Check for updates

Received: 4 November 2025 | Accepted: 15 April 2026

DOI: 10.1111/papt.70073

RESEARCH ARTICLE

Determinants of mental health in earthquake survivors: Trauma memories, cognitions, identity and safety-seeking behaviours in PTSD and CPTSD models

Fatmanur Çimen[1] | **İsmail Seçer**[1] | **Abdurrahman Kasım Pakiş**[2] | **Alice Alberici**[3]

[1]Psychological Counselling and Guidance Department, Atatürk University, Erzurum, Türkiye

[2]Department of Child Care and Youth Services, Van Yüzüncü Yıl University, Van, Türkiye

[3]Children and Young Person's Diabetes Team, Level 10 Royal Alexandra Children's Hospital, University Hospital Sussex, Brighton, UK

Correspondence
Fatmanur Çimen, Psychological Counselling and Guidance Department, Atatürk University, Erzurum, Türkiye.
Email: f.cimen@atauni.edu.tr

Abstract

Objective: This study aimed to examine the determinants of mental health among adult earthquake survivors by testing conceptual models of post-traumatic stress disorder (PTSD) and complex post-traumatic stress disorder (CPTSD). Specifically, the study investigated how trauma memories, post-traumatic cognitions, trauma identity and safety-seeking behaviours interact to influence mental health outcomes.

Methods: A cross-sectional design was employed with a sample of 285 adults (65.3% female) who experienced the 2023 Kahramanmaraş earthquakes in Türkiye. Participants completed self-report measures assessing trauma memories, post-traumatic cognitions, safety-seeking behaviours, trauma identity, PTSD and CPTSD symptoms, and overall mental health. Two structural equation models—one for PTSD and one for CPTSD—were tested to evaluate the pathways linking trauma-related variables to mental health.

Results: Structural equation modelling indicated that trauma memories significantly and positively predicted post-traumatic cognitions, which in turn predicted both trauma identity and safety-seeking behaviours. These mediators were positively associated with PTSD and CPTSD symptoms, which negatively predicted mental health. In the PTSD model, trauma identity had a stronger effect, whereas

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.
© 2026 The Author(s). *Psychology and Psychotherapy: Theory, Research and Practice* published by John Wiley & Sons Ltd on behalf of The British Psychological Society.

in the CPTSD model, safety-seeking behaviours were more influential. Both models demonstrated good fit indices, confirming the hypothesized pathways.

Conclusions: The findings underscore the pivotal role of trauma memories and post-traumatic cognitions in shaping trauma-related behavioural and identity processes that contribute to PTSD and CPTSD symptoms. Targeting these mechanisms in clinical interventions may enhance mental health outcomes in individuals exposed to large-scale natural disasters.

KEYWORDS

mental health, post-traumatic cognitions, post-traumatic safety-seeking behaviours, trauma identity, trauma memories

INTRODUCTION

On February 6, 2023, two major earthquakes with magnitudes of 7.7 and 7.6 struck Turkey within a few hours, both centred in the province of Kahramanmaraş. These earthquakes caused not only severe destruction in Kahramanmaraş but also affected several cities in Syria and led to the declaration of 11 surrounding provinces as disaster zones. The earthquakes had a wide geographical impact and resulted in large-scale devastation. According to official reports, 44,218 people lost their lives, and 80,278 were injured in Turkey. Due to their scale and severity, the earthquakes have been described as the 'disaster of the century' (AFAD, 2023). Consequently, this disaster has been recorded as the largest and most devastating natural catastrophe in the history of Turkey (Zhao et al., 2023).

Witnessing natural disasters is a traumatic experience that can deeply affect individuals, leading to heightened anxiety and stress. Such disasters threaten both the physical and psychological integrity of individuals, commonly resulting in responses such as shock, confusion, anger, helplessness and fear of death (Karaarslan et al., 2023). Although these reactions are initially considered normal responses to an extraordinary event, if elevated levels of anxiety and stress persist over time, they may develop into serious mental health problems (Wiseman et al., 2015). Post-traumatic stress disorder (PTSD) is one of the most common and severe consequences of exposure to potentially traumatic experiences. In the 11th Revision of the International Classification of Diseases (ICD-11), PTSD is characterized by three symptom clusters: re-experiencing in the here and now, avoidance of traumatic reminders and a persistent sense of threat. PTSD frequently co-occurs with other mental health disorders, particularly anxiety and depression (Akbari et al., 2022; Andualem et al., 2024; Lewis et al., 2019; Quan et al., 2023). This comorbidity significantly hinders recovery and negatively impacts individuals' daily functioning (Birkley et al., 2016; Futterman et al., 2021; Jellestad et al., 2021).

