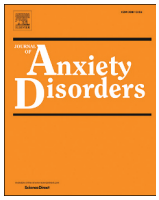
Journal of Anxiety Disorders 114 (2025) 103055

Contents lists available at ScienceDirect

Journal of Anxiety Disorders

journal homepage: www.elsevier.com/locate/janxdis



Memory and identity processes in *ICD-11* complex posttraumatic stress disorder: Tests of a new theory

Philip Hyland [a,*], Marcus Broughill [a], Mark Shevlin [b], Chris R. Brewin [c]

[a] *Department of Psychology, Maynooth University, Kildare, Ireland*
[b] *School of Psychology, Ulster University, Derry, Ireland*
[c] *Division of Psychology and Language Sciences, University College London, London, UK*

ARTICLE INFO

Keywords:
Complex PTSD (CPTSD)
Memory and Identity Theory
ICD-11
Trauma
PTSD

ABSTRACT

Background: This study empirically tested several predictions arising from the Memory and Identity (M&I) Theory of *ICD-11* Complex PTSD (CPTSD). Specifically, it examined the psychometric properties of two measures—the Experiences of Traumatic Memories Questionnaire (ETMQ) and the Trauma Identity Questionnaire (TIQ)—and tested relationships between different types of trauma exposure, disturbances in memory and identity, and CPTSD symptoms.
Methods: Data were collected from a non-probability based representative sample of the general adult population of the United Kingdom ($N = 975$), and latent variable modelling was used to test all hypotheses.
Results: Confirmatory factor analytic results provided support for the psychometric properties of the ETMQ and TIQ as measures of traumatic memories and negative identities. Multiple traumatization and interpersonal forms of trauma were associated with more disturbances in trauma memories and negative identities. Seven of the nine model-predicted associations between trauma memories, negative identities, and CPTSD symptoms were observed, including a link between a fragmented sense of self and emotional numbing.
Conclusions: Results support core elements of the M&I Theory, highlighting trauma memory and identity disturbances as key mechanisms in CPTSD.

The advent of the 11th version of the *International Classification of Diseases* (*ICD-11*: World Health Organization, 2019) with separate diagnoses of Posttraumatic Stress Disorder (PTSD) and Complex PTSD (CPTSD) represented a major development in understanding the nature of posttraumatic stress psychopathology. PTSD is described as a disorder of three symptom clusters (re-experiencing in the here and now, avoidance, and sense of current threat) and CPTSD as a disorder of six symptom clusters (three shared with PTSD plus persistent and pervasive affective dysregulation, negative self-concept, and disturbed relationships, which are collectively termed 'disturbances in self-organisation' [DSO]). This contrasts with descriptions of PTSD in successive editions of the *Diagnostic and Statistical Manual of Mental Disorders* (e.g., *DSM-5-TR*: American Psychiatric Association, 2022) that considered almost all of these problems as symptoms of a single disorder. Another unique element of *ICD-11* is that it specifies that chronic or multiple traumatization is a risk factor for CPTSD (WHO, 2019), while *DSM* never specified a role for multiple trauma exposure. These changes demanded a different theoretical account to those designed to explain PTSD in *DSM*-based terms. The Memory and Identity Theory of *ICD-11* CPTSD (M&I Theory: Hyland et al., 2023) was developed to address these challenges and explains how different PTSD and DSO symptoms develop from different types of trauma via disturbances in memory and identity. In this study we report on a series of empirical tests of predictions arising from this theory.

The M&I Theory conceptualizes trauma exposure as existing on a continuum of risk with multiple traumatization, early developmental trauma, and interpersonal forms of trauma increasing the risk of CPTSD due to a greater likelihood of developing disturbances in memory and identity. Memory disturbances are understood to lie at the core of posttraumatic stress reactions (Brewin, 2014; Ehlers & Clark, 2000) and are characterised by high levels of sensory information and low levels of contextual information. When cued, memories of the traumatic event, or events, enter consciousness automatically accompanied by the subjective sense that the trauma is reoccurring in the here and now. According to the M&I Theory, memory disturbances are the sole cause of the re-experiencing symptoms, and contribute to the development of the

* Correspondence to: Department of Psychology, Room 3.09 John Hume Building, Maynooth University, Kildare, Ireland.
E-mail address: philip.hyland@mu.ie (P. Hyland).

https://doi.org/10.1016/j.janxdis.2025.103055
Received 29 April 2025; Received in revised form 22 July 2025; Accepted 24 July 2025
Available online 25 July 2025

avoidance, sense of current threat, and affective dysregulation symptoms (in particular, the *hyperarousal* component of the affective dysregulation symptom cluster).

Identity disturbances have also been recognised as important etiopathogenetic mechanisms in PTSD (Brown et al., 2015; Herman, 1992; Janoff-Bulman, 1992) but were not formally included in any theory of PTSD prior to the M&I Theory. The M&I Theory lists seven exemplar negative identities and proposes specific relations between different negative identities and the different CPTSD symptom clusters. An identity centred on experiencing the self as 'unsafe' or 'powerless' is predicted to cause the avoidance and sense of current threat symptoms; an identity focused on experiencing the self as 'inferior' is predicted to cause the negative self-concept symptoms; an identity focused on experiencing the self as 'betrayed' or 'abandoned' is predicted to cause the disturbed relationship symptoms; and an identity focused on experiencing the self as 'fragmented' or 'non-existent' is predicted to cause the affective dysregulation symptoms (in particular, the *hypoarousal* component of the affective dysregulation symptom cluster). Fig. 1 displays these predicted relationships.

