and the accuracy of this conclusion remains to be determined. This study,

using a validated measure of the *ICD-11* disorders, obtained rates more comparable to those found in *DSM* PTSD studies. Overall, the methodological and statistical approach of the study and the findings generated from it provide a point of reference for future studies aiming to replicate results and to assess and interpret the prevalence of *ICD-11* PTSD and CPTSD in subpopulations such as those found in community, clinical, acute or primary care settings.

CPTSD was associated with greater symptom co-morbidity and lower levels of psychological well-being. These results indicate two clinical characteristics by which the disorders differ, consistent with and supportive of the two-disorder formulation. The results also clearly identify CPTSD as a more severe and impairing disorder with a greater psychiatric burden. Clinical implications for the treatment of CPTSD may be that this disorder will require a longer course of treatment as compared to treatment of PTSD and/or multimodal or multi-component therapies to achieve optimal outcomes.

Women were found to have rates of PTSD and CPTSD approximately twice as high as men, even when controlling for cumulative trauma in childhood and other sociodemographic variables. Of note, the gender differences were *amplified* when controlling for trauma history, suggesting that the gender effect was not particularly related to the event *per se* but to post-trauma sequelae. The gender effect so often observed following traumatic exposures has been attributed to a wide range of factors including sex differences in neuroendocrine programming following childhood trauma (see Olf et al., 2007), gender-specific cognitive appraisal processes (e.g., lower perceived control among girls), gender-specific coping responses (e.g., greater peritraumatic dissociation and social isolation among girls) and differences in social support (both perceived and “objective”) depending on the gender of the traumatized individual. These findings have potential implications for the development of gender-sensitive outreach, engagement and intervention programs.

Cumulative adulthood trauma was associated with both PTSD and CPTSD in a dose-response manner. However, as hypothesized, cumulative childhood trauma was much more

strongly associated with CPTSD, consistent with developmental theory and evidence that one significant pathway to CPTSD may be trauma's adverse impact on important developmental processes related to emotion regulation, self-concept, and relational capacities that persist through to adulthood (see Cloitre, Cohen, & Koenen, 2006). These results do not contradict the proposal that chronic adult-onset traumas create risk for CPTSD (e.g., being the target of genocide). Our survey did not collect sufficient information about these types of experiences to make a systematic investigation. Adult-onset traumas such as those experienced by refugees, prisoners of war and asylum seekers, are often horrific and sustained, and can lead to the deterioration of self-regulatory capacities and self-concept that are represented in CPTSD (see Nickerson et al., 2016).

Notably, childhood sexual and physical abuse perpetrated by a caregiver or guardian were particularly strongly related to risk for CPTSD as compared to other traumas within a multivariate context. In contrast, sexual assault during childhood *not* perpetrated by parent or guardian was associated with PTSD, as was kidnapping/abduction. This result is consistent with attachment theory that highlights the particularly important influence of caregivers during childhood in regard to self-organization processes. In addition, childhood abuse can more broadly be understood as a type of "betrayal trauma"; a circumstance where individuals (or institutions) upon which a person depends for survival violate that person's trust and well-being. Research investigating betrayal trauma has found that interpersonal traumas which are perpetrated by someone close to the victim produce worse problems than those perpetrated by a stranger or a non-caregiver (Goldberg & Freyd, 2006).

These findings highlight the importance of maintaining distinct terms and definitions for physical and sexual violence that include specification of the relationship to the perpetrator. Most epidemiological studies and many community studies assess sexual violence in childhood using one umbrella term, either "sexual assault" or "sexual abuse." The terms are frequently used interchangeably and without specification to the perpetrator. In

studies that intend to discriminate between risk factors for PTSD versus CPTSD outcomes, it will be important to characterize events by not only the life stage but also the nature of the relationship to the perpetrator.