Not every individual exposed to trauma develops severe mental health problems. Various individual and environmental factors—such as the type and severity of the trauma, the level of material or emotional support received afterward, personal injury and the loss of loved ones—can play a critical role in this process (Ford et al., 2015; Jones et al., 2024; Lai et al., 2021; Taşkın et al., 2025). In a study conducted by Liu et al. (2017), the lifetime prevalence of trauma exposure was found to be 70.3%; however, despite this high rate, the prevalence of PTSD among those exposed to trauma was only 4.0%. This discrepancy highlights the need for a better understanding of the factors that contribute to the development of PTSD. Gaining insight into the mechanisms underlying PTSD is essential for designing effective early intervention strategies (Bisson et al., 2021; Çimen, Seçer, & Pakiş, 2025).

The cognitive model of PTSD developed by Ehlers and Clark (2000) is one of the most widely accepted frameworks for explaining how PTSD symptoms develop and are maintained. According to the model,

20448341, 0, Downloaded from https://bpspsychub.onlinelibrary.wiley.com/doi/10.1111/papt.70073 by Fatmanur Cimen - Ataturk University , Wiley Online Library on [27/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

traumatized individuals tend to make excessively negative appraisals of the traumatic event, and the associated memories are processed in a fragmented and decontextualized manner. As a result, the traumatic event is encoded in a way that makes it feel like a current threat. Although the traumatic event has ended, the perceived sense of threat persists, leading individuals to engage in a range of cognitive and behavioural strategies to manage this perceived danger. For instance, an individual who has experienced an earthquake may exhibit safety-seeking behaviours, such as avoiding enclosed spaces or sitting near exits, or may resort to maladaptive coping responses like suppressing earthquake-related thoughts and memories or experiencing emotional numbing. In a study by Beierl et al. (2020), both negative appraisals and fragmented memories were found to have a direct impact on persistent symptom severity and to predict symptom levels through the use of unhelpful coping strategies. Similarly, Jones et al. (2024) reported that it is not necessarily the traumatic event itself, but rather how the trauma is processed and interpreted by the individual, that is associated with PTSD symptoms. While significant progress has been made in understanding the risk factors associated with the onset and maintenance of PTSD symptoms, substantial gaps remain regarding its heterogeneous development, and much remains to be explained (Fekete, 2024; Jones et al., 2024).

In the 2018 revision, the ICD-11 introduced a significant change by distinguishing a new diagnosis known as Complex Post-Traumatic Stress Disorder (CPTSD), separate from PTSD (World Health Organization, 2018). CPTSD refers to stress responses following exposure to repeated, prolonged and inescapable traumatic events. In addition to the three core symptom clusters present in PTSD, CPTSD includes a fundamental dimension called Disturbance in Self-Organization (DSO), which encompasses three symptom clusters: Affective Dysregulation, Negative Self-Concept and Disturbances in Relationships (World Health Organization, 2018). Similar to PTSD, negative cognitions and safety-seeking behaviours are considered to play a significant role in the onset and maintenance of CPTSD symptoms (Lofthouse et al., 2024).

Regarding the understanding of CPTSD, the Memory and Identity (M&I) theory proposed by Hyland et al. (2023) posits that exposure to trauma and individual vulnerabilities lead to the emergence of PTSD and DSO symptoms—which constitute the dimensions of CPTSD—through traumatic memories and negative trauma identities. According to the M&I theory, traumatic memories and trauma identity are fundamental to the development of both PTSD and CPTSD symptoms. The distinction lies in that PTSD symptoms involve identities characterized by experiencing the self as weak and unsafe, whereas CPTSD additionally includes identities that experience the self as worthless, betrayed, alienated, fragmented or nonexistent (Hyland et al., 2023). Considering CPTSD as a new diagnosis distinct from PTSD, it is apparent that the literature regarding the development of its symptoms is still in its early stages.

Although a substantial body of research has documented PTSD symptoms following earthquake exposure, studies examining both PTSD and CPTSD within the same theoretical framework remain limited, particularly in disaster-exposed adult populations. This gap is important because PTSD and CPTSD, while overlapping in core trauma symptoms, may differ in the cognitive and self-related mechanisms that maintain symptom severity. In the context of the Kahramanmaraş-centred earthquakes, previous findings have shown clinically significant levels of both PTSD and CPTSD symptoms among survivors (Çimen & Seçer, 2025; Yalım & Ünsal, 2025), highlighting the need to identify the psychological processes associated with these outcomes.

Despite the growing literature on trauma-related psychopathology following natural disasters, several important gaps remain. First, prior earthquake-related studies have predominantly focused on PTSD symptoms, whereas CPTSD has received considerably less empirical attention, particularly in adult disaster-exposed populations. Second, although theoretical models such as the cognitive model of PTSD (Ehlers & Clark, 2000) and the Memory and Identity theory (Hyland et al., 2023) propose that trauma-related cognitions, memory processes and identity disturbances play central roles in symptom development, these mechanisms have rarely been examined together within a single integrative model. Third, limited research has investigated how post-traumatic safety-seeking behaviours, trauma identity and traumatic memories jointly contribute to both PTSD and CPTSD symptoms, especially in the context of large-scale natural disasters such as earthquakes.