Our research group recently published the first empirical assessment of the M&I Theory using a general population sample of adults living in Ukraine during Russia's invasion and aggression (Hyland et al., 2024). We developed self-report measures of trauma memories (the *Experiences of Traumatic Memories Questionnaire* [ETMQ]) and negative identities (the *Trauma Identity Questionnaire* [TIQ]) and assessed their latent structures using exploratory factor analysis (EFA). The eight-item ETMQ scale was adequately represented by a unidimensional structure, and the scale items had excellent internal reliability. The 21-item TIQ was designed to represent the seven negative identities previously outlined but results favoured a four-factor model. These factors reflected identities related to experiencing the self as 'vulnerable' (combining the 'unsafe' and 'powerless' items), 'inferior', 'disconnected from others' (combining the 'betrayed' and 'alienated' items), and 'fragmented' (combining the 'fragmented' and 'non-existent' items), and each set of items possessed high internal reliability. The relations between memory and identity disturbances and the CPTSD symptom clusters were subsequently assessed using structural equation modelling techniques, and all but one of the theory-predicted associations were observed. The only effect not observed was the proposed relationship between fragmented identity and affective dysregulation symptoms, and this may have been due to our failure to model the two affective dysregulation symptoms independently so as to test if fragmented identity was positively associated with the hypoarousal symptom (i.e., feeling numb or emotionally shut down).

Initial evidence is encouraging but further testing of the M&I Theory is clearly required. We developed three major research objectives to be addressed in this study. The first objective was to further assess the psychometric properties of the ETMQ and TIQ using confirmatory factor analytic methods. Based on initial findings (Hyland et al., 2024), we hypothesized that the ETMQ would be effectively explained by a one-factor model, and the scale items would possess high internal reliability. For the TIQ, we tested four- and seven-factor models and hypothesized that the more parsimonious and previously indicated four-factor model would be the optimal representation of the latent structure of the scale items. We expected the scale scores for these factors would have good internal reliability.

An important element of the theory not yet tested is the proposed relations between different forms of trauma exposure and memory and identity disturbances. This represented the second objective of the current study. Based on the predictions of the M&I theory (Hyland et al., 2023), we formulated three hypotheses:

a. Exposure to multiple forms of trauma (irrespective of the developmental timing or the nature of the events) would be more strongly associated with trauma memories and negative identities than exposure to a single type of trauma,
b. childhood trauma scores would be more strongly associated with trauma memories and negative identities than adulthood trauma scores; and

