

Testing predictions from the memory and identity theory of *ICD-11* complex posttraumatic stress disorder: Measurement development and initial findings[☆]

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ARTICLE INFO

Keywords:

Complex PTSD, CPTSD, M&I theory
Trauma
Identity

ABSTRACT

Background: The 'Memory and Identity Theory' of *ICD-11* Complex Posttraumatic Stress Disorder (CPTSD) was recently published but has not yet been subjected to empirical testing. The objective of this study was to evaluate newly developed measures of memory and identity disturbances and test hypothesized structural relations between these constructs and CPTSD symptoms.

Methods: Self-report data were collected from a nationwide sample of adults living in Ukraine ($N = 2050$) in September 2023. Exploratory factor analysis was used to assess the latent structure of the newly developed measures, and structural equation modeling was used to test the associations between memory and identity disturbances and CPTSD symptoms.

Results: 90 % of participants experienced a lifetime trauma, and 9.2 % screened positive for *ICD-11* CPTSD. Results indicated that the newly developed measures of memory and identity problems possessed satisfactory psychometric properties, and all but one of the model-implied structural associations were observed.

Conclusion: This study provides initial empirical support for the Memory and Identity theory of *ICD-11* CPTSD, indicating that the basis of this disorder lies in distinct memory and identity processes. Several effects not predicted by the theory were observed, and these can provide the basis for further model testing and refinement.

1. Background

Complex Posttraumatic Stress Disorder (CPTSD) has attracted considerable research and clinical attention since being proposed for inclusion in the 11th version of the *International Classification of Diseases (ICD-11: World Health Organization, 2019)* a decade ago (Maercker et al., 2013). Dozens of studies using a range of methodological approaches have supported the proposition that *ICD-11* PTSD and CPTSD can be empirically distinguished from one another in different trauma exposed samples (McElroy et al., 2019; Redican et al., 2021). The recognition of complexity in patterns of trauma exposure and trauma response has challenged existing theories of PTSD (e.g., Brewin et al.,

2010; Ehlers & Clark, 2000; Foa & Rothbaum, 1998). This study tested key assumptions of the only theory so far to focus on *ICD-11* CPTSD, the Memory and Identity (M&I) theory (Hyland et al., 2023a).

ICD-11 CPTSD is defined by six symptom clusters that can occur after exposure to one or more traumatic life events including re-experiencing in the here and now (flashbacks or nightmares), avoidance of trauma reminders (avoiding internal or external reminders), sense of current threat (hypervigilance or hyperarousal), affective dysregulation (difficulties calming down or emotional numbing), negative self-concept (persistent beliefs about the self as a failure or worthless), and disturbed relationships (feeling disconnected or trouble staying close with others). The first three symptom clusters are shared with PTSD, and

[☆] This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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<https://doi.org/10.1016/j.janxdis.2024.102898>

Received 23 March 2024; Received in revised form 29 May 2024; Accepted 5 July 2024

Available online 8 July 2024

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the latter three clusters are collectively known as ‘Disturbances in Self-Organization’ (DSO). CPTSD can be diagnosed if symptoms are present across all six symptom clusters several weeks after trauma exposure and cause functional impairments. Across seven general population studies the mean prevalence rate of CPTSD is 4.4 % (Cloitre et al., 2019; Hyland et al., 2020; Hyland et al., 2021a; Kvedaraitė et al., 2022; Maercker et al., 2018; McGinty et al., 2023; Redican et al., 2022).

The M&I theory (Fig. 1) states that trauma occurs in the context of existing individual vulnerabilities (e.g., genetic risk, history of adversity, lack of resources, limited social support, ongoing life stressors) which interact to give rise to specific memory and identity problems that ultimately produce the PTSD and DSO symptoms. The characteristic nature of intrusive traumatic memories is that they are rich with sensory experiences related to the trauma (e.g., visual images, feelings of extreme fear or horror, intense bodily reactions) but generally absent of contextual information (e.g., the time, place, and space where the trauma occurred). This disjunction between perceptual and episodic elements of memory leads to the feeling that the traumatic event is recurring in the present moment when the memory is cued (Brewin, 2014). The M&I theory states that this type of memory disturbance is the primary cause of reexperiencing symptoms, and causally related to avoidance, sense of current threat, and affective dysregulation symptoms.

Like in other theories of complex psychopathology (e.g., Steele et al., 2011) identity is a central consideration. The M&I theory conceptualizes identity as a multifaceted construct including both self-perception and subjective experience of the self. Like memory, it exists on a continuum from pre-reflective experience (i.e., extremely limited awareness of the ongoing perceptual experiences of the self) to full awareness (Prebble et al., 2013). Healthy identity formation is understood to involve developing a realistic and positive view of the self where there is a high degree of self-awareness, a feeling of agency over experience, a feeling that the self is a coherent entity, and experienced as stable over time (Harter, 1998).

According to the theory, negative identities, which can develop or strengthen after trauma exposure, play a causal role in all ICD-11 CPTSD symptom clusters other than re-experiencing symptoms (which are understood to be caused by memory disturbances). The theory lists seven negative identities as examples of the types of identity disturbances that can lead to CPTSD symptoms. Specifically, the model implies that

identities related to being ‘unsafe’ and ‘powerless’ are involved in the development of the avoidance and threat symptoms, and identities related to being ‘inferior’, ‘betrayed/abandoned’, ‘alienated’, ‘fragmented’, and ‘non-existent’ are involved in the development of the DSO symptoms. A certain degree of specificity is predicted where the ‘unsafe’ and ‘powerless’ identities are primarily related to the avoidance and sense of current threat symptoms, the ‘inferior’ identity is primarily related to the negative self-concept symptoms, the ‘betrayed/abandoned’ and ‘alienated’ identities are primarily related to the disturbed relationship symptoms, and the ‘fragmented’ and ‘non-existent’ identities are primarily related to the affective dysregulation symptoms.