20448341, 0, Downloaded from https://bpspsychub.onlinelibrary.wiley.com/doi/10.1111/papt.70073 by Fatmanur Cimen - Ataturk University , Wiley Online Library on [27/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Addressing these gaps is important because understanding the mechanisms underlying both PTSD and CPTSD may help identify early risk pathways and inform targeted psychological interventions for disaster survivors. Therefore, the present study seeks to bridge this gap by testing a theoretically grounded serial mediation model that integrates traumatic memories, post-traumatic cognitions, trauma identity and safety-seeking behaviours in predicting PTSD and CPTSD symptoms and their associations with mental health outcomes. To address this gap, the present study employed two serial mediation models derived from established theoretical frameworks. Specifically, traumatic memories were conceptualized as the predictor variable, while post-traumatic cognitions, trauma identity and safety-seeking behaviours were modelled as sequential mediators predicting PTSD and CPTSD symptoms, which were then examined in relation to mental health outcomes.

Conceptual framework

The present study is grounded in two complementary theoretical frameworks: the cognitive model of PTSD (Ehlers & Clark, 2000) and the Memory and Identity theory of CPTSD (Hyland et al., 2023). The cognitive model proposes that maladaptive appraisals of trauma and fragmented trauma memories maintain a persistent sense of current threat, which in turn leads to avoidance, hypervigilance and safety-seeking behaviours. In parallel, the M&I theory emphasizes that trauma-related memory representations and negative trauma identities play a central role in the development of both PTSD and CPTSD symptoms, particularly symptoms related to disturbances in self-organization.

Integrating these frameworks, the present study proposes that traumatic memories function as the primary antecedent variable, influencing PTSD and CPTSD symptoms through three theoretically relevant mediators: post-traumatic cognitions, trauma identity and post-traumatic safety-seeking behaviours. In turn, PTSD and CPTSD symptoms are expected to be associated with poorer mental health outcomes. Accordingly, two serial mediation models were specified to test the pathways from traumatic memories to (a) PTSD symptoms and (b) CPTSD symptoms and subsequently to mental health. Based on the theoretical framework, the following hypotheses were tested (Figure 1):

H1. *Trauma memories positively predict PTSD symptoms through serial indirect pathways via post-traumatic cognitions, trauma identity and post-traumatic safety behaviours. Furthermore, PTSD symptoms negatively predict mental health.*

H2. *Trauma memories positively predict CPTSD symptoms through serial indirect pathways via post-traumatic cognitions, trauma identity and post-traumatic safety behaviours. Furthermore, CPTSD symptoms negatively predict mental health.*

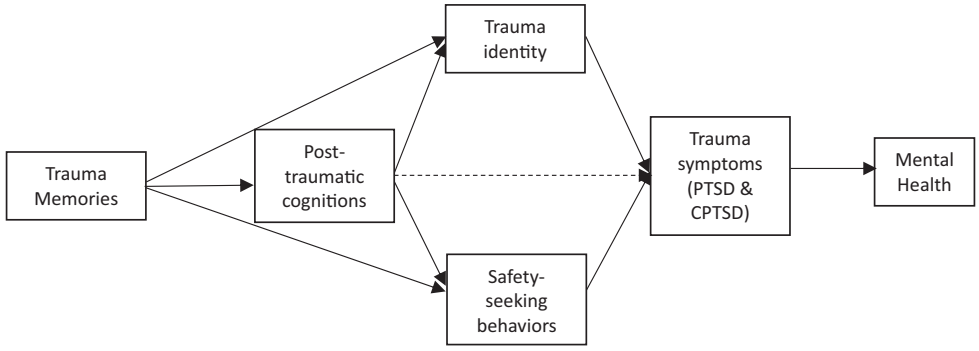


FIGURE 1 Conceptual framework.

20448341, 0, Downloaded from https://bpspsychub.onlinelibrary.wiley.com/doi/10.1111/jpap.70073 by Fatmanur Cimen - Ataturk University , Wiley Online Library on [27/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

METHOD

Research sample

The survey was conducted over a period of 3 weeks following ethical approval from the Scientific Research and Publication Ethics Committee of Atatürk University. The study sample consisted of adult earthquake survivors aged 18 and over who experienced the earthquakes centred in Kahramanmaraş on February 6. The inclusion criteria applied in the study are as follows:

- Having been exposed to the Kahramanmaraş earthquakes and residing in the earthquake-affected region
- Being an adult aged 18 or older
- Having fluency in Turkish
- Possessing access to any electronic device (tablet, phone, etc.) to complete the online survey
- To be eligible to complete the Trauma Memories Questionnaire, participants must have scored on at least one item within the re-experiencing subscale of the ITQ

Exclusion criteria:

- Having any developmental or learning disabilities
- Having been exposed to other traumatic experiences (e.g., loss, grief, etc.)
- Having participated in any therapy program

An online survey was created using Google Forms. Participants were recruited using a snowball sampling method, in which the survey link was initially shared with known contacts in the earthquake-affected region and then further distributed through social media and messaging platforms. The first section of the form included information about the purpose of the study, emphasized voluntary participation and assured participants of the confidentiality of the collected data. Participants were informed that they could discontinue the survey at any point. The subsequent sections contained questions regarding participants' demographic information (age, gender) as well as the scales used in the study. Since all questions were marked as mandatory, no missing data occurred in the study.

