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Title:

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Date:

2019-12-01

Citation:

Liddell, B. J., Nickerson, A., Felmingham, K. L., Malhi, G. S., Cheung, J., Den, M., Askovic, M., Coello, M., Aroche, J. & Bryant, R. A. (2019). Complex Posttraumatic Stress Disorder Symptom Profiles in Traumatized Refugees. *Journal of Traumatic Stress*, 32 (6), pp.822-832. <https://doi.org/10.1002/jts.22453>.

Persistent Link:

<https://hdl.handle.net/11343/286541>

Complex Posttraumatic Stress Disorder Symptom Profiles in Traumatized Refugees

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Abstract

Although it is well documented that exposure to severe, cumulative trauma and postdisplacement stress increases the risk for posttraumatic stress symptom disorder (PTSD), less is known about the representation and predictors of complex PTSD (CPTSD) symptoms in refugee populations. We examined PTSD and CPTSD symptom profiles (co-occurring PTSD and disturbances in self-organization symptoms [DSO]) and their premigration, postmigration, and demographic predictors, using latent class analysis (LCA), in a cohort of

This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the [Version of Record](#). Please cite this article as [doi: 10.1002/jts.22453](https://doi.org/10.1002/jts.22453).

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112 refugees resettled in Australia. The LCA identified a four-factor model as the best fit to the data, comprising classes categorized as: (a) CPTSD, exhibiting high levels of PTSD and DSO symptoms (29.5%); (b) PTSD only (23.5%); (c) high affective dysregulation (AD) symptoms (31.9%); and (d) low PTSD and DSO symptoms (15.1%). Membership in the CPTSD and PTSD classes was specifically associated with cumulative traumatization, CPTSD $OR = 1.56$, 95% CI [1.15, 2.12], and PTSD $OR = 1.64$, 95% CI [1.15, 2.34]; and female gender, CPTSD $OR = 14.18$, 95% CI [1.66, 121.29], and PTSD $OR = 16.84$, 95% CI [1.78, 159.2], relative to the low-symptom class. Moreover, CPTSD and AD class membership was significantly predicted by insecure visa status, CPTSD $OR = 7.53$, 95% CI [1.26, 45.08], and AD $OR = 7.19$, 95% CI [1.23, 42.05]. These findings are consistent with the *ICD-11* model of CPTSD and highlight the contributions of cumulative trauma to CPTSD and PTSD profiles as well as of contextual stress from visa uncertainty to DSO symptom profiles in refugee cohorts, particularly those characterized by AD.

Complex Posttraumatic Stress Disorder Symptom Profiles in Traumatized Refugees

The number of forcibly displaced people globally has risen to over 68 million, with 16 million newly displaced individuals in 2017 (United Nations High Commissioner for Refugees [UNHCR], 2018). Refugees have been forced to flee their homes and countries due to persecution, conflict, war, and violence. As such, refugees have generally been exposed to extremely high numbers of cumulative traumatic events, including gross human rights violations such as torture, sexual violence, witnessing the murder of loved ones, and deprivation-related traumas (Li, Liddell, & Nickerson, 2016; Sigvardsdotter, Vaez, & Saboonchi, 2016). It is well evidenced that a higher level of premigration trauma exposure substantially increases the risk for posttraumatic stress disorder (PTSD) in refugees,

reflecting a dose-response association (Mollica et al., 1998). Meta-analytic findings across studies indicate that approximately 1 in 3 (i.e., 30.6%) conflict-affected and displaced people will meet the diagnostic criteria for PTSD in their lifetimes, with torture exposure being the strongest predictor of PTSD and cumulative trauma exposure being the second strongest predictor (Steel, Chey, Silove, Marnane, Bryant, & von Ommeren, 2009).

Although there has been a focus on understanding the risks for PTSD among refugee populations, much less is known about the prevalence and determinants of the complex PTSD (CPTSD) construct in refugees. In general, the existing evidence supports a six-factor structure of CPTSD as included in the 11th revision of the *International Classification of Diseases (ICD-11*; World Health Organization, 2018), comprising two second-order factors: (a) PTSD symptoms reflecting three symptom clusters of reexperiencing, avoidance, and hyperarousal; and (b) three co-occurring symptoms associated with disruption to self-organization (DSO), comprising difficulties in regulating strong emotions, problems forming relationships, and negative self-concept (Brewin et al., 2017). This structure was originally validated in nonrefugee trauma-exposed populations, primarily involving individuals who had suffered childhood abuse (Cloitre, Garvert, Brewin, Bryant, & Maercker, 2013), but it appears to have relevance concerning refugee populations. Research suggests that the higher-order two-factor CPTSD construct as included in *ICD-11* is applicable to refugee samples (Nickerson, Cloitre, et al., 2016). Moreover, studies conducted in refugee populations using latent class analysis (LCA) approaches consistently distinguish between PTSD and CPTSD symptom profiles. Latent class analysis is a statistical method that groups individuals into latent classes based on the probability of the presence or absence of specific symptoms. For example, a study conducted among displaced refugees in Lebanon found evidence of separate PTSD (high probability of PTSD symptoms only) and CPTSD symptom (high probability of PTSD and DSO symptoms) classes but also identified a third class comprising refugees with

low levels of PTSD and CPTSD symptoms (Hyland et al., 2018). Similarly, distinct PTSD, CPTSD, and low symptom classes were also observed in a combined highly trauma-exposed group, including a refugee sample, alongside a fourth “anxiety” class in which members exhibited high levels of hyperarousal PTSD symptoms and emotion dysregulation CPTSD symptoms (Palic et al., 2016). Moreover, a survey conducted in a large sample of West Papuan refugees found support for the six factor structure of CPTSD, comprising three PTSD symptom clusters and three DSO symptom clusters (Tay et al., 2018), which is in accord with the majority of the literature (Brewin et al., 2017). Despite these differences between studies regarding number of classes and factors observed in forcibly displaced populations, they all provide supporting evidence for distinguishing CPTSD and PTSD symptoms in refugee populations.

Researchers have suggested that high levels of exposure to interpersonal, invasive, and violent events may be associated with increased risk of CPTSD symptoms in general populations (Herman, 1992; Perkonig et al., 2016). There is evidence to suggest that exposure to chronic, uncontrollable, and repeated interpersonal trauma, such as sexual violence, torture, or childhood maltreatment may precede the onset of the DSO symptoms that distinguish a CPTSD profile from PTSD (Brewin et al., 2017; Cloitre et al., 2013; Cloitre, Garvert, Weiss, Carlson, & Bryant, 2014; Herman, 1992; McDonnell, Robjant, & Katona, 2013; Palic et al., 2016). Given that refugee populations are exposed at higher levels to these extreme human rights violations (e.g., it is estimated that 1 in 5 refugees are survivors of torture; (Steel et al., 2009), it has been suggested that refugees may be more at risk of developing CPTSD (McDonnell et al., 2013; Nickerson, Cloitre, et al., 2016). Although the CPTSD profile appears to be relevant to refugees, there has been little research into whether the specific traumatic experiences of refugees, including whether they have been exposed to torture or sexual violence, may increase risk for CPTSD symptoms. Emerging

research suggests that recovery from the physical effects of torture, alongside other posttorture factors, may be an important factor associated with CPTSD symptoms (Choi, Lee, & Lee, 2017).