An important aspect of the M&I theory is that memory and identity disturbances can influence one another. It is common for survivors of trauma to engage in self-blame for having reliving experiences and for being unable to control their associated reactions (Dunmore et al., 2001). Consequently, traumatic memories can influence the development of a sense of the self as broken, inferior, and detached from others. Additionally, when a negative identity related to a traumatic event becomes activated, it can serve as an internal reminder of the trauma and precipitate a reliving experience. Thus, when testing the proposed relations between memory and identity disturbances and CPTSD symptoms, it is imperative to acknowledge the relationship between these variables.

To begin empirically testing hypotheses derived from the M&I theory, psychometrically sound measures of the core theoretical constructs of traumatic memories and negative identities are required. Memory disturbances have long been integral to theories of PTSD (Brewin et al., 1996; Ehlers & Clark, 2000), but few multi-item, self-report measures exist. Many studies assessing memory disturbances in PTSD employ semi-structured interviews to obtain relevant information (Hackmann et al., 2004; Reynolds & Brewin, 1998). Halligan et al. (2003) developed the Trauma Memory Questionnaire which requires respondents to provide a narrative description of their traumatic memories before assessing their disorganization and perceptual quality. Meiser-Stedman et al. (2007) developed the Trauma Memory Quality Questionnaire for use with children and adolescents, and this measure gathers information about the sensory experiences that define the memory and the extent to which the memory is organized or disorganized. These measures have been valuable, but a review of their content indicated that they did not capture all aspects of memory disturbance described in the M&I theory.

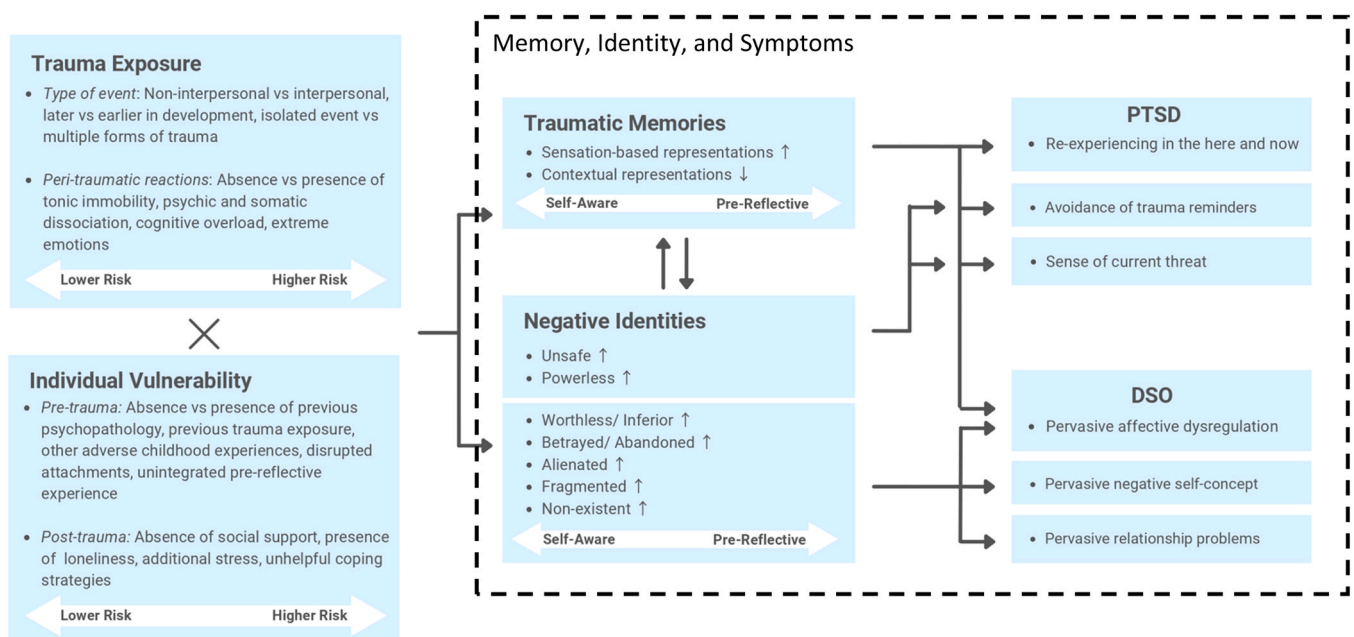


Fig. 1. The Memory and Identity Theory of ICD-11 Complex PTSD.

Likewise, suitable measures of negative identities did not exist. We therefore developed new measures – the *Experiences of Traumatic Memories Questionnaire* (ETMQ) and the *Trauma Identity Questionnaire* (TIQ) – for the purpose of theory testing.

This study was conducted to address two related objectives. The first was to conduct an initial assessment of the factorial validity and internal reliability of the EMTQ and TIQ scores as measures of the core constructs in the M&I theory. Guided by the M&I theory, we predicted that the EMTQ would be unidimensional and the TIQ would be multidimensional. Based on the results of these analyses, the second objective was to conduct an initial empirical test of an important part of the M&I model regarding the predicted associations between memory, identity, and the PTSD and DSO symptom clusters (depicted in Fig. 1). In line with the predictions of the M&I theory, we hypothesized that (a) only memory disturbances would be positively associated with re-experiencing symptoms, (b) memory disturbances would also be positively associated with avoidance, threat, and affective dysregulation symptoms; (c) identities related to being ‘powerless’ and/or ‘unsafe’ would be positively associated with avoidance and threat symptoms; and (d) identities related to being ‘inferior’, ‘betrayed/abandoned’/‘alienated’, ‘fragmented’, and ‘non-existent’ would be positively associated with the different DSO symptom clusters.