A total of 291 individuals participated in the study. However, participants who did not score on at least one item within the re-experiencing subscale of the ITQ were excluded from the dataset. Accordingly, 6 participants were removed, resulting in a final sample of 285 individuals, comprising 186 females (65.3%) and 99 males (34.7%), with a mean age of 25.65 (SD = 8.34). The participants ranged in age from 18 to 58 years. Demographic characteristics of the sample are presented in Table 1.

Measures

Trauma Memories Questionnaire (TMQ)

Developed by Hyland et al. (2024), this questionnaire assesses re-experiencing symptoms in individuals exposed to trauma. It consists of 8 items rated on a 5-point Likert scale (0 = Almost never true, 4 = Almost always true). To be included in the assessment of trauma memories, participants are required to have completed the ITQ and scored above zero on at least one of the two re-experiencing items within the ITQ. Scores on the TMQ range from 0 to 32, with higher scores indicating more intense sensory-based trauma memories. The Turkish adaptation of the scale was conducted by X and Y (2025), who reported good validity and reliability indices [$\chi^2/df = 3.84$; CFI = 0.94; TLI = 0.92; SRMR = 0.03].

20448341, 0, Downloaded from https://bpspsychub.onlinelibrary.wiley.com/doi/10.1111/bjpp.70073 by Fatmanur Cimen - Ataturk University , Wiley Online Library on [27/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

TABLE 1 Demographic information of participants.

	N (%)
Gender	
Female	186 (65.3)
Male	99 (34.7)
Age	
Mean (SD)	25.62 (8.38)
Total	285

Regarding reliability, the Cronbach's alpha internal consistency coefficient was found to be .90, confirming that the scale is valid and reliable for use in Turkish culture. In the present study, the Cronbach's alpha was determined to be .93.

Trauma Identity Questionnaire (TIQ)

Conceptualized based on the M&I theory by Hyland et al. (2023), the TIQ (Hyland et al., 2024) consists of 21 items rated on a 6-point Likert scale ranging from 0 (Strongly disagree) to 5 (Strongly agree). The scale includes four subdimensions: worthless self, disconnected self, inferior self and fragmented self. Higher scores indicate stronger negative identities. The Turkish adaptation of the scale was conducted by X and Y (2025), reporting good validity and reliability indices [$\chi^2/df = 2.19$, CFI = 0.91, IFI = 0.92, SRMR = 0.05]. The internal consistency coefficient (Cronbach's alpha) was found to be .94, supporting the scale's validity and reliability within the Turkish context. In the present study, Cronbach's alpha was also .94.

Post-Traumatic Cognitions Inventory – short form (PTCI-9)

This inventory is a 9-item self-report measure assessing thoughts and beliefs following a traumatic event. It is a short form of the original 36-item scale developed by Foa et al. (1999), with the shortened version created by Wells et al. (2019). The scale comprises three subscales: negative cognitions about the self, negative cognitions about the world and self-blame related to the traumatic event. Rated on a 7-point Likert scale (1 = Strongly disagree, 7 = Strongly agree), higher scores indicate greater levels of negative trauma-related cognitions. The Turkish adaptation by X and Y (2025) demonstrated good validity and reliability indices [$\chi^2/df = 1.76$, CFI = 0.98, IFI = 0.98, SRMR = 0.03]. The scale's reliability was supported by a Cronbach's alpha of .87, indicating that it is valid and reliable for use in the Turkish context. In the present study, the Cronbach's alpha was .86.

Post-traumatic safety-seeking behaviours (PSB)

Developed by Foulser et al. (2024), this scale measures safety-seeking behaviours employed by individuals to cope with the aftermath of a traumatic event. The 10-item measure uses a 5-point Likert scale (0 = Never, 5 = Always) and includes three subscales: avoidance, coping with negative thoughts and emotions and coping with threats to physical safety. The Turkish adaptation was conducted by X and Y (2025), reporting acceptable validity and reliability indices [χ^2 (148.218/32) = 4.63, CFI = 0.91, IFI = 0.91, SRMR = 0.06]. The scale demonstrated high internal consistency with a Cronbach's alpha of .92, confirming its validity and reliability within the Turkish context. In the present study, the Cronbach's alpha was found to be .90.