As such, there is significant evidence to suggest that postmigration stressors also adversely impact PTSD and depression symptoms in refugee populations (Li et al., 2016; Miller & Rasmussen, 2017; Porter & Haslam, 2005; Riley, Varner, Ventevogel, & Hasan, 2017). These stressors may have a direct adverse effect on mental health (Lindencrona, Ekblad, & Hauff, 2008; Miller & Rasmussen, 2017), and/or heighten the impact of premigration trauma exposure on mental health outcomes, particularly PTSD symptoms (Chen, Hall, Ling, & Renzaho, 2017; Lindencrona et al., 2008; Miller & Rasmussen, 2017; Morgan, Melliush, & Welham, 2017; Porter & Haslam, 2005) and depression (Bogic, Njoku, & Priebe, 2015; Hocking, Kennedy, & Sundram, 2015). One specific category of postmigration stress that may be particularly harmful to mental health is ongoing uncertainty regarding the resolution of the refugee determination process for asylum seekers or refugees on temporary visas. Insecure visa status has been significantly associated with increased levels of PTSD symptoms among refugees in Australia (Momartin et al., 2006; Nickerson, Steel, Bryant, Brooks, & Silove, 2011; Steel et al., 2011), the Netherlands (Knipscheer, Sleijpen, Moeren, ter Heide, & van der Aa, 2015), the United Kingdom (Morgan et al., 2017) and the United States (Chu, Keller, & Rasmussen, 2013). Visa insecurity may be particularly associated with elevated PTSD symptoms because it heightens realistic fears related to future trauma if repatriation is enforced and a protracted loss of control and agency.

It has been proposed that postmigration stress, such as visa insecurity, may also contribute to CPTSD symptom profiles in refugees (Nickerson, Cloitre, et al., 2016; Palic et al., 2016). Indeed, emotion dysregulation—a hallmark symptom of CPTSD—has been specifically found to mediate the aversive association between both trauma load and

postmigration living difficulties on PTSD, depression, and anger symptoms in refugees (Nickerson et al., 2015). However, some commentators have criticized this assumption, suggesting that CPTSD can only arise from exposure to traumatic events (de Jongh et al., 2017). The only study to directly examine this association to date found that CPTSD symptom scores were positively associated with the degree of trauma exposure as well as with the severity of perceived postmigration living difficulties (Tay et al., 2018). Accordingly, most of this discussion has been theoretical, and there has been a lack of empirical data with which to examine this issue.

The aim of the present study was therefore to use LCA to examine and identify profiles of PTSD and DSO symptoms in a sample of refugees and to investigate specific pre-migration, postmigration, and demographic correlates of these symptom profiles. Our sample comprised a mixture of treatment-seeking and community-based refugees residing in Australia at the time of the study who participated in a clinical interview. We hypothesized a three-class model, comprising a CPTSD class, a PTSD class, and a low-symptom class, which is consistent with the majority of findings thus far in the literature. We also predicted that both premigration trauma exposure and insecure visa status would be associated with membership in the PTSD class but that exposure to torture or sexual violence would be specifically associated with higher probability of membership in the CPTSD class.

Method

Participants and Procedure

Participants were 112 refugees from diverse backgrounds who had resettled in Sydney, Australia and been recruited to take part in a larger neuroimaging research project. Participants were primarily referred from the New South Wales (NSW) Service for the Treatment and Rehabilitation of Torture and Trauma Survivors (STARTTS), which is a torture and trauma treatment service in Sydney ($n = 57, 50.9\%$), or via referrals and

advertisements placed at other refugee services in Sydney ($n = 55$, 49.1%). Inclusion criteria were having a refugee background and being over 18 years of age. Exclusion criteria were assessed upon referral and included a history of psychosis or bipolar disorder; a previous diagnosis of a neurological condition; current severe suicidality; other serious medical condition, restricted vision, hearing, or movement; and not meeting magnetic resonance imaging (MRI) safety criteria (e.g., having a metal-related injury).

Data were collected between September 2013 and December 2016. Of the 112 participants in this study, 96 were recruited to take part in a larger neuroimaging research project, and an additional 16 participants took part in a second, separate project. As such, different measures of CPTSD symptoms were acquired in the two different projects and integrated for the purposes of the present analysis (see the Measures subsection for a full description). Notably, if participants completed both projects, data were used from the first, larger project.

All participants who met inclusion criteria provided written informed consent as approved by the UNSW Sydney Human Research Ethics Committee. Participants completed a clinical interview with a trained clinical or research psychologist over two separate sessions on different days, approximately one week apart. Professional health interpreter support was available if needed.

Measures

PTSD. Symptoms of PTSD were assessed using the PTSD Symptom Scale–Interview version (PSS-I), which has demonstrated strong psychometric properties (Foa & Tolin, 2000; Foa, Cashman, Jaycox, & Perry, 1997) and has been used in previous studies with refugee samples (Nickerson, Garber, et al., 2016; Nickerson et al., 2017). Each PTSD symptom was assessed for its frequency or severity over the preceding two weeks, with ratings provided on 4-point Likert ranging from 0 (*not at all*) to 3 (*5 or more times per week/very much*). In order

to adhere to the *ICD-11* definition of PTSD, we focused on six PTSD symptom items reflecting three symptom clusters: (a) reexperiencing of the trauma (intrusive memories and nightmares), (b) avoidance of trauma reminders (cognitive and physical avoidance), and (c) hyperarousal (hypervigilance and startle response). The internal consistency of these six items was strong in the current sample, Cronbach's $\alpha = .80$. In preparation for the LCA, we computed dichotomous items representing the presence (i.e., a score of 2 or 3 on the symptom item) or absence (i.e., a score of 0 or 1) of each of these six symptoms.

CPTSD. Complex PTSD was measured using the precursor versions of the International Trauma Questionnaire (ITQ; Cloitre et al., 2018) for the majority of participants ($n = 94$) in this study. At the time of data collection in the first, larger project, the ITQ had not been developed; thus, an initial version of this measure was constructed in collaboration with authors of the ITQ (M. Cloitre, personal communication, July 2013). This measure consisted of nine items related to CPTSD symptoms, with responses provided on a 4-point scale ranging from 0 (*not at all*) to 3 (*extremely*). Indicators of internal consistency were sound in the present sample, Cronbach's $\alpha = .75$.

The CPTSD measure in the second study ($N = 16$ participants) was based on a subsequent iteration of the measure that more closely reflected the ITQ (Cloitre, Roberts, Bisson, & Brewin, 2015; Cloitre et al., 2018), which comprised 17 ITQ items related to the three DSO symptom clusters. Responses were provided based on a 5-point scale ranging from 0 (*not at all*) to 4 (*extremely*). The internal consistency of the items was high for the present sample, Cronbach's $\alpha = .92$.

For the LCA analysis, we computed the presence or absence of five core DSO symptoms within the three symptom clusters: (a) affective dysregulation (easily upset, emotionally overreactive), (b) negative self-concept (feelings of worthlessness, strong sense of being a failure), and (c) poor interpersonal relationships (avoidance of relationships). The

presence of significant clinical symptoms was denoted by endorsing the item at a moderate level or above in both versions of the CPTSD measure. When an item was endorsed at a moderate level, the symptom was considered to be present; these dichotomously scored symptoms were used as indicator variables for the LCA.