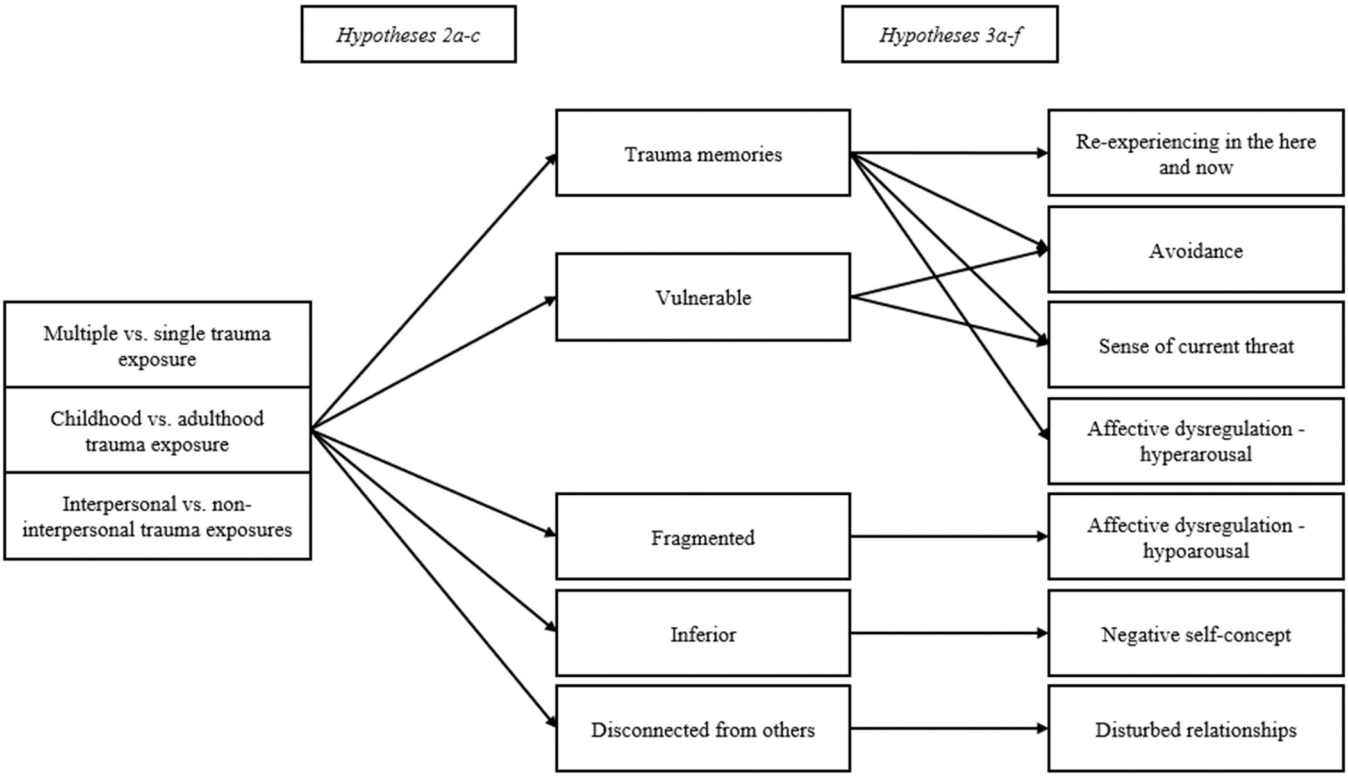


Fig. 1. Graphical representation of core predictions from the memory and identity theory of ICD-11 complex posttraumatic stress disorder.

c. lifetime exposure to interpersonal forms of trauma (e.g., physical assault, sexual assault, emotional abuse) would be more strongly associated with trauma memories and negative identities than exposure to non-interpersonal forms of trauma (e.g., life-threatening accidents, natural disaster).

The third objective was to examine the relations between trauma memories and negative identities and the different CPTSD symptoms. Based on the predictions of the M&I theory (Hyland et al., 2023), we formulated six hypotheses:

a. Trauma memories (but not negative identities) would be positively associated with re-experiencing in the here and now symptoms,
b. trauma memories would be positively associated with the avoidance, sense of current threat, and the hyperarousal symptom component of the affective dysregulation cluster,
c. 'vulnerable' identity would be positively associated with avoidance and sense of current threat symptoms,
d. 'fragmented' identity would be positively associated with the hypoarousal symptom of the affective dysregulation cluster,
e. 'inferior' identity would be positively associated with negative self-concept symptoms; and
f. 'disconnected from others' identity would be positively associated with the disturbed relationship symptom cluster.

1. Methods

1.1. Participants and procedures

Participants ($N = 975$) were adults aged 18 years or older living in the United Kingdom of Great Britain and Northern Ireland (UK). Data were collected from 1 to 27 March 2024 by the survey research company *Qualtrics* who recruit participants from online panels. Quota sampling was used to build a sample that reflected sex, age, geographical (England, Wales, Scotland, and Northern Ireland), and annual income (<£20,000, £20,00-£39,999, £40,00-£59,999, £60,000-£79,999, £80,000-£99,999, >£100,000) distributions of the UK population. Participants were selected using non-probability-based sampling methods which limits the representative nature of the sample, but research shows that samples developed using this method are highly representative of target populations (Boas et al., 2018), including the UK population (McBride et al., 2021). Multiple attention checks were used to ensure valid responses, and *Qualtrics* implements quality control checks such as CAPTCHA security to block bots, and removal of responses that were too quick, showed suspicious patterns of responding, or were from duplicate IP addresses. All participants passed these quality control checks. Participants were remunerated by *Qualtrics*, and ethical approval was granted by the Social Research Ethics Committee at Maynooth University (SRESC-2023–37628).

The sample included similar numbers of males (48.5 %, $n = 473$) and females (51.5 %, $n = 502$) and the mean age was 46.28 years ($Mdn = 45.00$, SD = 17.46, range 18–89). Most were born in the UK (89.3 %, $n = 871$), residing in England (86.4 %, $n = 842$), Scotland (6.8 %, $n = 66$), Wales (4.9 %, $n = 48$), and Northern Ireland (1.9 %, $n = 19$), with 15.1 % ($n = 147$) stating that they were part of a visible ethnic minority group and 8.9 % ($n = 87$) stating that they belong to a sexual minority group. Regarding highest educational attainment, 4.0 % ($n = 39$) had not completed school, 53.8 % ($n = 525$) completed an O- or A-level qualification (i.e., basic schooling), and 42.1 % ($n = 411$) completed an undergraduate or postgraduate university degree. Most participants were in a committed relationship (71.2 %, $n = 694$) and had children (64.6 %, $n = 630$).

1.2. Measures

Trauma Exposure: The International Trauma Exposure Measure (ITEM: Hyland et al., 2021) includes descriptions of 21 potentially traumatic life events consistent with the *ICD-11* definition of trauma (see Table 5). Participants indicated if they experienced each event during childhood (0–17 years) and adulthood (18 years or older) using a 'Yes' (1) or 'No' (0) response format. Higher scores represent exposure to a higher number of different traumatic events. Participants also nominated their index trauma and how long ago it occurred.