20448341, 0, Downloaded from https://bpspsychub.onlinelibrary.wiley.com/doi/10.1111/papt.70073 by Fatmanur Cimen - Ataturk University , Wiley Online Library on [27/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

International Trauma Questionnaire (ITQ)

Developed by Marylène Cloitre et al. (2018) in accordance with ICD-11 guidelines, the ITQ assesses symptoms experienced by individuals exposed to traumatic events. The 18-item scale uses a 5-point Likert scale (0 = Not at all true, 4 = Extremely true). The first six items assess the PTSD symptom clusters, including re-experiencing in the here and now, avoidance, and a persistent sense of threat. Another six items evaluate the DSO symptom clusters, which include affective dysregulation, negative self-concept and disturbances in relationships. Additionally, three items assess functional impairment for PTSD symptoms and three items assess functional impairment related to DSO symptoms. For a PTSD diagnosis, at least one symptom from each PTSD cluster (re-experiencing, avoidance and sense of threat) must be endorsed at a score of ≥2, along with at least one PTSD-related functional impairment item scored ≥2. For a CPTSD diagnosis, participants must first meet the PTSD criteria and, in addition, endorse at least one symptom from each DSO cluster (affective dysregulation, negative self-concept and disturbances in relationships) at a score of ≥2, together with at least one DSO-related functional impairment item scored ≥2. In line with ICD-11 diagnostic rules, participants meeting criteria for both PTSD and DSO dimensions are classified as having CPTSD rather than a separate PTSD diagnosis.

Previous studies have demonstrated that the ITQ shows good diagnostic agreement with structured clinical interviews for ICD-11 PTSD and CPTSD, supporting its clinical utility. The Turkish psychometric properties of the scale were examined by Gündoğmuş et al. (2023), reporting good model fit and Cronbach's alpha values of .91 for the PTSD dimension and .86 for the DSO dimension. Overall, the Turkish version was found to be valid and reliable. In the present study, Cronbach's alpha coefficients were .87 for the PTSD dimension, .86 for the DSO dimension and .91 for the entire scale.

Mental health continuum – short form (MHC-SF)

Developed by Keyes (2005), this scale assesses positive mental health experiences across three dimensions: emotional, psychological and social well-being. In the present study, the scale demonstrated high reliability with a Cronbach's alpha of .94. The measure consists of 14 items rated on a 6-point Likert scale, where higher scores indicate greater levels of positive mental health. The Turkish adaptation was conducted by Demirci and Akın (2015), reporting good fit indices [$\chi^2/df = 3.26$, RMSEA = 0.07, IFI = 0.97, CFI = 0.97, SRMR = 0.04] and a Cronbach's alpha of .90, supporting the scale's validity and reliability within the Turkish context. The current study's Cronbach's alpha was found to be .94.

Data analysis

Data analysis in this study was conducted step by step. First, skewness and kurtosis values were examined, and outliers were identified to assess whether the dataset met the assumptions for parametric testing. Relationships between variables were analysed using Pearson correlation in SPSS 21. After confirming that the data met parametric assumptions, structural equation modelling (SEM) was performed using AMOS 21. Before testing the hypothesized model, a measurement model was evaluated using confirmatory factor analysis to ensure that the variables were empirically distinct. Upon establishing good fit of the measurement model, SEM was conducted using the maximum likelihood estimation method. Model fit was assessed using chi-square (χ^2), Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA) and Standardized Root Mean Square Residual (SRMR). Acceptable model fit criteria were $\chi^2/df \leq 3$, CFI ≥ 0.90, and RMSEA and SRMR ≤ 0.08 (Kenny, 2015). To test mediation effects, bias-corrected nonparametric percentile bootstrap method was employed. Sampling was repeated 5000 times, and 95% confidence intervals were calculated. Mediation was considered statistically significant if the confidence interval did not include zero (Hayes, 2017).

20448341, 0, Downloaded from https://bpspsychub.onlinelibrary.wiley.com/doi/10.1111/papt.70073 by Fatmanur Cimen - Ataturk University , Wiley Online Library on [27/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

RESULTS

Preliminary analyses

Descriptive statistics for the dataset used in this study are presented in Table 2.

As shown in Table 2, significant positive correlations were observed among trauma memories, trauma identity, post-traumatic cognitions, post-traumatic safety-seeking behaviours, PTSD and CPTSD variables. Additionally, these variables demonstrated significant negative correlations with the mental health continuum. Examination of skewness and kurtosis values indicated that the data were normally distributed (skewness < |3| and kurtosis < |10|; Kline, 2011).

Measurement model

The measurement model tested for PTSD comprised six latent variables and 27 indicator variables, whereas the measurement model for CPTSD consisted of six latent variables and 23 indicator variables. The initial fit indices for Model 1 [$\chi^2/df = 2.46$; CFI = 0.91; RMSEA = 0.07; SRMR = 0.05] and Model 2 [$\chi^2/df = 2.86$; CFI = 0.91; RMSEA = 0.08; SRMR = 0.06] indicated acceptable model fit. All factor loadings for the indicators of the latent variables were significant, suggesting that each latent factor was well represented by its respective indicators. Furthermore, examination of the intercorrelations among latent variables showed that all correlations were significant and substantial in both Model 1 and Model 2 ($p < .01$).