Trauma exposure. We used the Harvard Trauma Questionnaire (HTQ; Mollica et al., 1992) to index exposure to 16 traumatic event types commonly experienced by refugees. For the purposes of the present study, we focused on direct experience of each event as opposed to witnessing events or learning about the event happening to a loved one, with the exception of murder of loved ones or strangers, which includes witnessing. A total count of traumatic events experienced was computed to index the level of lifetime trauma exposure, excluding the sexual violence and torture items, which were measured differently (described later). Internal consistency for these items was sound, Cronbach's $\alpha = .75$.

We were also interested in whether specific exposure to torture or sexual violence might predict symptom profiles. Torture was defined according to the characterization given by the United Nations Convention Against Torture (UNCAT), in which torture is an act during which severe pain or suffering is inflicted on a person for the purposes of obtaining information, intimidation, punishment, or to extract a confession as directed by or consented to by a public official (Office of the United Nations High Commissioner for Human Rights [UNHCHR], 1984). Torture exposure was determined via clinical interview in three stages. First, if a participant endorsed the torture exposure item in the HTQ, they then completed a more detailed questionnaire regarding torture experiences—a semistructured interview developed by the researchers to ascertain the extent of torture exposure and based on the Semi-Structured Interview for Survivors of Torture (Basoglu et al., 1994). Then, the interviewer completed the Torture Survivor Check-List (TSCL; (Rasmussen, Crager, Keatley, Keller, & Rosenfeld, 2011) to determine whether the events described by the participant met

criteria of the UNCAT definition of torture (UNHCHR, 1984). If the events described by the participant met the UNCAT criteria for torture, the participant was categorized as a torture survivor.

Exposure to sexual violence, including sexual abuse and/or rape, was determined via the HTQ and denoted lifetime exposure (in childhood and adulthood). Because it was not possible to separate the experience of sexual violence in the context of torture or otherwise in our sample, we computed a predictor variable that merged exposure to torture or the experience of sexual violence for use as a predictor of latent class (see Data Analysis section).

Data Analysis

Statistical analyses were conducted in Mplus (Version 7.4). First, we conducted an LCA to identify symptom profiles based on six PTSD and five DSO symptoms as outlined in the *ICD-11* (World Health Organization, 2018). Data was missing for one participant on PTSD symptoms, and data from the CPTSD measure were missing for 16 participants. Mplus uses the full information maximum likelihood estimate approach to deal with missing data in an LCA. Little's Missing Completely at Random (MCAR) test was performed, and any missing data across all quantitative variables was found to be completely random, $\chi^2(25, N = 111) = 27.86, p = .314$. The final number of participants in the sample for analysis was 111.

To determine the optimal number of latent classes, we first fit the most parsimonious (one-class) model to the data, with each successive model adding another class. The fit for each model was determined using conventional indices, including the Akaike's information criterion (AIC), Bayesian information criterion (BIC), and the sample size-adjusted Bayesian information criterion (SS-BIC), where lower values indicate better fit. We also used the entropy score (higher levels suggest better fit), the Lo-Mendell-Rubin likelihood ratio test (LMR-LRT), and the bootstrap likelihood ratio test (BLRT, with significant values indicating

that the k model fits the data better than the $k-1$ model), as well as interpretability and parsimony considerations.

The LCA assigns participants to particular classes based on probabilities. The probability of symptoms being present in each class was indicated by the following values: probabilities of 0.60 or higher were considered a high likelihood of endorsement, probabilities between 0.16 and 0.59 suggested a moderate possibility of endorsement, and values of 0.15 and lower suggested a low probability of endorsement (Galatzer-Levy, Nickerson, Litz, & Marmar, 2013; Nickerson et al., 2014).

We were also interested in the specific factors that predicted class membership. To test this, we conducted a multinomial logistic regression on the derived classes in the conditional model. We restricted the number of predictors given the moderate sample size, focusing on core demographic, trauma exposure, and postmigration factors. Five predictors were denoted as auxiliary variables in the model: sex, age, number of traumatic event types experienced (excluding torture and sexual violence), exposure to torture or sexual violence outside of torture, and visa status. The three-step approach was used as it is deemed superior to other imputation methods for examining the relation between latent classes and predictor variables (Asparouh & Muthén, 2014). There were no missing data for the predictor variables across participants. As this multinomial logistic regression represents one regression model, significance levels were set at $p < .05$.

Results

Participant Characteristics

The majority of participants in the sample were male ($n = 74$; 66.1%), and the average participant age was 37.7 years ($SD = 11.5$; range: 18–70 years). The most common country of origin in the sample was Iran ($n = 39$, 34.8%), followed by Iraq ($n = 23$, 20.5%), Afghanistan ($n = 7$, 6.3%), and Sri Lanka ($n = 7$, 6.3%), with a further 36 participants

(32.1%) from an additional 21 countries, including Syria, Vietnam, Bangladesh, and Ethiopia. Over half of participants in the sample were married ($n = 62$, 55.4%), one-third were single and never married ($n = 40$, 35.7%), and other participants reported being divorced or separated ($n = 6$, 5.4%) or were a widow or widower ($n = 4$, 3.6%). More than half of participants were not in the workforce ($n = 60$, 53.4%), and others were in the workforce ($n = 20$, 17.9%), studying ($n = 23$, 20.5%), or were occupied with home duties or were retired ($n = 9$, 8%). Almost half of the sample had completed tertiary education ($n = 48$, 42.9%); the rest of the sample reported educational attainment as having completed high school ($n = 33$, 29.5%), primary school ($n = 25$, 22.3%), or having minimal education ($n = 6$, 5.4%). Half of the sample had secure residency and either held permanent visas or were Australian citizens ($n = 54$, 48.2%); the second half of the sample had insecure residency ($n = 58$, 51.8%) and either held either a temporary or bridging visa or they were in the process of seeking asylum. Close to half of participants in the sample were in current psychological or psychiatric treatment ($n = 48$, 42.8%). The sample was highly trauma exposed: The most commonly endorsed traumatic events were food and/or water deprivation (70.5%) and being close to death (70.5%), with a further 40.2% of the sample reportedly having experienced torture and an additional 13.4% having experienced sexual violence outside the torture experience (Table 1). Participants reported a mean of 7.36 ($SD = 3.43$) types of traumatic events. Overall endorsement of PTSD and DSO symptoms are presented in Table 3.

Latent Class Analysis

Fit indices for one- to five-class models are presented in Table 2. The AIC and SS-BIC indices decreased with each successive class, and the BIC decreased up until the four-class model but increased for the five-class model. Entropy indices were particularly high for the three-, four-, and five-class models. The LMR-LRT was significant for two-, three- and four-class models but not significant for the five-class model. Taken together, it was deduced

that the four-class model showed the most optimal fit to the data. This was confirmed by observing that identified classes were clearly distinguishable and each comprised over 15% of the sample.

The examination of the symptom profiles for each class revealed that the classes could be described as a CPTSD class, comprising high levels of PTSD and DSO symptoms ($n = 33$, 29.5% of the sample, posterior probability = 0.928); a PTSD-only class, encompassing high levels of PTSD symptoms and low-to-moderate DSO symptoms ($n = 26$, 23.5% of the sample, posterior probability = 0.969); an affective dysregulation (AD) class, including high levels of AD symptoms, low PTSD symptoms, and moderate levels of the remaining DSO symptoms ($n = 35$, 31.9.9%, posterior probability = 0.872); and a low symptom class, comprising low levels of both PTSD and DSO symptoms ($n = 17$, 15.1%, posterior probability = 0.989). Symptom probabilities of each latent class are shown in Figure 1, and Table 3 presents probability and standard error statistics for each class.