2. Methods

2.1. Participants and procedures

This study uses data collected as part of the ‘*The Mental Health of Parents and Children in Ukraine Study: 2023 Follow-up*’ project which is an ongoing study to monitor the social and mental health effects of Russia’s war on the population of Ukraine (Hyland et al., 2023b; Martsenkovskiy et al., 2024). The data were collected online by TGM Research from September 7–18, 2023. All participants belonged to an online research panel available for survey research. Quota sampling methods were used to construct a sample (N = 2050) intended to be reasonably representative of the Ukrainian adult population in terms of sex, age, and regional distributions. It is impossible to say how representative the sample is of the population given that the last census took place in 2001, and the enormous levels of internal displacement and emigration following Russia’s invasions in 2014 and 2022. We met our quotas for male (51.7 %) and female (48.3 %) respondents, and all age groups except for those over the age of 60 years who were under-represented. We were also able to recruit participants from different regions of Ukraine (West, North, South, Central, and East), other than Crimea. Although not part of the quota variables, our sample composition matches some other known population parameters. For example, information from the European Commission in 2021 found that 58.0 % of Ukrainians had completed a university education, and 57.9 % of our sample reported completing a university education. To be clear, we do not claim our sample is entirely representative of the general population, merely that we took steps to construct a sample with a reasonable degree of representativeness given the current circumstances. Demographic information is presented in Table 1.

Attention checks were used (participants were asked, for example, to select the third option from a list of ten choices) to ensure trustworthy information was gathered, and geolocation data was collected by the survey company to ensure accurate regional distributions. Ethical approval was provided by the SI Institute of Psychiatry, Forensic Psychiatric Examination and Drug Monitoring of the Ministry of Health of Ukraine.

2.2. Measures

Information was collected online via self-report questionnaires completed in Ukrainian. Where measures were not already available in Ukrainian, standard forward and backward translation processes were

Table 1
Sociodemographic Details for the Sample (N = 2050).

	%	n
Sex		
Males	51.7	1059
Females	48.3	991
Age		
18-29	20.8	426
30-39	25.2	517
40-49	23.2	475
50-59	19.0	390
60 and older	11.8	242
Born in Ukraine (or USSR)	92.0	1885
Current living location in Ukraine		
Western region	24.3	498
Northern region	22.0	450
Central region	13.5	277
Eastern region	15.6	319
Southern region	24.7	506
Life disrupted by 2014 invasion	42.2	866
Forced displacement by 2022 invasion	27.7	568
Living area		
Urban area	81.1	1662
Rural area	18.9	388
Type of living accommodation		
Apartment	64.1	1314
House	32.9	674
Emergency accommodation	3.0	62
Marital Status		
Single	22.6	463
In a relationship but not living with a partner	4.1	84
In a relationship and living with a partner	10.7	219
Married	50.1	1027
Separated but still legally married	0.7	14
Divorced	8.3	171
Widowed	3.5	72
Have children	69.5	1425
Highest education level		
Completed mandatory schooling	2.8	58
Completed general/secondary schooling	10.9	223
Completed vocational school	28.4	582
Completed university	57.9	1187
Employment status		
Full-time employed	47.3	969
Part-time employed	19.6	401
Temporarily unemployed due to the war	7.8	159
Long-term unemployed	9.1	187
Student	3.5	72
Retired	10.3	211
Disabled and unable to work	2.5	51

followed, led by a member of the study team fluent in Ukrainian and English, and familiar with the constructs (DM).

Trauma exposure: The *International Trauma Exposure Measure* (ITEM; Hyland et al., 2021b) is a 21-item checklist of lifetime exposure to different potentially traumatic events. The events included in this measure reflect the *ICD-11* definition of trauma which states that any event that provokes feelings of extreme threat or horror can be traumatic. The ITEM includes prototypical events such as physical assault and war exposure as well as other events such as stalking, emotional abuse, and neglect that have been empirically linked to posttraumatic stress reactions. The list of events, and the proportion of people reporting each, is presented in supplementary table 1. All items were answered on a ‘Yes’ (1) or ‘No’ (0) scale, with scores ranging from 0–21 and higher scores reflecting exposure to a higher number of different traumatic life events. Participants indicating exposure to more than one event were asked to choose the event they found most distressing (i.e., their index trauma), and indicate how long ago it occurred. Several studies have demonstrated that the ITEM has good predictive validity for posttraumatic stress responses (Hyland et al., 2021b; Rossi et al., 2022).