As hypothesized, ACEs were found to increase risk for PTSD and CPTSD and equally so. These results could suggest that ACEs are general “potentiators” for any number of disorders. Notably, at least one study has found that ACEs interact synergistically with certain types of traumatic stressors to increase risk for complexity in psychiatric profile (Putnam, Harris & Putnam, 2013). While it is beyond the scope of this paper, future studies might investigate whether certain types of ACEs act in combination with certain types of traumatic stressors to differentially potentiate risk for CPTSD versus PTSD. (e.g., the possible interactive effects of a history of parental psychiatric illness and childhood sexual assault).

Limitations of the study need to be considered. First, the survey was conducted as a self-report which can limit the precision of the responses. Second the population studied was a general U.S. population and oversampled from females and minority groups. Although steps were taken (weighting of the data) to ensure that the sample was representative of the general population, it is unknown whether results will generalize to other countries, or to other important traumatized subgroups such as refugees, military personnel, and children and adolescents. Nevertheless, the paper has several strengths, in particular the assessment of a nationally representative sample and the use of a reliable and validated measure of *ICD-11* PTSD and CPTSD.

In summary, this study has established the current prevalence rates of *ICD-11* PTSD and CPTSD in the United States. It determined that CPTSD was associated with greater psychiatric burden and reduced psychological well-being. The study also identified gender, adulthood cumulative trauma, and ACEs as risk factors for both disorders, and childhood cumulative trauma as a particularly strong risk factor for CPTSD. Additionally, childhood

sexual and physical abuse were unique events that elevated risk for CPTSD, and the relationship of the perpetrator to the victim/survivor was another important differential risk factor for CPTSD (guardian) versus PTSD (non-guardian). Differences in clinical correlates and risk factors support the validity of the distinction between CPTSD and PTSD. They also contribute to better understanding of pathways to the disorders, the coherence of symptom expression, and treatment directions.

Important next steps in further characterizing *ICD-11* PTSD and CPTSD include an evaluation of (1) differences in the prevalence rates and population characteristics associated with *ICD-11* PTSD and CPTSD as compared to *DSM-5* PTSD, (2) the prevalence and characteristics of *ICD-11* PTSD and CPTSD in subgroups of trauma populations (e.g., rape victims, domestic violence victims, disaster survivors) or in specialty settings (psychiatric clinics, substance abuse programs), (3) the influence of different types of adulthood traumas in creating differential risk for CPTSD and PTSD, and (4) the potential synergistic effects of ACEs interacting with traumatic events. Lastly, investigations of protective as well as risk factors will contribute to a deeper understanding of the causes of these disorders and help guide their treatment.

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Table 1. Weighted proportions and differences in diagnostic rates for ICD-11 CPTSD or PTSD, ICD-11 PTSD, and ICD-11 CPTSD across five demographic variables.

	Total N = 1,893	CPTSD or PTSD 7.2%, n = 132	PTSD 3.4%, n = 62	CPTSD 3.8%, n = 70
Sex				
Male	48.0%	4.6%	1.9%	2.7%
Female	52.0%	9.7%	4.8%	4.9%
χ^2 (p),		18.01 (<.001),	11.03 (<.001),	5.59 (.018),
OR		2.25	2.53	1.82
Race/Ethnicity				
White	63.8%	6.0%	2.7%	3.4%
Non-white	36.2%	9.5%	4.7%	4.6%
χ^2 (p),		7.47 (.006),	5.51 (.019),	1.77 (.183),
OR		1.64	1.82	1.39
Education				
No college	37.8%	8.6%	3.8%	4.7%
College	62.2%	6.4%	3.2%	3.3%
χ^2 (p),		2.99 (.084),	0.50 (.478),	2.33 (.127),
OR		0.73	0.83	0.69
Relationship				
Yes	63.4%	6.6%	3.0%	3.6%
No	36.6%	8.4%	4.1%	4.2%
χ^2 (p),		2.10 (.148),	1.37 (.242),	0.51 (.474),
OR		1.30	1.36	1.20

Employment				
Employed	71.1%	7.0%	3.6%	3.5%
Unemployed	28.9%	8.0%	3.0%	4.8%
χ^2 (p),		0.58 (.448),	0.30 (.587),	1.66 (.198),
OR		1.16	0.85	1.39

Note: χ^2 = Pearson chi-square test; p = statistical significance; OR = odds ratio; all degrees of freedom = one.