Multinomial Logistic Regression Models

Table 4 presents the outcomes of the multinomial logistic regression models, contrasting each latent class with each other. Herein, we discuss the results according to predictor category.

Trauma-exposure predictors. A higher trauma load significantly predicted membership in the CPTSD, odds ratio (OR) = 1.56, 95% CI [1.15, 2.12], and PTSD-only classes, $OR = 1.64$, 95% CI [1.15, 2.34] classes, relative to the low-symptom class. Trauma load also predicted membership in the CPTSD class compared to the AD class, $OR = 1.23$, 95% CI [1.01, 1.51]. The specific experience of torture or sexual violence did not predict membership in any of the classes over and above cumulative trauma load.

Insecure visa status predictor. Insecure visa status significantly predicted membership in the CPTSD class relative to the low-symptom class, $OR = 7.53$, 95% CI

[1.26, 45.08], and PTSD-only class, $OR = 5.69$, 95% CI [1.13, 28.62]. Moreover, insecure visa status also predicted membership in the affective dysregulation class compared to the low-symptom class, $OR = 7.19$, 95% CI [1.23, 42.05], and PTSD-only class, $OR = 5.44$, 95% CI [1.02, 29.10].

Demographic predictors. Older age predicted membership in the PTSD class relative to the CPTSD, $OR = 1.08$, 95% CI [1.02, 1.15], and AD classes, $OR = 1.07$, 95% CI [1.01, 1.15]. Female sex was highly associated with a higher probability of membership in all the symptom classes compared to the low-symptom class: CPTSD class, $OR = 14.18$, 95% CI [1.66, 121.29]; PTSD class, $OR = 16.84$, 95% CI [1.78, 159.20]; and AD class, $OR = 22.83$, 95% CI [2.76, 188.83].

Discussion

The present study examined PTSD and CPTSD symptom profiles in a sample of trauma-exposed refugees resettled in Australia. The findings support the validity of the *ICD-11* construct of CPTSD in a refugee sample, represented by co-occurring PTSD and DSO symptoms. We identified a distinct CPTSD class, representing 29.5% of the sample, from PTSD-only (23.5%) and low-symptom classes (15.1%), as predicted. Additionally, we found evidence of a fourth class characterized by high AD symptoms, moderate negative self-concept and disrupted relationship symptoms, and low levels of PTSD symptoms (i.e., the AD class; 31.9% of the sample). The identification of this AD class is partially consistent with the emerging literature in both clinical and community samples (Knefel, Garvert, Cloitre, & Lueger-Schuster, 2015; Palic et al., 2016; Perkonig et al., 2016), and points to the notion that AD symptoms can exist without other CPTSD or PTSD symptoms in this cohort. Membership in the AD class, relative to the low-symptom and PTSD classes, was most strongly associated with insecure visa status. Moreover, both premigration trauma and insecure visa status uniquely predicted membership in the CPTSD class, suggesting that

trauma load and visa uncertainty for refugees may be specifically associated with the prevalence of CPTSD symptoms.

Our observation of a PTSD symptom class and a distinct PTSD and co-occurring DSO symptom class reflecting CPTSD is consistent with the a higher-order two-factor structure for CPTSD that has been observed across multiple clinical and community samples (Brewin et al., 2017). This suggests that a distinct CPTSD symptom profile is evident among a cohort of traumatized refugees characterized by co-occurring moderate-to-high PTSD and DSO symptoms (Brewin et al., 2017; Cloitre et al., 2013). These findings also reflect outcomes from previous studies conducted with displaced populations and torture survivors (Nickerson, Cloitre, et al., 2016; Palic et al., 2016; A. K. Tay et al., 2018).

We predicted that premigration factors, such as cumulative trauma load and exposure to torture and sexual violence, may distinguish membership in a CPTSD class over a PTSD class. This hypothesis was only partially supported by the data as only trauma load and not exposure to torture or sexual violence specifically predicted membership of both CPTSD and PTSD classes relative to the low-symptom and the AD classes (CPTSD only), and did not distinguish between the CPTSD and PTSD classes. Studies focusing on predictors of PTSD symptoms in refugees have found cumulative traumatization to be the more robust predictor relative to exposure to any specific traumatic event (Knipscheer et al., 2015). Two studies conducted in refugee or displaced samples have found the level of trauma exposure to either predict CPTSD class membership (Palic et al., 2016) or be positively associated with CPTSD symptom severity in a regression analyses (Tay et al., 2016); however, neither of these studies examined the contribution of exposure to specific traumatic events. It is possible that highly potent interpersonal traumatic events, including torture and sexual violence, may impact symptom severity (Catani, Adenauer, Keil, Aichinger, & Neuner, 2009; Gola et al., 2012) rather than the presence or absence of symptoms, but this will need to be examined in

future studies. The findings of the current study clearly demonstrate that a highly cumulative trauma history is an important risk factor associated with both CPTSD and PTSD symptomatology.

The findings of the LCA also identified a class characterized by AD symptoms and other moderate DSO symptoms but low PTSD symptoms, which is consistent with previous research. In a study conducted among adult survivors of childhood abuse, a fourth class characterized by low PTSD and high-to-moderate CPTSD symptoms—especially AD and negative self-concept symptoms—was observed (Knefel et al., 2015). The authors determined that it was unlikely this group was nonpathological or subthreshold CPTSD, as they did not exhibit PTSD symptoms, but rather might reflect symptoms of other psychological disorders not measured or yet understood (Knefel et al., 2015). This interpretation matches with the findings of a second community-based study conducted with adolescents and young adults in which a class characterized by high levels of DSO symptoms, low levels of PTSD symptoms, and low ratings of functional impairment was interpreted as suggesting that DSO symptoms may not be unique to CPTSD but could be related to symptoms from other anxiety, mood, substance use, or even Axis II disorders (Perkonig et al., 2016). Using data derived from multiple trauma-exposed samples, including refugees, Palic et al. (2016) also identified an “anxiety” class, characterized by high probabilities of hyperarousal and AD symptoms, moderate interpersonal difficulties, and less functional impairment. The authors proposed that this class was characterized by a subset of symptoms relatively lower in severity, which may reflect a set of adaptive reactions to ongoing stress or continuous threats in the environment regardless of the nature of past trauma exposure (Palic et al., 2016). However, the study by Palic and colleagues did not directly test the quality of the current environment in regards to class prediction.