ICD-11 CPTSD: All participants reporting lifetime trauma exposure completed the *International Trauma Questionnaire* (ITQ; Cloitre et al., 2018), a 12-item measure of *ICD-11* PTSD and DSO symptoms where

each symptom cluster is measured by two items. Three items measure functional impairments related to PTSD and DSO symptoms, respectively. Participants complete the ITQ in relation to their index trauma and indicate how bothered they have been by the six PTSD symptoms over the past month, and to what extent the six DSO symptoms represent typical reactions. All items are based on a five-point Likert scale (0 = *Not at all*, 4 = *Extremely*). PTSD and DSO scores range from 0–24 with higher scores reflecting higher symptoms. There is considerable empirical support for the reliability and validity of the ITQ scores (see Redican et al., 2021 for a review), and the validity and reliability of the scores of the Ukrainian translation of the ITQ has been supported in a different sample (Ho et al., 2023). As with the English version, the latent structure of the Ukrainian ITQ was well represented by one of two models: a correlated six-factor model where the six factors represent the six CPTSD symptom clusters, and a two-factor second-order model where a higher-order ‘PTSD’ factor accounts for the correlations between the PTSD factors, and a higher-order ‘DSO’ factor accounts for the correlations between the DSO factors. In this sample, the six PTSD items ($\alpha = .84$), six DSO items ($\alpha = .88$), and 12 ITQ items ($\alpha = .90$) had satisfactory internal reliability.

Trauma memories: The eight EMTQ items are presented in Table 2. Participants who completed the ITQ and had a non-zero score on one of the two re-experiencing items completed the EMTQ (71.6 %, $n = 1450$). Participants were given the following instruction, ‘*In the previous section you indicated having powerful images or memories that sometimes come into your mind in which you feel the experience is happening again in the here and now? Please take a moment to think of the most prominent image or memory that you re-experience as happening again in the present*’, and asked to rate how true each is for them on a five-point Likert scale (0 = ‘*Almost never true*’, 4 = ‘*Almost always true*’). Scores range from 0–32 with higher scores reflecting more intense sensation-based trauma memories.

Negative identities: The 21 TIQ items are presented in Table 3. The TIQ was completed by all those who had experienced a traumatic event, and three items were written to represent the seven negative identities outlined in the M&I theory: items 1–3 represent the ‘powerless’ identity, items 4–6 represent the ‘unsafe’ identity, items 7–9 represent the ‘inferior’ identity, items 10–12 represent the ‘betrayed/abandoned’ identity, items 13–15 represent the ‘alienated’ identity, items 16–18 represent the ‘fragmented’ identity, and items 19–21 represent the ‘non-existent’ identity. Participants were asked to rate their agreement with each statement based on how they typically feel about themselves. Responses were recorded on a six-point Likert scale (0 = ‘*Disagree very strongly*’, 5 = ‘*Agree very strongly*’), and higher scores represent stronger negative identities.

2.3. Data analysis

Levels of trauma exposure and posttraumatic stress reactions were assessed using descriptive statistics. Next, the optimal measurement

Table 2
Standardized Factors Loadings for the Experiences of Traumatic Memories Questionnaire.

When this image or memory of the traumatic event (or events) reoccurs...	Factor loading	Standard error
1. It seems to come out of nowhere.	.53	.02
2. I feel it vividly in my body.	.66	.02
3. It seems like time stops.	.74	.01
4. I feel like I have travelled back in time to when the event (or events) occurred.	.72	.02
5. I feel disconnected from the world around me.	.76	.02
6. I feel that I am completely unable to control what is happening to me.	.72	.02
7. It replays in my mind like a film or movie.	.73	.02
8. I see it happening again but I'm watching myself from the outside.	.67	.02

Note. All factor loadings are statistically significant at $p < .05$.

Table 3
Standardized Factors Loadings and Factor Correlations for the Four-Factor Model of the Trauma Identity Questionnaire.

	F1: Vulnerable	F2: Disconnected	F3: Inferior	F4: Fragmented
Factor loadings				
1. I can't stop bad things from happening.	.63 *	-.04	-.01	-.03
2. I'm a weak person.	.57 *	-.05 *	.30 *	.06 *
3. I'm powerless to change anything in the world.	.69 *	-.01	.02	-.06
4. People can easily take advantage of me.	.51 *	.08 *	.21 *	-.04
5. I always feel that something bad is about to happen.	.35 *	.20 *	-.06	.17 *
6. I feel vulnerable in many situations.	.63 *	.11 *	.03	.07 *
7. I don't deserve good things to happen to me.	-.01	-.04	.64 *	.08
8. Other people are better and more deserving than me.	.04	.05	.76 *	-.01
9. I feel like there is something wrong with me as a person.	.24 *	.13 *	.43 *	.20 *
10. Other people will betray me.	.05	.77 *	.07 *	-.05 *
11. I have been left alone in the world.	-.01	.37 *	.20 *	.29 *
12. Other people will let me down sooner or later.	-.07 *	.92 *	.01	-.01
13. I feel like I don't belong.	-.02	.32 *	.20 *	.36 *
14. It's difficult to trust other people.	.10 *	.67 *	-.14 *	.06
15. Other people don't understand me.	.12 *	.46 *	.03	.20 *
16. Sometimes I don't even know who I am.	.06	.03	.12 *	.65 *
17. I feel like a different person from one day to the next.	.00	.05	.05	.66 *
18. I often feel like I am broken in some important way.	.28 *	.17 *	-.08 *	.54 *
19. Sometimes I don't even feel like I exist anymore.	-.01	-.02	-.06	.95 *
20. I don't feel like a whole person.	.15 *	-.03	.10 *	.70 *
21. Sometimes I feel like I'm not even really alive.	-.06 *	-.02	.05	.86 *
Factor correlations				
F1: Vulnerable	1			
F2: Disconnected from Others	.56 *	1		
F3: Inferior	.37 *	.39 *	1	
F4: Fragmented Self	.50 *	.56 *	.58 *	1

Note. * = effects are statistically significant at $p < .05$.