ICD-11 CPTSD symptoms: The International Trauma Questionnaire (ITQ: Cloitre et al., 2018) is an 18-item self-report measure of all *ICD-11* PTSD and CPTSD diagnostic requirements. It was completed by those who had experienced a traumatic event, and in relation to their nominated index trauma. Each symptom cluster is measured using two items with participants rating how much the PTSD symptoms have bothered them over the past month and how true the DSO symptoms are of them along a five-point Likert scales (0 = '*Not at all*', 4 = '*Extremely*'). All symptom clusters can range in score from 0 to 8 with higher scores reflecting greater symptomatology. The latent structure of the ITQ is best represented by a correlated six-factor model where each factor represents the different symptom clusters, and a two-factor higher-order model where the first-order factor correlations are explained by correlated 'PTSD' and 'DSO' second-order factors (Redican et al., 2021). Since the M&I Theory makes predictions at the first-order level, this model was used for analyses in this study. This model fit the current sample data well (χ^2 (df = 39, $n = 707$) = 86.25, $p < .001$; CFI = .99, TLI = .98, RMSEA (90 % CI) = .04 (.03,.05), SRMR = .02), and the internal reliability of each subscale was acceptable: re-experiencing (α =.78), avoidance (α =.79), threat (α =.79), affective dysregulation (α =.74), negative self-concept (α =.89), and disturbed relationships (α =.81).

Trauma Memories: The ETMQ (Hyland et al., 2024) assesses different features of reliving experiences, and was completed by participants who were trauma exposed and reported having a flashback or nightmare experience on the ITQ ($n = 523$, 53.6 %). Participants rated how true each statement about their reliving experience was for them (e.g., "*It replays in my mind like a film or movie*", "*I feel it vividly in my body*", "*It seems like time stops*") using a five-point Likert scale (0 = *Almost Never True*, 4 = *Almost Always True*) such that higher scores reflect more intense trauma memories.

Negative Identities: The TIQ (Hyland et al., 2024) includes 21 items and was completed by participants who had experienced at least one traumatic life event (see Table 2 for items). Participants were instructed to answer all items in terms of how they typically feel about themselves and to rate their agreement on a six-point Likert scale (0 = *Disagree very strongly*, 5 = *Agree very strongly*). Higher scores reflect higher levels of each negative identity.

1.3. Analytic plan

The latent structures of the ETMQ and TIQ items were assessed using confirmatory factor analysis (CFA). Standard procedures for determining model fit were followed (Hu & Bentler, 1999), where good model fit is indicated by a non-significant chi-square (χ^2) result, comparative fit index (CFI) and Tucker-Lewis index (TLI) values greater than.90 and closer to 1, and root mean square error of approximation (RMSEA) and standardized root mean squared residual (SRMR) values less than.08 and closer to 0. The χ^2 test is known to produce Type 1 errors (i.e., rejecting good fitting models) with sample sizes as large as the one used in this study, so this result should be interpreted cautiously (Tanaka, 1987). The relative fit of the alternative models of the TIQ was assessed using the Akaike Information Criterion (AIC) and the Bayesian Information Criterion (BIC) where the model with the lowest value is considered statistically superior. Assessment of model fit also requires inspection of all model parameters to determine a viable solution. Internal reliability of the scale scores was assessed using omega reliability

(ω), where values can range from 0 to 1 and higher values indicate higher internal reliability. For clarity, the assessment of the latent structure of the TIQ was based on a sample size of $n = 707$ (the number of people who experienced at least one traumatic event), and the assessment of the latent structure of the ETMQ was based on a sample size of $n = 523$ (the number of people who experienced at least one traumatic event and reported a re-experiencing event).

Structural equation modelling (SEM) was used to test all hypotheses relating to research objectives 2 and 3. These analyses are based on a sample size of $n = 707$ (the number of people who experienced at least one traumatic event). To test hypothesis 2a, latent variables representing trauma memories and negative identities were regressed onto a categorical variable with two levels (0 = single trauma exposure, 1 = multiple trauma exposure). For hypothesis 2b, latent variables representing trauma memories and negative identities were regressed onto two observed variables representing total number of childhood and adulthood trauma exposures. Wald χ^2 tests were planned to determine if these effects were significantly different. For hypothesis 2c, latent variables representing trauma memories and negative identities were regressed onto observed variables representing lifetime exposure to the 21 different interpersonal and non-interpersonal traumatic events in the ITEM (unadjusted and adjusted effects were computed).

To test hypotheses 3a-3f, CPTSD symptoms were simultaneously regressed onto latent variables representing trauma memories and negative identities. Latent variables representing re-experiencing in the here and now, avoidance, sense of current threat, negative self-concept, and disturbed relationship symptoms were constructed, while the two affective dysregulation symptoms were included as separate observed variables to test for the proposed specific associations with the memory and identity processes. Overall model fit was judged by the same criteria described for the CFA procedures.

There was no missing data because a requirement for study participation was providing full information. All models were estimated using the robust maximum likelihood estimator (MLR), and all analyses were conducted using Mplus version 8.2 (Muthén & Muthén, 2017).

2. Results

2.1. Descriptive statistics

Most participants (72.5 %, $n = 707$) experienced at least one traumatic event in their lifetime. The most commonly reported event was learning that a loved one was diagnosed with a life-threatening illness or was involved in a life-threatening accident (41.7 %, $n = 407$), and the least commonly reported event was having caused extreme suffering or death to another person (3.2 %, $n = 31$). The most commonly selected index trauma event was a loved one dying in an awful manner (14.5 %, $n = 141$). The mean number of traumatic events experienced in childhood was 2.26 (SD = 3.22), in adulthood it was 1.87 (SD = 2.47), and across the lifetime it was 3.69 (SD = 4.03).