Structural model for PTSD

After confirming acceptable fit for the measurement model of PTSD, the hypothesized structural model formulated in the study was tested. The model examined the chain mediation effect of trauma identity, post-traumatic safety-seeking behaviours and post-traumatic cognitions in the relationship between trauma memories and PTSD symptoms, assuming that PTSD symptoms directly predict mental health (Figure 2). Initial analyses indicated inadequate model fit indices [$\chi^2/df = 2.70$; CFI = 0.89; RMSEA = 0.07; SRMR = 0.08]. Accordingly, modification indices were examined and three modifications were applied between items 3 and 7, 7 and 8, and 7 and 2 of the trauma memories scale. After applying these modifications, the model fit indices improved to acceptable levels [$\chi^2/df = 2.58$; CFI = 0.90; RMSEA = 0.07; SRMR = 0.08].

Upon examining the significance of the paths among latent variables, the path between post-traumatic cognitions and CPTSD was found to be non-significant ($p > .01$). Therefore, this path was

TABLE 2 Descriptive statistics and correlation.

	Mean (SD)	Skew.	Kurt.	1	2	3	4	5	6	7
TM	13.04 (7.83)	.090	−.546	1	.631*	.557*	.720*	.697*	.731*	−.293*
TI	36.63 (23.40)	.465	−.568		1	.745*	.503*	.483*	.620*	−.408*
PTC	25.50 (11.41)	.523	−.472			1	.540*	.445*	.552*	−.362*
PSB	15.71 (8.89)	−.160	−.493				1	.616*	.651*	−.208*
PTSD	10.54 (5.52)	.134	−.630					1	.917*	−.194*
CPTSD	19.48 (10.39)	.248	−.623						1	−.286*
MH	35.54 (15.64)	−.069	−.584							1

Abbreviations: CPTSD, complex post-traumatic stress disorder; MH, mental health; PSB, post-traumatic safety-seeking behaviours; PTC, post-traumatic cognitions; PTSD, post-traumatic stress disorder; TI, trauma identity; TM, trauma memories.

*$p < .01$.

20448341, 0, Downloaded from https://bpspsychub.onlinelibrary.wiley.com/doi/10.1111/bjop.70073 by Fatmanur Cimen - Ataturk University , Wiley Online Library on [27/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

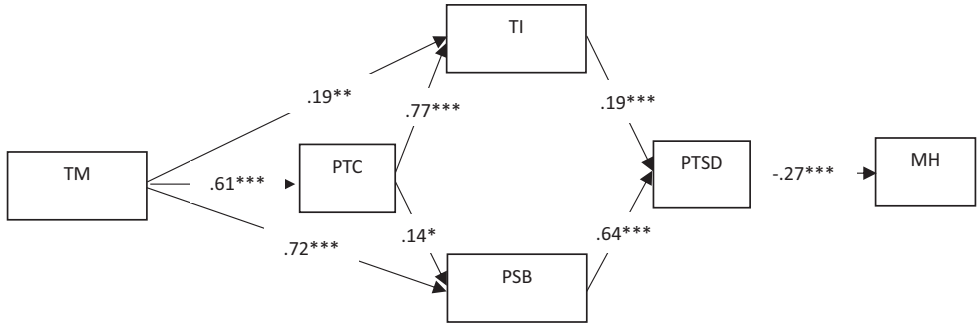


FIGURE 2 Serial mediation model for PTSD symptoms. MH, mental health; PSB, post-traumatic safety-seeking behaviours; PTC, post-traumatic cognitions; PTSD, post-traumatic stress disorder; TI, trauma identity; TM, trauma memories. *p<.05, **p<.01, ***p<.001.

removed, and the analysis was rerun. The repeated analysis demonstrated adequate model fit indices [χ^2/df=2.58; CFI=0.90; RMSEA=0.07; SRMR=0.08] with all paths in the model being statistically significant (p<.01). The final model is presented in Figure 2.