models for the ITQ, ETMQ, and TIQ were assessed using factor analytic methods, and the internal reliability of the scale scores for the ETMQ and TIQ were assessed using omega (ω) reliability. Given the abundant evidence that the latent structure of the ITQ is best represented by either a correlated six-factor model or a two-factor high-order model (see Redican et al., 2021 for a review; see Ho et al., 2023 for analysis of the Ukrainian translation of the ITQ), these models were assessed using confirmatory factor analysis (CFA). Since the ETMQ and TIQ are newly developed measures and their respective latent structures are unclear, these were assessed using exploratory factor analysis (EFA). We expected the ETMQ to be best represented by a unidimensional latent structure but recognized that a multidimensional structure might exist. We expected the TIQ to be best represented by a multidimensional structure, but we were unsure of the optimal number of factors. We suspected that a seven-factor model might represent the latent structure of the scale since items were written to reflect the seven identities described in the M&I theory, but we recognized that some of the identities were conceptually similar (e.g., unsafe and powerless, betrayed/abandoned and alienated) and therefore that a simpler structure might emerge. Upon determining the optimal measurement models for the ETMQ and TIQ, these latent variables were specified as exogenous variables predicting the ITQ latent variables, thereby creating a structural equation model (SEM).

Analyses were conducted using Mplus 8.2 (Muthén & Muthén, 2017). All models were tested using robust maximum likelihood estimation, and model fit was assessed via standard recommendations (Hu & Bentler, 1999). Good model fit is indicated by a non-significant chi-square (χ^2) result, but this test often produces Type 1 errors with large sample sizes (Tanaka, 1987). Comparative fit index (CFI) and Tucker-Lewis index (TLI) values range from 0–1 with values closer to 1 indicative of closer fit, and values $\geq .90$ are usually regarded as indicating ‘acceptable’ fit. Root-mean square error of approximation (RMSEA) and standardized root-mean square residual (SRMR) values also range from 0–1 with values closer to 0 indicative of closer fit, and values $\leq .08$ usually regarded as indicating ‘acceptable’ fit. The Bayesian Information Criterion (BIC) statistic was used to compare alternative models, where the model with the lowest value is favored. The BIC was selected over other information criterion statistics because it includes a penalty for model complexity.

For the EFA analysis, oblique goemin rotation was used to allow extracted factors to correlate, and parallel analysis using 100 random draws was used to help ascertain the optimal number of latent factors to extract. Parallel analysis involves the generation of random datasets with the same sample size and number of variables as the real dataset and these undergo EFA, and the eigenvalues obtained are recorded. The mean and 95th percentile eigenvalues from the ‘parallel data’ are compared to those from the original data. If the eigenvalue of a factor from the original data is greater than the 95th percentile eigenvalue of the parallel factor, that factor should be considered for retention (Heaton et al., 2004). Ultimately, decisions regarding the optimal number of factors to extract were based on statistical fit, model interpretability, and theoretical consistency.

3. Results

3.1. Descriptive statistics

90.0 % ($n = 1845$) of respondents experienced at least one traumatic life event, and the mean number was 5.42 ($Mdn = 5.00$, $SD = 4.04$, range = 0–21). The most common event reported was ‘someone close to you was diagnosed with a life-threatening illness or experienced a life-threatening accident’ (54.0 %, $n = 1107$) and the least common was ‘sexually assaulted by a parent or caregiver’ (1.6 %, $n = 32$). The most frequently selected index event was ‘exposure to war or combat as a civilian or a soldier’ (18.2 %, $n = 336$). Full details are presented in [Supplementary Table 1](#).

The mean PTSD symptom score was 8.37 ($Mdn = 8.00$, $SD = 5.14$, range 0–24) and the mean DSO score was 6.70 ($Mdn = 5.00$, $SD = 5.31$, range 0–24). Overall, 11.1 % ($n = 228$) met diagnostic requirements for PTSD and a further 9.2 % ($n = 188$) met requirements for CPTSD.

3.2. Measurement analyses

The correlated six-factor model of the ITQ fit the data closely ($\chi^2 (39) = 86.959$, $p < .001$; CFI = .994; TLI = .990; RMSEA (90 % CI) = .026 (.019,.033); SRMR = .015), and was a closer fit than the two-factor second-order model ($\chi^2 (47) = 264.485$, $p < .001$; CFI = .974; TLI = .963; RMSEA (90 % CI) = .050 (.044,.056); SRMR = .044). The superior fit of the six-factor model was also indicated by its lower BIC value (57,444 vs. 57,610). In the six-factor model, all items loaded onto their respective factor positively and significantly with standardized loadings ranging from .68 to .92. All factors were positively and significantly correlated ranging from .43 (reexperiencing and negative self-concept) to .84 (negative self-concept and disturbed relationships). Full details are presented in [Supplementary Table 2](#).

For the ETMQ, only one factor had an eigenvalue greater than one (factor 1 = 4.37, factor 2 = 0.79), and the parallel analysis strongly suggested that only one factor be retained (see [Supplementary Figure 1](#)). The one-factor model provided a reasonable fit to the data: $\chi^2 (20) = 208.252$, $p < .001$; CFI = .942; TLI = .918; RMSEA (90 % CI) = .081 (.071,.091); SRMR = .036. All items loaded positively and significantly onto the ‘Trauma Memories’ latent factor with loadings ranging from .53 to .76 (see [Table 2](#)). The internal reliability of the scale scores was good ($\omega = .88$).