Means and standard deviations for each CPTSD symptom cluster were as follows: re-experiencing in the here and now ($M = 2.43$, SD = 2.21), avoidance ($M = 2.58$, SD = 2.26), sense of current threat ($M = 2.73$, SD = 2.41), affective dysregulation ($M = 2.94$, SD = 2.18), negative self-concept ($M = 2.45$, SD = 2.47), and disturbed relationships ($M = 2.67$, SD = 2.40).

2.2. Objective 1: CFA results

The one-factor model of the ETMQ had acceptable fit (χ^2 [df = 20, $n = 523$] = 66.749, $p < .001$; CFI =.962, TLI =.947, RMSEA [90 % CI] =.067 [.050,.085], SRMR =.032), and all items loaded onto the 'Trauma Memories' latent variable positively and significantly ($p < .001$) with standardized loadings ranging from.49 to.76. The internal reliability of the scale items was good (ω =.88).

The four-factor model of the TIQ had acceptable fit (χ^2 [df = 183, $n = 707$] = 616.108, $p < .001$; CFI =.941, TLI =.933, RMSEA [90 % CI] =.058 [.053,.063], SRMR =.040; AIC = 42,183, BIC = 42,497), as did the seven-factor model (χ^2 [df = 168, $n = 707$] = 526.820, $p < .001$; CFI =.952, TLI =.939, RMSEA [90 % CI] =.055 [.050,.060], SRMR =.038). The AIC and BIC values were lower for the seven-factor model, but the viability of this model was compromised by several extremely high factor correlations (see supplementary table 1 for full details). The factors in the seven-factor model that are combined in the four-factor model correlated at $r = .92$ ('unsafe' and 'powerless'), $r = .94$ ('alienated' and 'betrayed'), and $r = .95$ ('fragmented' and 'non-existent'). Thus, based on model parsimony and improved discriminant validity of the latent factors, the four-factor model was deemed to be the better description of the latent structure of the TIQ items. The factor loadings and factor correlations are presented in Table 1. Internal reliability estimates were

Table 1
Standardized factors loadings and factor correlations for the four-factor model of the trauma identity questionnaire.

	Vulnerable	Inferior	Disconnected	Fragmented
Factor loadings				
I can't stop bad things from happening.	.53			
I'm a weak person.	.76			
I'm powerless to change anything in the world.	.59			
People can easily take advantage of me.	.73			
I always feel that something bad is about to happen.	.80			
I feel vulnerable in many situations.	.82			
I don't deserve good things to happen to me.		.74		
Other people are better and more deserving than me.		.73		
I feel like there is something wrong with me as a person.		.88		
Other people will betray me.			.79	
I have been left alone in the world.			.76	
Other people will let me down sooner or later.			.80	
I feel like I don't belong.			.83	
It's difficult to trust other people.			.75	
Other people don't understand me.			.82	
Sometimes I don't even know who I am.				.85
I feel like a different person from one day to the next.				.83
I often feel like I am broken in some important way.				.86
Sometimes I don't even feel like I exist anymore.				.86
I don't feel like a whole person.				.88
Sometimes I feel like I'm not even really alive.				.84
Factor correlations				
Vulnerable	1			
Inferior	.88	1		
Disconnected from others	.86	.85	1	
Fragmented	.88	.91	.88	1

Note. All effects are statistically significant at $p < .001$.

good: 'vulnerable' (ω =.86), 'inferior' (ω =.83), 'disconnected from others' (ω =.91), and 'fragmented' (ω =.94).

2.3. Objective 2: trauma exposure, trauma memories, and negative identities

Multiple traumatization was positively and significantly associated with 'trauma memories' (β =.16, $p < .001$), and the 'vulnerable' (β =.18, $p < .001$), 'inferior' (β =.17, $p < .001$), 'disconnected from others' (β =.24, $p < .001$), and 'fragmented' (β =.16, $p < .001$) identities.

Childhood and adulthood trauma scores were positively and significantly associated with trauma memories and all negative identities (see Table 2). Post-hoc Wald χ^2 tests indicated that 'trauma memories' were more strongly associated with adulthood trauma scores than childhood trauma scores, while 'inferior' identity was more strongly associated with childhood trauma scores than adulthood trauma scores.

Table 3 presents the unique (i.e., adjusted) associations between each traumatic life event and trauma memories and negative identities (the bivariate or 'unadjusted' associations are presented in supplementary table 2). The only traumatic life events positively and significantly correlated with traumatic memories and each negative identity were interpersonal forms of trauma.

2.4. Objective 3: trauma memories and negative identities predicting CPTSD symptoms

The SEM model in which the CPTSD symptoms were simultaneously regressed on the trauma memory and negative identity latent variables fit the sample data well (χ^2 [df = 715, n = 707] = 1561.603, $p < .001$; CFI =.944, TLI =.936, RMSEA [90 % CI] =.041 [.038,.044], SRMR =.042) and explained between 37.5 % (hyperarousal symptom of the affective dysregulation cluster) and 73.0 % (disturbed relationships cluster) of the variance in CPTSD symptoms (all $ps < .001$).