When examining the determination coefficients (R^2) for the endogenous variables in the model, it was found that trauma-related cognitions explained 37.1% of the variance (R^2=.371), trauma identity explained 80.2% of the variance (R^2=.802), post-traumatic safety-seeking behaviours explained 66.4% of the variance (R^2=.664), PTSD symptoms explained 59.0% of the variance (R^2=.590) and mental health continuum explained 7.1% of the variance (R^2=.071). The results indicated that trauma memories positively and significantly predicted trauma identity (β=.186, p<.01), post-traumatic safety-seeking behaviours (β=.730, p<.001) and trauma-related cognitions (β=.620, p<.001). Additionally, trauma-related cognitions positively and significantly predicted trauma identity (β=.769, p<.001), while trauma identity positively predicted PTSD symptoms (β=.193, p<.001). Thus, trauma identity was found to play a significant mediating role between trauma-related cognitions and PTSD symptoms. Similarly, there was a positive and significant predictive relationship between trauma-related cognitions and post-traumatic safety-seeking behaviours (β=.129, p<.05), and post-traumatic safety-seeking behaviours positively predicted PTSD symptoms (β=.636, p<.001). Therefore, post-traumatic safety-seeking behaviours also had a significant mediating effect between trauma-related cognitions and PTSD symptoms. Finally, PTSD symptoms negatively and significantly predicted the mental health continuum (β=−.267, p<.001).

The indirect effects based on the bootstrapping technique in the model are presented in Table 3.

When examining Table 3, it is observed that post-traumatic cognitions mediate the relationship between trauma memories and trauma identity (β=.46 [.34; .62]), as well as between trauma memories and post-traumatic safety-seeking behaviours (β=.08 [.01; .15]). Additionally, post-traumatic safety-seeking behaviours and trauma identity serve as mediators both between post-traumatic cognitions and CPTSD symptoms (β=.23 [.08; .36]) and between trauma memories and CPTSD symptoms (β=.64 [.55; .73]). Lastly, CPTSD symptoms mediate the relationship between trauma identity and mental health (β=−.05 [−.10; −.00]) as well as between post-traumatic safety-seeking behaviours and mental health (β=−.17 [−.27; −.72]). The results indicate that post-traumatic cognitions, post-traumatic safety-seeking behaviours and trauma identity can indirectly and negatively predict PTSD symptoms in the relationship between trauma memories and mental health. Moreover, CPTSD symptoms are significant negative predictors of mental health.

Structural model for CPTSD

After confirming that the measurement model for CPTSD demonstrated acceptable fit, the hypothesized model was tested. In this model, the mediating roles of trauma identity, post-traumatic

20448341, 0, Downloaded from https://bpspsychub.onlinelibrary.wiley.com/doi/10.1111/papt.70073 by Fatmanur Cimen - Ataturk University , Wiley Online Library on [27/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

TABLE 3 Indirect consequences between the variables.

	Indirect effect		Total effect	
Model pathways	**β [95% CI]**	***p***	**β [95% CI]**	***p***
TM → PTC → TI	0.46 [0.34; 0.62]	.01	0.65 [0.55; 0.72]	.01
TM → PTC → PSB	0.08 [0.01; 0.15]	.02	0.80 [0.72; 0.86]	.01
PTC → TI → CSSB → CPTSD	0.23 [0.08; 0.36]	.01	0.23 [0.08; 0.36]	.01
TM → TI → CSSB → CPTSD	0.64 [0.55; 0.73]	.01	0.64 [0.55; 0.73]	.01
TI → CPTSD → MH	−0.05 [−0.10; −0.00]	.02	−0.17 [−0.10; −0.00]	.02
CSSB → CPTSD → MH	−0.17 [−0.27; −0.72]	.01	−0.17 [−0.27; −0.07]	.01

Abbreviations: CPTSD, complex post-traumatic stress disorder; MH, mental health; PSB, post-traumatic safety-seeking behaviours; PTC, post-traumatic cognitions; PTSD, post-traumatic stress disorder; TI, trauma identity; TM, trauma memories.

safety-seeking behaviours and post-traumatic cognitions were examined in the relationship between trauma memories and CPTSD symptoms. It was also assumed that CPTSD symptoms directly predict mental health (Figure 3). The analysis results showed that the model demonstrated good fit and met acceptable fit indices [χ^2/df: 3.04; CFI: 0.90; RMSEA: 0.08; SRMR: 0.07]. When the paths between latent variables were examined, no significant predictive relationships were found between post-traumatic cognitions and CPTSD and between post-traumatic cognitions and safety-seeking behaviours ($p > .001$). To improve model fit, the suggested modifications (between items 2 and 7, and items 3 and 7 of the Trauma Memories Questionnaire, and between the first and second dimensions of the Post-Traumatic Cognitions Inventory) were applied. After applying the modifications, the model fit indices indicated that the model achieved acceptable fit [χ^2/df: 2.74; CFI: 0.92; RMSEA: 0.07; SRMR: 0.07]. Upon examining the significance of the paths in the model, the path between post-traumatic cognitions and CPTSD was found to be non-significant ($p > .001$), and this path was removed, followed by a re-analysis. The final model demonstrated acceptable fit indices [χ^2/df: 2.73; CFI: 0.92; RMSEA: 0.07; SRMR: 0.07], and all paths in the model were significant. The final model is presented in Figure 3.