For the TIQ, four factors had eigenvalues greater than one (factor 1 = 9.29, factor 2 = 1.73, factor 3 = 1.40, factor 4 = 1.08, factor 5 = 0.76), and the parallel analysis provided clear evidence for the extraction of three factors and suggested that the extraction of a fourth factor may be warranted (see [Supplementary Figure 2](#)). We inspected model parameters for all solutions with a particular focus on the three- and four-factor solutions. Model fit results are available in [Supplementary Table 3](#). The one- and two-factor models fitted poorly and were rejected. Model fit for the three-factor solution was adequate ($\chi^2 (150) = 1211.586$, $p < .001$; CFI = .922; TLI = .891; RMSEA (90 % CI) = .062 (.059,.065); SRMR = .035) and the factor loadings are presented in [Supplementary Table 4](#). Factor 1 was defined most clearly by the ‘powerless’ and ‘unsafe’ items, and the ‘inferior’ items also loaded weakly and significantly onto this factor. Factor 2 was defined by the ‘betrayed/abandoned’ and ‘alienated’ items. Factor 3 was defined most clearly by the ‘fragmented’ and ‘non-existent’ items and, like factor 1, the ‘inferior’ items loaded weakly and significantly onto this factor. The three factors were positively and significantly correlated ranging from .59 to .63.

The four-factor model fit the data reasonably well ($\chi^2 (132) = 695.553$, $p < .001$; CFI = .958; TLI = .934; RMSEA (90 % CI) = .048 (.045,.052); SRMR = .022), and the BIC value was lower compared to the three-factor model (96,561 vs. 97,193). Inspection of the factor loadings revealed that the only notable difference to the three-factor model was that the three ‘inferior’ items loaded strongly and significantly onto a distinct factor. Models with more than four factors could not be interpreted based on the nature of the model parameters (e.g., factors were extracted with only one item loading positively onto the factor, other items loading negatively onto the factor, and additional factors not correlating with other factors).

Given the superior fit of the four-factor model relative to the three-factor model, its simpler structure where the ‘inferior’ items reflected a clearly defined factor, and its overall interpretability, the four-factor model was deemed to be the optimal representation of the latent structure of the TIQ in this sample. The factor loadings and factor correlations are presented in [Table 3](#). The four factors were labelled ‘Vulnerable’, ‘Inferior’, ‘Disconnected from Others’, and ‘Fragmented Self’, and the internal reliability of the scale scores were as follows: Vulnerable, $\omega = .74$, Inferior, $\omega = .65$, Disconnected from Others,

$\omega = .77$, and Fragmented Self, $\omega = .88$.

3.3. Structural analyses

The SEM model, with six latent factors representing the ICD-11 CPTSD symptom clusters regressed onto a latent factor representing ‘Trauma Memories’ and four factors representing ‘Vulnerable’, ‘Inferior’, ‘Disconnected from Others’, and ‘Fragmented Self’ identities, fit the data adequately: $\chi^2(724) = 3424.543, p < .001$; CFI = .912; TLI = .901; RMSEA (90 % CI) = .045 (.043,.046); SRMR = .047. The Trauma Memories and identity factors explained a substantial proportion of variance in each CPTSD symptom cluster (all $ps < .001$): re-experiencing in the here and now (46.8 %), avoidance (38.4 %), sense of current threat (41.1 %), affective dysregulation (57.5 %), negative self-concept (48.0 %), and disturbed relationships (56.9 %). The standardized regression coefficients are presented in Table 4.

Table 4 represents those paths the M&I theory predicts should be positive and significant (cells in grey) and those about which no prediction was made (cells in white). All predicted paths except one – ‘fragmented self’ identity predicting affective dysregulation symptoms – were positive and significant. Several non-predicted significant paths were also observed.

Trauma Memories was the only factor associated with re-experiencing in the here and now ($\beta = .63$) and was also positively associated with avoidance ($\beta = .51$), sense of current threat ($\beta = .55$), and affective dysregulation ($\beta = .54$) symptoms. Additionally, and not predicted by the model, Trauma Memories was positively associated with the negative self-concept ($\beta = .40$) and disturbed relationship ($\beta = .55$) factors.

The ‘Vulnerable’ identity factor was positively associated with the avoidance ($\beta = .17$) and sense of current threat ($\beta = .22$) factors and was also positively associated with the affective dysregulation ($\beta = .39$) and negative self-concept ($\beta = .25$) factors. The ‘Inferior’ identity factor was positively associated with the negative self-concept factor ($\beta = .18$), and negatively associated with the avoidance ($\beta = -.21$) and affective dysregulation ($\beta = -.15$) factors. Of note, these negative associations are likely to represent a statistical artifact of the regression (suppressor effects) as the zero-order correlations between the variables were positive. The ‘Disconnected from Others’ identity factor was positively associated with the disturbed relationship factors ($\beta = .25$) and positively associated with the avoidance factor ($\beta = .19$). Finally, the ‘Fragmented Self’ identity factor was not significantly associated with any symptom factor.

4. Discussion

This study was conducted to provide an initial psychometric assessment of newly developed measures of memory and identity

disturbances outlined in the M&I theory of ICD-11 CPTSD, and to test model-derived hypotheses regarding the associations between these constructs. Prior to discussing the substantive findings, it is important to acknowledge that this study was conducted in a unique context - a general population sample experiencing an ongoing war - and recognize that this places limits on the interpretability and generalizability of the results. The ICD-11 is, however, intended for use globally and to be applicable in challenging contexts (First et al., 2015), and there are frequent calls to globalize psychological science research and to test theories in regions of the world other than North America and Western Europe (e.g., Fodor et al., 2014; Henrich et al., 2010). As such, conducting the first empirical assessment of the M&I theory of ICD-11 CPTSD in Ukraine, during a time of war, can be viewed as a strength.