Our finding that postmigration circumstances in relation to visa insecurity emerged as a potentially important correlate of both CPTSD and AD class membership fits with the notion that the stressors in the posttrauma recovery environment can influence DSO symptomatology. Specifically, we found that insecure visa status predicted membership in the CPTSD and AD classes relative to both the low-symptom and PTSD classes. In Australia, visa insecurity is characterized by prolonged uncertainty regarding the future, a lack of control in the refugee determination process (e.g., unclear waiting times for decisions, sudden policy changes requiring new submissions), and elevated postmigration living difficulties (i.e., significant practical barriers, including restricted employment opportunities and access to services, family separation, fear for the future, and social problems including isolation and intercultural adjustment problems; (Li et al., 2016; Momartin et al., 2006; Morgan et al., 2017; Nickerson et al., 2011; Steel et al., 2011). Notably, this group was not distinguished by higher trauma load or exposure to torture or sexual violence, but they did appear to be younger than the PTSD class and were more likely to be female compared to the low-symptom class. Furthermore, AD class membership was predicted by lower trauma exposure than what was found in the CPTSD class. The contribution of the quality of postdisplacement conditions to CPTSD class membership is a new finding, suggesting that both trauma exposure and current contextual stress are important correlates of CPTSD symptom profiles in refugees. It has been argued that trauma exposure should be the sole consideration in CPTSD development and maintenance (de Jongh et al., 2017). However, this argument misses the very real situational or contextual factors that could exacerbate or contribute to CPTSD symptoms, particularly if trauma survivors are in situations of either ongoing threat or excessive stress, such as is often the case with refugees. The findings of the current study suggest that poor regulation of emotional reactions may reflect appropriate responses to the difficulty of adjusting to a major situational stressor; that is, ongoing uncertainty about the future associated with insecure visa

status. This suggests that once this significant stressor is removed (i.e., a resolution in the refugee status determination process and/or being awarded a secure visa), these dysregulation symptoms would recede among refugees in this class. Such a finding has both clinical and policy implications: Strategies to effectively manage and treat high levels of AD symptoms without concomitant PTSD symptoms may be facilitated by a focus on optimizing AD skills, with partial reliance on the alleviation of external stressors.

This study had a number of limitations. First, our cohort was not a representative sample as participants were recruited to participate in two larger research studies. Our sample size was also moderate, meaning that we were not able to test the contribution of more specific categories of postmigration stress in the current analysis. Furthermore, it is important to acknowledge that participants were sampled from both community and treatment-seeking populations and represented a wide range of countries of origin and ethnicities. Although this is a limitation, it also may assist in the generalizability of the findings. The majority of participants completed a brief precursor CPTSD measure that is not the current validated measure of CPTSD symptoms (i.e., the ITQ). Moreover, this measure only included one item measuring disrupted interpersonal relationships. The concept of CPTSD according to the *ICD-11* includes two symptoms within this cluster: avoidance of relationships (measured in the current study) and feelings of detachment from others (Brewin et al., 2017). In terms of trauma exposure, we were not able to distinguish between childhood and adulthood experiences of trauma as the HTQ measures lifetime trauma exposure; however, the vast majority of traumatic events endorsed by participants were experienced in adulthood. Moreover, exposure to torture and/or sexual violence was combined into a single factor. Future studies could consider the specific contribution of each of these traumatic events separately.

This study provides support for distinctive CPTSD and PTSD symptom profiles in a refugee sample. The findings also suggest that although cumulative trauma load is an important predictor of PTSD and CPTSD symptoms, posttrauma stressors, such as visa insecurity, are also associated with CPTSD symptomatology. The presence of a fourth class characterized by prominent AD, which was also predicted by visa insecurity but not trauma load, indicates that highly stressful situational factors may have a major impact on the psychological well-being of refugees. The finding that visa insecurity plays an important role in predicting CPTSD symptom profile highlights the importance of a safe, stable, and certain resettlement environment for the promotion of trauma recovery and positive mental health outcomes for trauma-exposed refugees.

References

- Asparouh, T., & Muthén, B. (2014). Auxiliary variables in mixture modeling: Three-Step approaches using Mplus. *Structural Equation Modelling: A Multidisciplinary Journal*, 21, 329–341. <https://doi.org/10.1080/10705511.2014.915181>
- Basoglu, M., Paker, M., Paker, O., Ozmen, E., Marks, I., Incesu, C., . . . Sarimurat, N. (1994). Psychological effects of torture: a comparison of tortured with nontortured political activists in Turkey. *American Journal of Psychiatry*, 151, 76–81. <https://doi.org/10.1176/ajp.151.1.76>
- Bogic, M., Njoku, A., & Priebe, S. (2015). Long-term mental health of war-refugees: A systematic literature review. *BMC International Health and Human Rights*, 15, 29. <https://doi.org/10.1186/s12914-015-0064-9>
- Brewin, C. R., Cloitre, M., Hyland, P., Shevlin, M., Maercker, A., Bryant, R. A., . . . Reed, G. M. (2017). A review of current evidence regarding the *ICD-11* proposals for diagnosing PTSD and complex PTSD. *Clinical Psychological Review*, 58, 1–15.

- Catani, C., Adenauer, H., Keil, J., Aichinger, H., & Neuner, F. (2009). Pattern of cortical activation during processing of aversive stimuli in traumatized survivors of war and torture. *European Archives of Psychiatry and Clinical Neuroscience*, 259, 340–351. <https://doi.org/10.1007/s00406-009-0006-4>
- Chen, W., Hall, B. J., Ling, L., & Renzaho, A. M. (2017). Pre-migration and post-migration factors associated with mental health in humanitarian migrants in Australia and the moderation effect of post-migration stressors: Findings from the first wave data of the BNLA cohort study. *Lancet Psychiatry*, 4, 218–229. [https://doi.org/10.1016/S2215-0366\(17\)30032-9](https://doi.org/10.1016/S2215-0366(17)30032-9)
- Choi, H., Lee, H. J., & Lee, H. Y. (2017). The effects of torture-related stressors on long-term complex post-traumatic symptoms in South Korean torture survivors. *International Journal of Psychology*, 52(Suppl 1), 57–66. <https://doi.org/10.1002/ijop.12276>
- Chu, T. Q., Keller, A. S., & Rasmussen, A. (2013). Effects of post-migration factors on PTSD outcomes among immigrant survivors of political violence. *Journal of Immigrant Minority Health*, 15, 890–897. <https://doi.org/10.1007/s10903-012-9696-1>
- Cloitre, M., Garvert, D. W., Brewin, C. R., Bryant, R. A., & Maercker, A. (2013). Evidence for proposed ICD-11 PTSD and complex PTSD: A latent profile analysis. *European Journal of Psychotraumatology*, 4, 20706. <https://doi.org/10.3402/ejpt.v4i0.20706>
- Cloitre, M., Garvert, D. W., Weiss, B., Carlson, E. B., & Bryant, R. A. (2014). Distinguishing PTSD, complex PTSD, and borderline personality disorder: A latent class analysis. *Journal of Psychotraumatology*, 5, 25097. <https://doi.org/10.3402/ejpt.v5.25097>
- Cloitre, M., Roberts, N. A., Bisson, J., & Brewin, C. R. (2015). *PTSD & Complex PTSD Diagnostic Interview, Schedule for ICD-11–ICD-11 Trauma Questionnaire (Self-Report Research Version 1.4)*. Unpublished manuscript.