The standardized regression coefficients are presented in Table 4. As can be seen, 'trauma memories' was the only variable significantly and positively associated with the re-experiencing in the here and now symptoms (β =.66, $p < .001$), and was also significantly and positively associated with all other CPTSD symptoms. 'Vulnerable' identity was not significantly associated with the avoidance or sense of current threat symptoms but was positively associated with the hyperarousal component of the affective dysregulation cluster (β =.66, $p < .001$). 'Fragmented' identity was significantly associated with the hypoarousal component of the affective dysregulation symptom cluster (β =.30, $p = .033$). Additionally, 'inferior' identity was significantly associated with the negative self-concept cluster (β =.39, $p < .001$) and 'disconnected from others' identity was significantly associated with the disturbed relationship cluster (β =.58, $p < .001$).

Table 2
Standardized regression coefficients of the relations between childhood and adulthood traumas and trauma memories and negative identities.

	Childhood trauma	Adulthood trauma	Wald χ^2	p
Trauma memories	.18***	.27***	5.73	.017
Vulnerable	.23***	.17***	0.01	.931
Inferior	.32***	.11**	6.06	.014
Disconnected from others	.31***	.22***	0.17	.681
Fragmented	.30***	.15***	3.16	.075

Note: Wald χ^2 tests the null hypothesis that the effects for childhood and adulthood trauma are equal; all Wald χ^2 tests have 1 degree of freedom; p = statistical significance results for the Wald χ^2 test; statistical significance = * $p < .05$, ** $p < .01$, *** $p < .001$.

3. Discussion

This purpose of this study was to provide further empirical testing of predictions arising from the M&I Theory of *ICD-11* CPTSD (Hyland et al., 2023). The first objective of this study focused on assessing the psychometric properties of the ETMQ and TIQ because a pre-requisite for theory testing is the availability of measures of core theoretical constructs that generate valid and reliable scores. Prior work with exploratory factor analytic methods suggested that the ETMQ was unidimensional in nature, and the TIQ measured four types of negative identities (vulnerable, fragmented, inferior, and disconnected from others) (Hyland et al., 2024). Current results based on a confirmatory approach replicated these findings. Model fit for the seven-factor model of the TIQ was very similar to the four-factor model, but the latter was preferred on the basis of model parsimony. Nevertheless, there may be occasions when clinicians and researchers may wish to apply the scoring scheme for the seven-factor model. The high correlations between the different factors of the TIQ are somewhat concerning as they suggest limited discriminant validity among the different negative identities. It will be important to observe how the scale performs in future studies, especially with clinical samples, and some revision of the items may be necessary to improve discrimination. Overall, the ETMQ and TIQ appear to be empirically supported methods to assess the core theoretical constructs in the M&I Theory.

The second objective of this study was to probe the relations between different types of trauma exposure and memory and identity disturbances. A unique element of the M&I Theory is its explicit statement that different types of trauma exposure can carry different levels of risk in generating disturbances in memory and identity. Consistent with expectations, multiple traumatization and interpersonal forms of trauma exposure were associated with more disturbed traumatic memories and all negative identities. The interpersonal events most robustly associated with memory and identity problems were emotional abuse, emotional rejection, and physical rejection/neglect. This is particularly noteworthy because these events would not be considered traumatic based on the *DSM-5-TR's* definition of a trauma (APA, 2022). Nevertheless, they have previously been shown to predict meeting diagnostic requirements for *ICD-11* PTSD and CPTSD over and above traditionally accepted traumatic life events (Hyland et al., 2021). One possible explanation for this is that the *DSM's* criterion for what constitutes a trauma is overly focused on single events that typically occur later in development and underestimate the impact of events that typically occur early in development and are normally chronic in nature.

Contrary to theoretical expectations, adulthood trauma scores were more strongly associated with memory disturbances than childhood trauma scores. Moreover, only in the case of inferior identity was the effect for childhood trauma significantly stronger than for adulthood trauma. One interpretation of these findings is that the type and number of trauma exposures matters more in predicting trauma memories and negative identities than the developmental timing of the trauma exposure(s). Another possibility is that these results may be due to limitations in the measurement of trauma exposure by the ITEM which simply asked if a given event occurred before and after the age of 18. A more sensitive measure of the timing of the traumatic event(s) may have produced a different result. Future work will want to consider how to most effectively isolate the effects for type, number, and timing of traumatic exposure(s) to better test these theoretical predictions.

The third and final objective of this study focused on testing the theorized associations between the core psychological processes of memory and identity disturbances and the different CPTSD symptoms. Several things about these findings warrant discussion. We found that trauma memories were robustly associated with all CPTSD symptoms. In our initial theoretical formulation, we proposed that memory disturbances were especially relevant to understanding the development of the PTSD symptoms but not so the DSO symptoms (apart from the hyperarousal component of the affective dysregulation symptom cluster).

Table 3
Standardized regression coefficients of the relations between different traumatic events and trauma memories and negative identities.