Table 2. One-way between groups analysis of variance results of differences in mental health indicators across diagnostic status.

	Depression		Generalized Anxiety		Psychological Well-being	
	Mean	SD	Mean	SD	Mean	SD
No diagnosis (n = 1,639)	3.36	4.57	2.95	4.05	15.54	6.06
PTSD (n = 60)	10.09	6.10	10.26	5.92	10.39	5.84
CPTSD (n = 70)	15.59	6.54	13.42	6.01	5.89	4.61
	F (2, 1762) = 274.21		F (2, 1765) = 283.94		F (2, 1808) = 104.85	
Pairwise comparisons[^]:	<i>D</i>		<i>d</i>		<i>d</i>	
No diagnosis vs. PTSD	1.25		1.44		.87	
No diagnosis vs. CPTSD	2.17		2.04		1.79	
PTSD vs. CPTSD	.87		.53		.86	

Note: All comparisons are statistically significant ($p < .001$); [^] Tukey HSD test (all comparisons have 1 degree of freedom); *d* = Cohen's *d* values ($\leq .4$ = small differences, values $.5 - .7$ = moderate differences, values $\geq .8$ = large differences).

Table 3. Binary logistic regression results assessing three predictors of PTSD and CPTSD: cumulative adulthood trauma, cumulative childhood trauma and ACEs (N = 1,839)

	ICD-11 PTSD ^a		ICD-11 PTSD ^b		ICD-11 CPTSD ^a		ICD-11 CPTSD ^b	
	OR	95% CI	OR _{adj}	95% CI	OR	95% CI	OR _{adj}	95% CI
<i>Cumulative adulthood trauma</i>								
1	.44	.12/1.56	.55	.15/2.00	.53	.14/2.00	.62	.16/2.39
2	.82	.26/2.63	1.28	.38/4.27	.80	.22/2.86	1.04	.28/3.84
3	1.76	.59/5.29	3.27	1.03/10.39	1.65	.49/5.50	2.29	.66/8.00
≥ 4	2.69	.99/7.35	5.80**	1.97/17.11	4.96**	1.72/14.30	7.02***	2.29/21.54
<i>Cumulative childhood trauma</i>								
1	.50	.16/1.55	.41	.13/1.29	1.75	.31/9.83	1.67	.30/9.47
2	2.49	.99/6.27	2.28	.89/5.82	3.70	.68/20.17	3.70	.68/20.23
3	2.58	.98/6.79	2.17	.81/5.85	13.56**	2.81/65.51	12.39**	2.54/60.34
≥ 4	3.36**	1.40/8.09	2.63*	1.07/6.43	24.07***	5.24/110.55	21.91***	4.73/101.51

Note; OR 95% CI = odds ratio and 95% confidence intervals; Bonferroni adjusted level of statistical significance = .025; * p < .025, ** p < .01, *** p < .001

^a = unadjusted ORs; ^b = ORs adjusted for sex, age, education, race/ethnicity, marital status, area of residence, employment status, annual income.

Table 4. Binary logistic regression assessing type of traumatic exposure during childhood as predictors of PTSD and CPTSD (N = 1,839).