- Cloitre, M., Shevlin, M., Brewin, C. R., Bisson, J. I., Roberts, N. P., & Maercker, A. (2018). *The International Trauma Questionnaire (ITQ): Development of a self-report measure of ICD-11 PTSD and Complex PTSD. Acta Psychiatrica Scandinavica, 138*(6), 536–546. <https://doi.org/10.1111/acps.12956>
- de Jongh, A., Bicanic, I. A. E., Huntjens, R. J. C., Kiers, H. A. L., van der Gaag, M., & van Wijk, A. J. (2017). Response to 'The factor structure of complex posttraumatic stress disorder in traumatized refugees.' *European Journal of Psychotraumatology, 8*, 1307078. <https://doi.org/10.1080/20008198.2017.1307078>
- Foa, E., & Tolin, D. F. (2000). Comparison of the PTSD Symptom Scale–Interview Version and the Clinician-Administered PTSD Scale. *Journal of Traumatic Stress, 13*, 181–191. <https://doi.org/10.1023/A:1007781909213>
- Foa, E. B., Cashman, L., Jaycox, L., & Perry, K. (1997). The validation of a self-report measure of posttraumatic stress disorder: The Posttraumatic Diagnostic Scale. *Psychological Assessment, 9*, 445–451. <https://doi.org/10.1037/1040-3590.9.4.445>
- Galatzer-Levy, I. R., Nickerson, A., Litz, B. T., & Marmar, C. R. (2013). Patterns of lifetime PTSD comorbidity: A latent class analysis. *Depression and Anxiety, 30*, 489–496. <https://doi.org/10.1002/da.22048>
- Gola, H., Engler, H., Schauer, M., Adenauer, H., Riether, C., Kolassa, S., . . . Kolassa, I. T. (2012). Victims of rape show increased cortisol responses to trauma reminders: A study in individuals with war- and torture-related PTSD. *Psychoneuroendocrinology, 37*, 213–220. <https://doi.org/10.1016/j.psyneuen.2011.06.005>
- Herman, J. L. (1992). Complex PTSD: A syndrome in survivors of prolonged and repeated trauma. *Journal of Traumatic Stress, 5*, 377–391. <https://doi.org/10.1002/jts.2490050305>

Hocking, D. C., Kennedy, G. A., & Sundram, S. (2015). Mental disorders in asylum seekers:

The role of the refugee determination process and employment. *Journal of Nervous and Mental Disease*, 203, 28–32. <https://doi.org/10.1097/NMD.0000000000000230>

25503784

Hyland, P., Ceannt, R., Daccache, F., Abou Daher, R., Sleiman, J., Gilmore, B., . . . Vallières,

F. (2018). Are posttraumatic stress disorder (PTSD) and complex PTSD distinguishable within a treatment-seeking sample of Syrian refugees living in Lebanon? *Global Mental Health*, 5, e14). <https://doi.org/10.1017/gmh.2018.2>

Knefel, M., Garvert, D. W., Cloitre, M., & Lueger-Schuster, B. (2015). Update to an evaluation of *ICD-11* PTSD and complex PTSD criteria in a sample of adult survivors of childhood institutional abuse by Knefel & Lueger-Schuster (2013): A latent profile analysis. *European Journal of Psychotraumatology*, 6, 25290.

<https://doi.org/10.3402/ejpt.v6.25290>

Knipscheer, J. W., Sleijpen, M., Mooren, T., ter Heide, F. J. J., & van der Aa, N. (2015).

Trauma exposure and refugee status as predictors of mental health outcomes in treatment-seeking refugees. *British Journal of Psychiatry Bulletin*, 39, 178–182.

<https://doi.org/10.1192/pb.bp.114.047951>

Li, S. S., Liddell, B. J., & Nickerson, A. (2016). The relationship between post-migration stress and psychological disorders in refugees and asylum seekers. *Current Psychiatry Reports*, 18, 82. <https://doi.org/10.1007/s11920-016-0723-0>

<https://doi.org/10.1007/s11920-016-0723-0>

Lindencrona, F., Ekblad, S., & Hauff, E. (2008). Mental health of recently resettled refugees from the Middle East in Sweden: The impact of pre-resettlement trauma, resettlement stress and capacity to handle stress. *Social Psychiatry and Psychiatric Epidemiology*,

43, 121–131. <https://doi.org/10.1007/s00127-007-0280-2>

- McDonnell, M., Robjant, K., & Katona, C. (2013). Complex posttraumatic stress disorder and survivors of human rights violations. *Current Opinion in Psychiatry*, 26, 1–6. <https://doi.org/10.1097/YCO.0b013e32835aea9d>
- Miller, K. E., & Rasmussen, A. (2017). The mental health of civilians displaced by armed conflict: An ecological model of refugee distress. *Epidemiology and Psychiatric Sciences*, 26, 129–138. <https://doi.org/10.1017/S2045796016000172>
- Mollica, R., Caspi-Yavin, Y., Bollini, P., Truong, T., Tor, S., & Lavelle, J. (1992). The Harvard Trauma Questionnaire: Validating a cross cultural instrument for measuring torture, trauma, and post-traumatic stress disorder in Indochina refugees. *Journal of Nervous and Mental Disease*, 180, 111–116. <https://doi.org/10.1097/00005053-1992202000-00008>
- Mollica, R. F., McInnes, K., Pham, T., Smith Fawzi, M. C., Murphy, E., & Lien, L. (1998). The dose-effect relationships between torture and psychiatric symptoms in Vietnamese ex-political detainees and a comparison group. *The Journal of Nervous and Mental Disease*, 186, 543–553. <https://doi.org/10.1097/00005053-199809000-00005>
- Momartin, S., Steel, Z., Coello, M., Aroche, J., Silove, D., & Brooks, R. (2006). A comparison of the mental health of refugees with temporary versus permanent protection visas. *Medical Journal of Australia*, 185, 357–361. <https://doi.org/10.5694/j.1326-5377.2006.tb00610.x>
- Morgan, G., Melluish, S., & Welham, A. (2017). Exploring the relationship between postmigratory stressors and mental health for asylum seekers and refused asylum seekers in the UK. *Transcultural Psychiatry*, 54(5–6), 653–674. <https://doi.org/10.1177/1363461517737188>

Nickerson, A., Bryant, R. A., Schnyder, U., Schick, M., Mueller, J., & Morina, N. (2015).

Emotion dysregulation mediates the relationship between trauma exposure, post-migration living difficulties and psychological outcomes in traumatized refugees

Journal of Affective Disorders, 173, 185–192.

<https://doi.org/10.1016/j.jad.2014.10.043>

Nickerson, A., Cloitre, M., Bryant, R. A., Schnyder, U., Morina, N., & Schick, M. (2016).

The factor structure of complex posttraumatic stress disorder in traumatized refugees.

European Journal of Psychotraumatology, 7, 33253.

Nickerson, A., Garber, B., Ahmed, O., Asnaani, A., Cheung, J., Hofmann, S. G., . . . Bryant,

R. A. (2016). Emotional suppression in torture survivors: Relationship to

posttraumatic stress symptoms and trauma-related negative affect. *Psychiatry*

Research, 242, 233–239. <https://doi.org/10.1016/j.psychres.2016.05.048>

Nickerson, A., Garber, B., Liddell, B. J., Litz, B. T., Hofmann, S. G., Asnaani, A., . . .

Bryant, R. A. (2017). Impact of cognitive reappraisal and emotion suppression on

affect, heart rate and intrusive memories in traumatized refugees *Clinical*

Psychological Science, 5, 497–512. <https://doi.org/10.1177/2167702617690857>

Nickerson, A., Liddell, B. J., Maccallum, F., Steel, Z., Silove, D., & Bryant, R. A. (2014).