We found that 90 % of adults living in Ukraine had experienced a traumatic event in their lifetime, and perhaps not surprisingly that the most frequently reported index trauma was exposure to war. While acknowledging that the current sample is probably not entirely representative of the general adult population of Ukraine, this rate of trauma exposure is higher than the global average of 70 % (Benjet et al., 2016). Moreover, approximately one in five people reported symptoms and impairments in daily living consistent with meeting requirements for a diagnosis of ICD-11 PTSD or CPTSD. This is considerably higher than what has been observed in other countries including neighboring Lithuania (7.6 %: Kvedaraite et al., 2022), the United States (7.2 %: Cloitre et al., 2019), Ireland (11.2 %; McGinty et al., 2023), and Israel (11.6 %; Hyland et al., 2020). Relative to other general population samples then, the current sample can be considered highly traumatized.

Consistent with a recent psychometric assessment of the Ukrainian translation of the ITQ (Ho et al., 2023), we found that its latent structure was best explained by six correlated factors reflecting the different PTSD and DSO symptom clusters of ICD-11 CPTSD. It should be noted that this model, and the slightly less closely fitting two-factor higher-order model, are both consistent with the description of CPTSD in ICD-11 and they only differ in capturing the distinction between the PTSD and DSO symptoms at the first or second-order levels. It was advantageous for the purpose of this study that the correlated six-factor model was the optimal fitting solution given that the M&I theory outlines relations between memory and identity disturbances and individual CPTSD symptom clusters. The current findings add to an extensive literature supporting the reliability and validity of the ITQ as a measure of ICD-11 CPTSD symptoms in a variety of contexts and cultures (Redican et al., 2021).

The ETMQ was designed to capture some of the most common and defining phenomenological experiences of memory disturbances associated with posttraumatic stress disorders (Brewin et al., 2014). These phenomena include the perception that the memory of the trauma is

Table 4
Standardized Regression Coefficients from the Structural Equation Modeling Results.

	Re	Av	Th	AD	NSC	DR
Trauma memories	.69***	.51***	.55***	.54***	.40***	.55***
Vulnerable	-.03	.17**	.22***	.39***	.25***	.07
Fragmented Self	-.04	-.09	-.09	.06	.06	-.08
Inferior	-.06	-.15*	-.06	-.21**	.18**	.09
Disconnected from Others	.10	.19***	.06	.01	-.06	.25***

Note: Shaded cells indicated effects predicted by the M&I theory to be positive and significant; statistical significance = * $p < .05$, ** $p < .01$, *** $p < .001$; Re = re-experiencing in the here and now, Av = avoidance, Th = sense of current threat, AD = affective dysregulation, NSC = negative self-concept, DR = disturbed relationships.

unpredictable and uncontrollable, that it provokes intense somatic reactions, and is often accompanied by feelings of dissociation. The scale items were written to reflect different elements of the same underlying phenomenon, and as expected, a unidimensional model provided the optimal representation of the latent structure of the scale items. There was no evidence to suggest a multidimensional structure to the scale items, and although model fit was generally satisfactory, we recognize that it could have been closer to the sample data. This suggests that there may be ways to refine and improve the scale (e.g., item overlap/redundancy), but since this was an initial assessment, performed in a unique context, we did not think it appropriate to make any modifications. Subsequent studies can use confirmatory approaches to further test the factorial validity of the scale, and perhaps identify areas for refinement. Overall, the current findings, including the high level of internal reliability among the scale items, are encouraging and suggest that the ETMQ has potential to be used as a quick and simple measure of memory disturbances in trauma research.

The TIQ was designed to measure different types of identity disturbances known to correlate with posttraumatic stress problems (Andrews, 1997; Brewin et al., 2011; Delker & Freyd, 2017; Ebert & Dyck, 2004; McIlveen et al., 2020) and highlighted as important in the M&I theory of *ICD-11* CPTSD. As hypothesized, a multidimensional model was found to best explain the latent structure of scale items but, somewhat unexpectedly, the optimal solution included four factors. These factors reflected identity problems related to viewing oneself as vulnerable, inferior, disconnected from others, and fragmented. All four factors were positively correlated with one another, but correlations were less than .60 demonstrating satisfactory discriminant validity. Each set of items possessed good internal reliability, apart from the three items comprising the inferior identity, but this was likely a function of the small number of items. Notably, when specified in a confirmatory manner within the SEM, all factor loadings were strong.

The analysis indicated that certain pairs of identities described in the M&I theory (feeling powerless and unsafe; feeling betrayed/abandoned and alienated; and feeling fragmented and non-existent) loaded on the same factors. Although these loadings indicate latent variables linking the pairs of identities, we believe that at this point there is value in continuing to consider the original seven identities for the purposes of ongoing measurement and theory testing. All reflect common themes in the experience of individuals with CPTSD, who may identify with either or both members of a particular pair. The availability of different concepts and terms may also be helpful to clinicians seeking to understand and capture these experiences with their patients. Altogether, as with the ETMQ, these findings provide encouraging initial results and can provide a basis for future analyses to test, and possibly refine, the TIQ as a measure of identity disturbances in trauma-exposed persons.

With confidence that the key variables were being measured with sufficient accuracy and reliability, we turned our attention to the hypothesized relations between memory and identity disturbances and CPTSD symptoms. Several findings are worth discussing. First, all but one of the nine model-implied hypothesized associations were found to be positive and statistically significant. Memory disturbances were robustly associated with all PTSD symptom clusters, and the affective dysregulation symptom cluster; the vulnerable identity was positively associated with the avoidance and sense of threat symptoms; the inferior identity was positively associated with the negative self-concept symptoms; and the disconnected from others identity was positively associated with the disturbed relationship symptoms.