	Trauma memories	Vulnerable	Inferior	Disconnected	Fragmented
Diagnosed with a life-threatening illness	.06	.02	−.03	−.02	−.02
Someone close to you died in an awful manner	.05	.07	.03	.06	.05
Someone close to you had a life-threatening illness or accident	−.02	.00	.03	.04	.01
Someone threatened your life with a weapon	.03	.04	.05	.07	.06
Physical assault by a parent/guardian	.03	.06	.08	**.08***	.04
Physical assault by a non-parent/guardian	.01	−.03	.01	.02	−.01
Sexual assault by a parent/guardian	.01	.05	.07	.01	.05
Sexual assault by a non-parent/guardian	**.09***	.04	.01	.05	.03
Sexual harassment (unwanted comments/actions)	.08	**.09***	**.10***	.07	**.09****
Exposure to war or combat	.02	−.04	−.04	−.01	−.06
Held captive and/or tortured	−.04	−.03	−.03	−.05	−.04
You caused extreme suffering/death to another person	.02	.01	**.10***	.01	**.08***
Witnessed extreme suffering or death to another person	.08	.00	−.05	−.02	−.02
Accident where your life was in danger	.04	−.05	.00	−.02	−.03
Natural disaster where your life was in danger	**−.10***	.03	.01	−.01	.02
Human-made disaster where your life was in danger	−.03	−.07	−.06	−.02	−.03
Stalked by another person	.05	−.02	−.05	.02	.03
Bullied online or offline	−.05	.02	.04	.04	.01
Humiliated, put down, or insulted by another	.02	**.12****	.05	**.11****	.05
Made to feel unloved, unwelcome, or worthless	**.13***	.08	**.12***	**.13****	**.14****
Neglected, ignored, rejected, or isolated	.08	.09	.10	**.11***	**.13****
R^2	**15.1 %*****	**14.4 %*****	**16.6 %*****	**22.8 %*****	**17.9 %*****

Note: $N = 975$; statistical significance = * $p < .05$, ** $p < .01$, *** $p < .001$; R^2 = % of variance explained in each criterion variable; statistically significant effects are in bold for ease of identification.

Table 4
Standardized regression coefficients of the relations between trauma memories and negative identities and CPTSD symptoms.

	Re	Av	Th	AD1: Arousal	AD2: Numbing	NSC	DR
Trauma memories	.66***	.57***	.49***	.24***	.37***	.30***	.40***
Vulnerable	.11	.01	.15	.41***	.08	.17	−.04
Fragmented	.31	.15	.21	.02	.30*	.04	−.14
Inferior	−.14	−.15	−.26	−.14	−.13	.39***	.16
Disconnected from others	−.22	.10	.16	.14	.12	.00	.58***
R^2	52.4 %***	44.2 %***	49.7 %***	37.5 %***	44.8 %***	62.7 %***	73.0 %***

Note: $N = 707$; Highlighted cells indicate 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; R^2 = % of variance explained in each criterion variable.

Current and past findings (Hyland et al., 2024) indicate however that disturbances in traumatic memories are central to all CPTSD symptoms. This is important because formulations of complex PTSD prior to *ICD-11* did not include the intrusion and avoidance of trauma memories among their symptoms. Our data show that the experience of traumatic memories is a significant aspect of CPTSD.

Additionally, we found that fragmented identity was uniquely associated with the hypoarousal component of the affective dysregulation symptom cluster, a specific effect predicted by the M&I Theory (see Hyland et al., 2023, p. 1053). In our previous study in Ukraine, we found no association between fragmented identity and the affective dysregulation symptom cluster. Reflecting on this result in the preparation of the current study, we suspected that the null effect may have been caused by not isolating the hypoarousal symptom. To confirm this suspicion, and cross-validate the current finding, we re-analysed the Ukrainian data in the same manner as the current study in which the two affective dysregulation symptoms were modelled separately. 'Fragmented' identity was not significantly associated with the hyperarousal symptom, but it was positively and significantly associated with the hypoarousal symptom (β =.12, p = .012). This shows that different kinds of affect dysregulation are associated with different experiences of and perceptions of the self. Whereas persistent and pervasive hyperarousal seems to be associated with a sense of the self being vulnerable, persistent and pervasive hypoarousal seems to be associated with a sense of the self being fragmented and non-existent. A fragmented or non-existent self is an often-described feature of complex PTSD, and these data suggest new hypotheses concerning its origin. There are clear parallels with brain imaging findings suggestive of disturbances to a coherent and embodied sense of self in the dissociative subtype of *DSM-5* PTSD (APA, 2022), which is characterized by over-modulation of affect, depersonalization, and derealization (Lanius et al., 2010; Rabellino et al., 2023).

3.1. Limitations

The current findings should be judged considering several limitations. First, the cross-sectional nature of the data precludes inferences regarding causal or temporal relationships between the variables. An important next step in testing the M&I Theory will be to test hypothesised relations using longitudinal data. Second, the use of a general population sample limits generalizations to clinical populations. It will be important to test aspects of the M&I Theory in clinical populations, or at least among members of the general population that meet diagnostic requirements for CPTSD.

4. Conclusion

Despite these limitations, the current findings provide further support for several key elements of the M&I Theory of *ICD-11* CPTSD, primarily the influence of interpersonal and multiple forms of trauma exposure on trauma memories and negative identities, and the role these processes play in understanding the different sets of CPTSD symptoms. The M&I Theory represents a promising theoretical description to understand this debilitating psychiatric disorder.

Funding

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

CRediT authorship contribution statement

Chris R. Brewin: Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization. **Mark Shevlin:** Writing – review & editing, Writing – original draft, Visualization, Methodology, Formal analysis, Conceptualization. **Philip Hyland:** Writing – review & editing, Writing – original draft, Visualization, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Marcus Broughill:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization.