Posttraumatic stress disorder and prolonged grief in refugees exposed to trauma and

loss. *BMC Psychiatry*, 14, 106. <https://doi.org/10.1186/1471-244X-14-106>

Nickerson, A., Steel, Z., Bryant, R., Brooks, R., & Silove, D. (2011). Change in visa status

amongst Mandaean refugees: Relationship to psychological symptoms and living

difficulties. *Psychiatry Research*, 187, 267–274.

<https://doi.org/10.1016/j.psychres.2010.12.015>

United Nations Office of the High Commissioner for Human Rights. (1984). *Convention against torture and other cruel, inhuman or degrading treatment or punishment*.

<https://www.ohchr.org/en/professionalinterest/pages/cat.aspx>

Palic, S., Zerach, G., Shevlin, M., Zeligman, Z., Elklit, A., & Solomon, Z. (2016). Evidence of complex posttraumatic stress disorder (CPTSD) across populations with prolonged trauma of varying interpersonal intensity and ages of exposure. *Psychiatry Research*, 246, 692–699. <https://doi.org/10.1016/j.psychres.2016.10.062>

Perkonig, A., Hofler, M., Cloitre, M., Wittchen, H. -U., Trautmann, S., & Maercker, A. (2016). Evidence for two different *ICD-11* posttraumatic stress disorders in a community sample of adolescents and young adults. *European Archives of Psychiatry and Clinical Neuroscience*, 266, 317–328. <https://doi.org/10.1007/s00406-015-0639-4>

Porter, M., & Haslam, N. (2005). Predisplacement and postdisplacement factors associated with mental health of refugees and internally displaced persons: A meta-analysis. *JAMA*, 294, 602-612. <https://doi.org/10.1001/jama.294.5.602>

Rasmussen, A., Crager, M., Keatley, E., Keller, A. S., & Rosenfeld, B. (2011). Screening for torture: A narrative checklist comparing legal definitions in a torture treatment clinic. *Journal of Psychology*, 219, 143–149. <https://doi.org/10.1027/2151-2604/a000061>

Riley, A., Varner, A., Ventevogel, P., & Hasan, M. M. T. (2017). Daily stressors, trauma exposure, and mental health among stateless Rohingya refugees in Bangladesh. *Transcultural Psychiatry*, 54 304–331. <https://doi.org/10.1177/1363461517705571>

Sigvardsson, E., Vaez, M., M., R. H. A., & Saboonchi, F. (2016). Prevalence of torture and other war-related traumatic events in forced migrants: A systematic review. *Torture*, 26(2), 41–73. https://doi.org/10.1163/2210-7975_hrd-9921-2016014

Steel, Z., Chey, T., Silove, D., Marnane, C., Bryant, R. A., & von Ommeren, M. (2009). Association of torture and other potentially traumatic events with mental health

outcomes among populations exposed to mass conflict and displacement: A systematic review and meta-analysis. *JAMA*, 302, 537–549.

<https://doi.org/10.1001/jama.2009.1132>

Steel, Z., Momartin, S., Silove, D., Coello, M., Aroche, J., & Tay, K. W. (2011). Two year psychosocial and mental health outcomes for refugees subjected to restrictive or supportive immigration policies. *Social Science & Medicine*, 72, 1149–1156.

<https://doi.org/10.1016/j.socscimed.2011.02.007>

Tay, A. K., Mohsin, M., Rees, S., Tam, N., Kareth, M., & Silove, D. (2018). Factor structures of complex posttraumatic stress disorder and PTSD in a community sample of refugees from West Papua. *Compr Psychiatry*, 85, 15–22.

<https://doi.org/10.1016/j.comppsy.2018.05.001>

Tay, A. K., Rees, S., Steel, Z., Tam, N., Soares, Z., Soares, C., & Silove, D. (2016). Six-year trajectories of post-traumatic stress and severe psychological distress symptoms and associations with timing of trauma exposure, ongoing adversity and sense of injustice: A latent transition analysis of a community cohort in conflict-affected Timor-Leste.

BMJ Open, 6, e010205. <https://doi.org/10.1136/bmjopen-2015-010205>

United Nations High Commissioner for Refugees. (2018). *Global trends: Forced displacement in 2017*. Geneva, Switzerland: World Health Organization. Retrieved from <https://www.unhcr.org/globaltrends2017/>

Table 1

Participants' Direct Exposure to Different Types of Traumatic Events

Trauma	N	%
Torture	45	40.2
Sexual violence (in non-torture survivors)	15	13.4
Lack of food or water	79	70.5
Ill health without access to medical care	65	58.0
Lack of shelter	50	44.6
Imprisonment	44	39.3
Serious injury	57	50.9
Combat situation	65	58.0
Brain washing	48	42.9
Forced isolation from others	49	43.8
Being close to death	79	70.5
Forced separation from family members	62	55.4
Murder of family member or friend	58	51.8
Murder of stranger or strangers	38	33.9

Unnatural death of family member or friend	54	48.2
Lost or kidnapped	30	26.8
Other serious trauma	50	44.6

Note. $N = 112$.

Table 2

Goodness-of-Fit Indices for Class Solutions

Model	AIC ^a	BIC ^a	SS-BIC ^a	Entropy ^b	LMR-LRT ^c	p	BLRT ^c	p
1 class	1,550.46	1,580.36	1,545.60					
2 class	1,428.68	1,491.20	1,418.51	0.861	137.99	.005	-757.81	< .001
3 class	1,354.59	1,449.44	1,339.12	0.882	97.18	.001	-687.60	< .001
4 class	1,320.05	1,447.82	1,299.28	0.879	57.10	.002	-638.15	< .001
5 class	1,310.21	1,470.6	1,284.14	0.880	34.87	.305	-608.96	< .001

Note. AIC = Akaike information criterion; BIC = Bayesian information criterion; SS-BIC = sample size-adjusted BIC; LMR-LRT = Lo-Mendell-Rubin likelihood ratio test; BLRT = bootstrap likelihood ratio test.

^aLower values indicate better model fit. ^bHigher values are associated with better fit. ^cTests the significance of successive classes such that significant values indicate the current model (k) is a significantly better fit than the previous model (k-1).

Table 3

Overall Posttraumatic Stress Disorder (PTSD) and Complex PTSD (CPTSD) Symptom Frequency and Probability of Endorsement in Each

<i>Latent Class</i>										
Symptom	Overall		High CPTSD		High PTSD		Affective		Low PTSD	
	Symptom		and High		Only Class		Dysregulation		and CPTSD	
	Frequency		PTSD Class				Class		Class	
	<i>n</i>	%	Prob.	<i>SE</i>	Prob.	<i>SE</i>	Prob.	<i>SE</i>	Prob.	<i>SE</i>
PTSD										
Intrusive memories	59	52.7	0.96	0.04	0.72	0.09	0.15	0.111	0.13	0.09
			1	7	1	0	4		9	1
Nightmares	38	33.9	0.69	0.10	0.52	0.10	0.04	0.046	0.00	0.00
			7	4	5	3	2		0	0
Psychological avoidance	61	54.4	0.79	0.09	0.75	0.09	0.28	0.101	0.29	0.11
			7		9	1	9		2	5
Physical avoidance	43	38.7	0.60	0.11	0.71	0.09	0.14	0.073	0.00	0.00
			9	4	4	7	4		0	0
Hypervigilance	39	35.1	0.56	0.11	0.66	0.10	0.10	0.058	0.00	0.00
			8	7	7	0	3		0	0
Startle	33	29.7	0.58	0.10	0.41	0.10	0.13	0.073	0.00	0.00
			1	7	9	1	0		0	0

CPTS

D

Easily upset	59	60.8	0.96	0.03	0.04	0.04	1.00	0.000	0.00	0.00
			7	6	9	7	0		0	0
Feelings of	37	38.1	0.62	0.11	0.21	0.78	0.38	0.107	0.00	0.00
worthlessness			7	8	9	1	6		0	0
Feelings of	39	40.2	0.66	0.11	0.26	0.09	0.42	0.106	0.00	0.00
being a failure			1	1	2	3	0		0	0
Avoidance of	49	51.0	0.82	0.08	0.41	0.10	0.49	0.105	0.14	0.09
relationships			4	7	2	6	2		1	5

Note. Prob. = probability.