The only model-predicted effect not observed was the association between the fragmented self identity and the affective dysregulation symptoms. We can only speculate as to why this effect was not observed. It may be a sample-related issue as we suspect that experiencing the self as being broken in some fundamental way, or feeling like one does not exist, is likely to be a rare occurrence affecting only the most distressed individuals. Of note, these items were among the least likely to be agreed with. It is possible that the association between this type of identity

problem and CPTSD may only be identified – or at least most readily identified – in clinical populations. Of course, other possibilities are that a fragmented self identity has no relationship to CPTSD, or that it does but our measurement was insufficient to observe this effect. Further research is required to better understand this issue.

Second, the M&I theory places a special emphasis on memory disturbances. Memory disturbances are assumed to be the sole cause of reexperiencing symptoms, to also play a causal role in the avoidance and sense of current threat symptoms, and while playing less of a role in the DSO symptoms, also influence the affective dysregulation symptoms. The current findings suggest that memory disturbances may be even more important than the M&I theory assumed. As the model predicts, the traumatic memory factor was the only variable correlated with reexperiencing symptoms, and it was also robustly associated with avoidance, sense of current threat, and affective dysregulation symptoms, but it was also robustly associated with negative self-concept and disturbed relationship symptoms. Upon reflection, the association with negative self-concept is not unexpected given that measures reflecting the appraisal of posttraumatic symptoms as a sign of weakness or inadequacy have been found to predict the course of the disorder (Ehring et al., 2008; Halligan et al., 2003; Kleim et al., 2007). The link to disturbed relationships makes the useful suggestion that traumatic memories may either directly or indirectly prompt withdrawal from others. For example, flashbacks and intrusive memories may be easier to handle away from other people, or their occurrence may lead to conflict and misunderstandings in relationships.

It is important not to overinterpret these findings, but if they are borne out in subsequent studies, there are several potential implications. One is that successful engagement in existing therapies for PTSD that focus on reprocessing memories of the traumatic event, such as prolonged exposure therapy (McLean et al., 2022) or cognitive processing therapy (Asmundson et al., 2019), should have a positive impact on all elements of *ICD-11* CPTSD. Another is that the success of alternative treatments, including non-psychological and non-trauma-focused approaches, is likely to depend to a considerable extent on how well they reduce the impact of traumatic memories.

Third, and relatedly, it was notable that the vulnerable identity factor was not only positively associated with avoidance and sense of threat symptoms, as predicted by the model, but was additionally positively associated with affective dysregulation and negative self-concept symptoms. Some critiques of the *ICD-11* model of CPTSD have suggested that the DSO symptoms are too like those found in other disorders such as borderline personality disorder and major depressive disorder, and therefore too disconnected from the core posttraumatic stress response to justify their inclusion (e.g., Wolf et al., 2015). If true, this would ultimately undermine the construct validity of *ICD-11* CPTSD. The fact that the core psychological processes involved in PTSD (i.e., memory disturbances and experiencing the self as vulnerable) are so strongly related to the DSO symptoms suggests that these symptoms do form an internally coherent posttraumatic stress response.

Fourth, the SEM results generally support the specificity of relationships embodied in the M&I theory. For example, no negative identity was associated with the reexperiencing symptoms. This supports the key distinction in the model between memory and identity processes. The avoidance and sense of threat symptoms were specifically associated with the vulnerable identity and not with the inferior and fragmented self identities. Also, the inferior identity was specifically associated with negative self-concept symptoms and the disconnected from others identity was specifically associated with disturbance in relationships. There was, however, evidence for some non-predicted associations (e.g., between a disconnected from others identity and avoidance symptoms). Speculatively, this could be due to a latent trait underlying avoidance of aversive experiences, whether they be memories, situations, or other people. One such trait that has been suggested is harm avoidance (Cloninger et al., 1993).

4.1. Limitations

These findings should be interpreted considering several study limitations. First, the data are cross-sectional therefore no causal inferences can be drawn regarding the relations between the memory and identity problems and CPTSD symptoms. Longitudinal research will be required to determine if the types of memory and identity problems described in the M&I theory emerge following trauma exposure and subsequently give rise to the CPTSD symptoms. Second, and as discussed, the generalizability of these findings, both to the population of Ukraine as a whole and to other populations is limited. We fully recognize that more research is required in other clinical and community samples to further test the M&I theory of ICD-11 CPTSD. Third, alternative operationalizations of the key theoretical constructs may generate different patterns of findings.

4.2. Conclusion

This study provides initial support for the newly developed measures of memory and identity problems described in the M&I theory of ICD-11 CPTSD, and for several key predictions emanating from the theory. Chief amongst these is that the basis of the disorder lies in distinctive memory and identity processes which combine in specific ways to create the characteristic symptom clusters of CPTSD. A few non-predicted findings suggest interesting associations that may need to be incorporated in the theory at some future time. We hope these findings, and the new measures, stimulate further testing of the M&I Theory in diverse samples.

CRedit authorship contribution statement

Chris R Brewin: Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Dmytro Martenskovskiy:** Writing – review & editing, Resources, Methodology, Investigation, Data curation, Conceptualization. **Menachem Ben-Ezra:** Writing – review & editing, Project administration, Methodology, Investigation, Data curation, Conceptualization. **Philip Hyland:** Writing – review & editing, Writing – original draft, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Mark Shevlin:** Writing – review & editing, Writing – original draft, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Declaration of Competing Interest

none.

Data availability

Data will be made available on request.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.janxdis.2024.102898](https://doi.org/10.1016/j.janxdis.2024.102898).

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