Childhood trauma events	ICD-11 PTSD ^a		ICD-11 PTSD ^b		ICD-11 CPTSD ^a		ICD-11 CPTSD ^b	
	OR	95% CI	OR _{adj}	95% CI	OR	95% CI	OR _{adj}	95% CI
Natural disaster	.84	.47/1.52	.77	.42/1.43	.53	.29/1.00	.54	.28/1.04
Fire or explosion	1.10	.49/2.44	1.11	.47/2.62	1.05	.50/2.22	.98	.43/2.20
Transportation accident	.92	.51/1.67	.87	.47/1.61	.88	.48/1.60	.92	.49/1.73
Serious accident	1.13	.54/2.39	.94	.42/2.12	2.05	1.05/4.02	2.24	1.09/4.60
Exposure to toxic substances	1.63	.56/4.78	2.43	.74/7.92	.65	.18/2.33	.63	.16/2.49
Physical assault NOT by a caregiver	.66	.33/1.34	.61	.29/1.32	1.98	1.08/3.61	1.92	1.02/3.64
Assault weapon NOT by a caregiver	1.05	.37/2.99	1.24	.41/3.75	.82	.33/2.05	.86	.33/2.25
Sexual assault NOT by a caregiver	3.28**	1.52/7.11	2.77*	1.21/6.36	.85	.41/1.73	.71	.32/1.56
Combat or exposure to war	1.00	.16/6.47	.80	.11/6.10	1.91	.47/7.86	2.32	.52/10.46
Captivity	5.83**	1.68/20.27	5.73*	1.41/23.36	.70	.15/3.16	.69	.13/3.70
Life-threatening illness or injury	1.50	.72/3.13	1.64	.76/3.51	1.57	.76/3.28	1.78	.81/3.88
Witnessed a violent death	1.08	.35/3.34	1.54	.49/4.82	1.82	.71/4.67	2.21	.83/5.94
Sudden unexpected death	1.79	1.00/3.20	1.62	.88/2.98	1.49	.81/2.72	1.41	.75/2.65

Caused injury, harm, or death	.49	.09/2.80	.45	.07/2.82	2.49	.77/8.08	2.30	.68, 7.73
Sexual abuse	1.47	.71/3.04	1.36	.63/2.94	4.42***	2.35/8.31	3.88***	1.95/7.70
Physical abuse	.95	.47/1.95	.96	.44/2.11	4.65***	2.62/8.24	4.40***	2.40/8.07

Note: OR = odds ratio; 95% CI = 95% confidence intervals; Bonferroni adjusted statistical significance level = .025; *p < .025, **p < .010, ***p < .001.

^a = unadjusted ORs; ^b = ORs adjusted for sex, age, education, race/ethnicity, marital status, area of residence, employment status, annual income.

Supplementary Table 1. Weighted proportions of childhood, adulthood, and lifetime exposure to traumatic and adverse events (N = 1,839).

	Childhood	Adulthood	Lifetime
	%	%	%
Traumatic Events			
Natural disaster (LECR_1)	36.2	39.9	52.7
Fire or explosion (LECR_2)	11.0	11.9	19.9
Transportation accident (LECR_3)	33.9	55.8	67.5
Serious accident (LECR_4)	12.9	17.2	23.7
Exposure to toxic substances (LECR_5)	3.3	7.1	9.3
Physical assault NOT by a parent or caregiver (LECR_6)	21.2	16.7	29.8
Assault with a weapon NOT by a parent of caregiver (LECR_7)	5.4	11.1	14.6
Sexual assault NOT by a parent of caregiver (LECR_8)	11.7	6.9	15.3
Combat or exposure to war (LECR_9)	1.2	5.1	5.4
Captivity (LECR_10)	1.6	2.5	3.1
Life-threatening illness or injury (LECR_11)	9.5	20.3	25.0
Witnessed a violent death (LECR_12)	4.4	6.8	9.1
Sudden unexpected death of someone close (LECR_13)	30.0	51.5	60.5
Caused injury, harm, or death to another person (LECR_14)	2.9	4.8	6.3
Sexual abuse by parent or caregiver (ACE_1)	17.5	--	--

Physical abuse by parent or caregiver (ACE_2)	15.7	--	--
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Adverse Childhood Events

Physical Neglect (ACE_3)	5.4	--	--
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Verbal abuse (ACE_4)	21.3	--	--
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Emotional neglect (ACE_5)	17.0	--	--
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Parental violence in the home (ACE_6)	11.6	--	--
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Parental divorce or separation (ACE_7)	33.5	--	--
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Problematic drug or alcohol used in the home	24.5	--	--
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(ACE_8)			
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Mental illness in the home (ACE_9)	15.5	--	--
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Household member go to jail (ACE_10)	8.0	--	--
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Note: LECR = Revised Life Events Checklist for DSM-5; ACE = Adverse Childhood

Experiences Questionnaire.