Declaration of Competing Interest

All authors have no competing interests to declare.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.janxdis.2025.103055.

Data availability

Data will be made available on request

References

American Psychiatric Association. (2022). Diagnostic and statistical manual of mental disorders (5th ed., text rev.). https://doi.org/10.1176/appi.books.9780890425787.

Boas, T. C., Christenson, D. P., & Glick, D. M. (2018). Recruiting large online samples in the United States and India: Facebook, Mechanical Turk, and Qualtrics. *Political Science Research and Methods, 8*(2), 232–250. https://doi.org/10.1017/psrm.2018.28

Brewin, C. R. (2014). Episodic memory, perceptual memory, and their interaction: Foundations for a theory of posttraumatic stress disorder. *Psychological Bulletin, 140*(1), 69–97. https://doi.org/10.1037/a0033722

Brown, A. D., Kouri, N. A., Joscelyne, A., Marmar, C. R., & Bryant, R. A. (2015). Experimentally examining the role of self-identity in posttraumatic stress disorder. In L. A. Watson, & D. Bernsten (Eds.), *Clinical perspectives on autobiographical memory* (pp. 316–334). Cambridge University Press. https://doi.org/10.1017/CBO9781139626767.016.

Cloitre, M., Shevlin, M., Brewin, C. R., Bisson, J. I., Roberts, N. P., Maercker, A., Karatzias, T., & Hyland, P. (2018). The international trauma questionnaire: 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

Ehlers, A., & Clark, D. M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research and Therapy, 38*(4), 319–345. https://doi.org/10.1016/s0005-7967(99)00123-0

Herman, J. L. (1992). Complex PTSD: a syndrome in survivors of prolonged and repeated trauma. *Journal of Traumatic Stress, 5*(3), 377–391. https://doi.org/10.1002/jts.2490050305

Hu, L.-t, & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Hyland, P., Karatzias, T., Shevlin, M., McElroy, E., Ben-Ezra, M., Cloitre, M., & Brewin, C. R. (2021). Does requiring trauma exposure affect rates of ICD-11 PTSD and complex PTSD? Implications for DSM-5. *Psychological Trauma: Theory, Research, Practice and Policy, 13*(2), 133–141. https://doi.org/10.1037/tra0000908

Hyland, P., Shevlin, M., & Brewin, C. R. (2023). The memory and identity theory of *ICD-11* complex posttraumatic stress disorder. *Psychological Review, 130*(4), 1044–1065. https://doi.org/10.1037/rev0000418

Hyland, P., Shevlin, M., Martsenkovskyi, D., Ben-Ezra, M., & Brewin, C. R. (2024). Testing predictions from the memory and identity theory of ICD-11 complex posttraumatic stress disorder: Measurement development and initial findings. *Journal of Anxiety Disorders, 105*, Article 102898. https://doi.org/10.1016/j.janxdis.2024.102898

Janoff-Bulman, R. (1992). *Shattered assumptions: Towards a new psychology of trauma.* Free Press.

Lanius, R. A., Vermetten, E., Loewenstein, R. J., Brand, B., Schmahl, C., Bremner, J. D., & Spiegel, D. (2010). Emotion modulation in PTSD: Clinical and neurobiological evidence for a dissociative subtype. *The American Journal of Psychiatry, 167*(6), 640–647. https://doi.org/10.1176/appi.ajp.2009.09081168

McBride, O., Murphy, J., Shevlin, M., Gibson-Miller, J., Hartman, T. K., Hyland, P., Levita, L., Mason, L., Martinez, A. P., McKay, R., Stocks, T. V., Bennett, K. M., Vallières, F., Karatzias, T., Valiente, C., Vazquez, C., & Bentall, R. P. (2021). Monitoring the psychological, social, and economic impact of the COVID-19 pandemic in the population: Context, design and conduct of the longitudinal COVID-19 psychological research consortium (C19PRC) study. *International Journal of Methods in Psychiatric Research, 30*(1), Article e1861. https://doi.org/10.1002/mpr.1861

Muthén, L. K., & Muthén, B. O. (2017). *Mplus: Statistical analysis with latent variables: User's guide (Version 8*. Los Angeles, CA: Authors.

Rabellino, D., Thome, J., Densmore, M., Théberge, J., McKinnon, M. C., & Lanius, R. A. (2023). The vestibulocerebellum and the shattered self: A resting-state functional connectivity study in posttraumatic stress disorder and its dissociative subtype. *Cerebellum, 22*(6), 1083–1097. https://doi.org/10.1007/s12311-022-01467-4

Redican, E., Nolan, E., Hyland, P., Cloitre, M., McBride, O., Karatzias, T., Murphy, J., & Shevlin, M. (2021). A systematic literature review of factor analytic and mixture models of ICD-11 PTSD and CPTSD using the International Trauma Questionnaire. *Journal of Anxiety Disorders, 79*, Article 102381. https://doi.org/10.1016/j.janxdis.2021.102381

Tanaka, J. S. (1987). "How big is big enough?": Sample size and goodness of fit in structural equation models with latent variables. *Child Development, 58*(1), 134–146. https://doi.org/10.2307/1130296

World Health Organization (2019). International classification of diseases (11th rev.). Retrieved from ⟨https://ICD.who.int/browse11/l-m/en⟩.