Table 4

Predictors of Class Membership

Classes and Predictor	Estimate	SE	OR	95% CI	p
CPTSD vs. low symptoms					
Age	-0.066	0.054	0.94	[0.84, 1.04]	.223
Female sex	2.652	1.095	14.18	[1.66, 121.29]	.015
Trauma load	0.447	0.155	1.56	[1.15, 2.12]	.004
Torture or sexual violence	0.923	0.908	2.52	[0.42, 14.92]	.309
Insecure visa status	2.019	0.913	7.53	[1.26, 45.08]	.027

PTSD only vs. low symptoms

Age	0.012	0.054	1.01	[0.91, 1.13]	.819
Female sex	2.824	1.146	16.84	[1.78, 159.20]	.014
Trauma load	0.495	0.181	1.64	[1.15, 2.34]	.006
Torture or sexual violence	0.002	0.952	1.00	[0.16, 6.47]	.998
Insecure visa status	0.279	1.094	1.32	[0.15, 11.28]	.795

AD symptoms vs. low symptoms

Age	-0.060	0.055	0.94	[0.32, 2.77]	.270
Female sex	3.128	1.078	22.83	[2.76, 188.83]	.004
Trauma load	0.237	0.169	1.27	[0.91, 1.77]	.161
Torture or sexual violence	0.402	0.880	1.49	[0.27, 8.39]	.648
Insecure visa status	1.973	0.901	7.19	[1.23, 42.05]	.029

CPTSD vs. PTSD only

Age	-0.078	0.031	0.92	[0.87, 0.98]	.012
Female sex	0.173	0.813	1.19	[0.24, 5.85]	.832
Trauma load	-0.048	0.131	0.95	[0.73, 1.23]	.713
Torture or sexual violence	0.922	0.828	2.51	[0.50, 12.74]	.266
Insecure visa status	1.739	0.824	5.69	[1.13, 28.62]	.035

CPTSD vs. AD symptoms

Age	-0.006	0.030	0.99	[0.94, 1.05]	.844
Sex	-0.476	0.626	0.62	[0.18, 2.12]	.477
Trauma load	0.210	0.102	1.23	[1.01, 1.51]	.038
Torture or sexual violence	0.521	0.664	1.68	[0.46, 6.19]	.433
Insecure visa status	0.046	0.656	1.05	[0.29, 3.79]	.944
PTSD only vs. AD symptoms					
Age	0.072	0.034	1.07	[1.01, 1.15]	.033
Female sex	-0.303	0.784	0.74	[0.16, 3.43]	.699
Trauma load	0.259	0.134	1.30	[0.996, 1.68]	.054
Torture or sexual violence	-0.400	0.776	0.67	[0.15, 3.07]	.606
Insecure visa status	-1.693	0.856	0.18	[0.03, 0.98]	.048

Note. OR = odds ratio; PTSD = posttraumatic stress disorder; CPTSD = complex PTSD; AD = affective dysregulation.

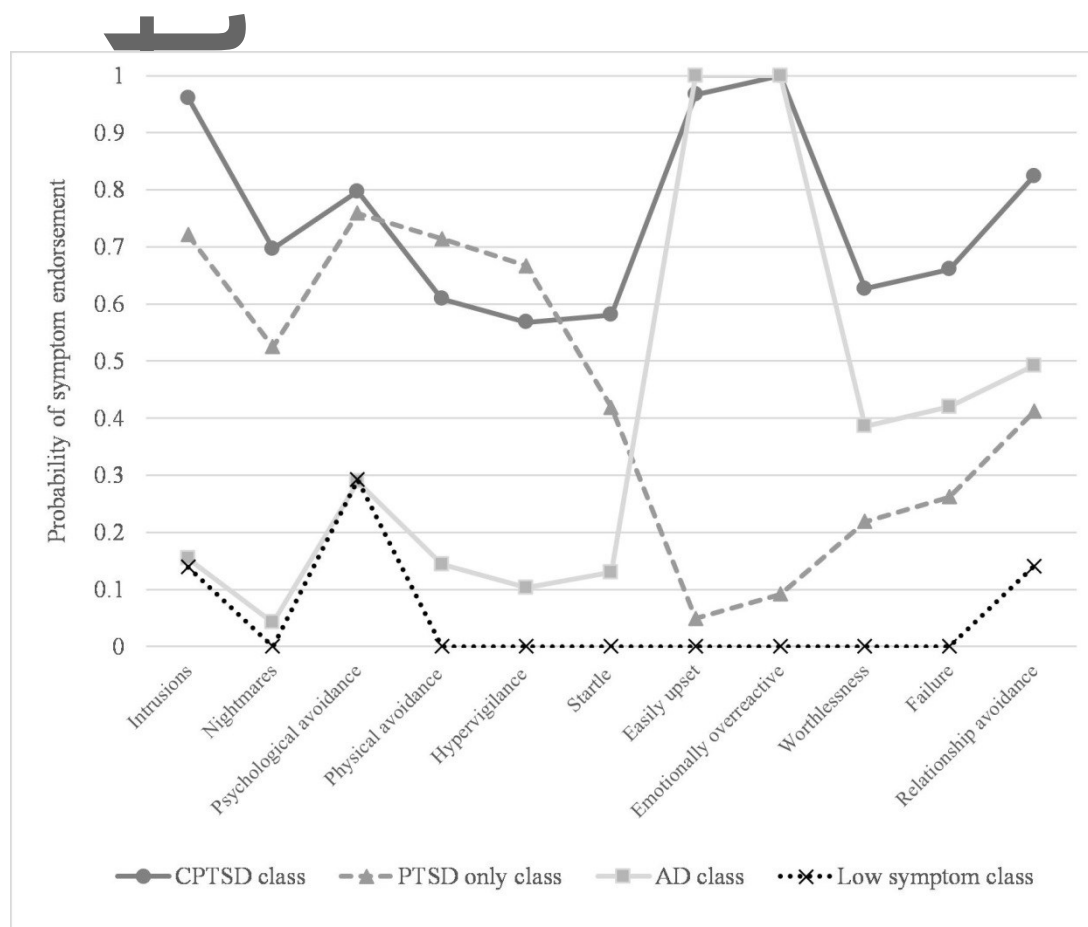


Figure 1. Probabilities of posttraumatic stress disorder (PTSD) and complex PTSD (CPTSD) symptom endorsement for each of the four latent classes. AD = affective dysregulation