When examining the determination coefficients (R^2) for the endogenous variables in the model, it was observed that the variance explained was 32.1% for post-traumatic cognitions ($R^2 = .321$), 71.9% for trauma identity ($R^2 = .710$), 64.5% for post-traumatic safety-seeking behaviours ($R^2 = .645$), 75.1% for CPTSD symptoms ($R^2 = .751$) and 16.7% for the mental health continuum ($R^2 = .167$). The results indicated that trauma memories positively and significantly predicted trauma identity (β = .288, $p < .001$), post-traumatic safety-seeking behaviours (β = .684, $p < .001$) and post-traumatic cognitions (β = .567, $p < .001$). Additionally, post-traumatic cognitions positively and significantly predicted trauma identity (β = .651, $p < .001$), and trauma identity positively and significantly predicted CPTSD symptoms (β = .461, $p < .001$). This suggests that trauma identity plays an important mediating role between post-traumatic cognitions and CPTSD symptoms. Furthermore, a positive and significant relationship was found between post-traumatic cognitions and post-traumatic safety-seeking behaviours (β = .185, $p < .001$), while post-traumatic safety-seeking behaviours positively and significantly predicted CPTSD symptoms (β = .508, $p < .001$). Therefore, post-traumatic safety-seeking behaviours also have an important mediating effect between post-traumatic cognitions and CPTSD symptoms. Finally, CPTSD was found to negatively and significantly predict the mental health continuum (β = −.409, $p < .001$). The indirect effects based on the bootstrap technique used to examine mediation effects in the model are presented in Table 4.

Upon examining Table 4, it was observed that post-traumatic cognitions serve as a mediator both between trauma memories and trauma identity (β = .47 [.29; .46]) and between trauma memories and post-traumatic safety-seeking behaviours (β = .10 [.04; .78]). Furthermore, post-traumatic safety-seeking behaviours and trauma identity act as mediators both between post-traumatic cognitions and CPTSD symptoms (β = .11 [.28; .48]) and between trauma memories and CPTSD symptoms (β = .35 [.62; .78]).

20448341, 0, Downloaded from https://bpspsychub.onlinelibrary.wiley.com/doi/10.1111/papt.70073 by Fatmanur Cimen - Ataturk University , Wiley Online Library on [27/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

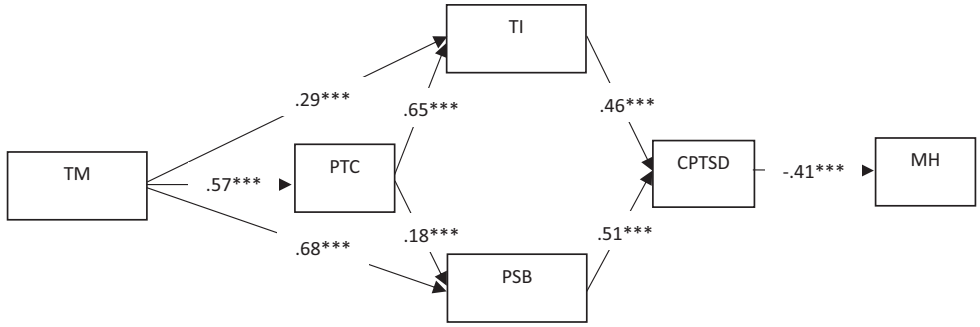


FIGURE 3 Serial mediation model for CPTSD symptoms. CPTSD, complex post-traumatic stress disorder; MH, mental health; PSB, post-traumatic safety-seeking behaviours; PTC, post-traumatic cognitions; TI, trauma identity; TM, trauma memories. ***$p < .001$.

TABLE 4 Indirect and total consequences between the variables.

	Indirect effect		Total effect	
Model pathways	**β [95% CI]**	***p***	**β [95% CI]**	***p***
TM → PTC → TI	0.47 [0.29; 0.46]	.01	0.65 [0.55; 0.72]	.01
TM → PTC → PSB	0.10 [0.04; 0.78]	.01	0.78 [0.70; 0.84]	.01
PTC → TI → PSB → CPTSD	0.11 [0.28; 0.48]	.01	0.39 [0.28; 0.48]	.01
TM → TI → PSB → CPTSD	0.35 [0.61; 0.78]	.01	0.70 [0.61; 0.78]	.01
TI → CPTSD → MH	−0.33 [−0.38; −0.19]	.01	−0.28 [−0.38; −0.19]	.01
PSB → CPTSD → MH	−0.09 [−0.30; −0.13]	.01	−0.20 [−0.30; −0.13]	.01

Abbreviations: CPTSD, complex post-traumatic stress disorder; MH, mental health; PSB, post-traumatic safety-seeking behaviours; PTC, post-traumatic cognitions; PTSD, post-traumatic stress disorder; TI, trauma identity; TM, trauma memories.

Finally, CPTSD symptoms mediate the relationship both between trauma identity and the mental health continuum (β = −.33 [−.38; −.19]) and between post-traumatic safety-seeking behaviours and mental health (β = −.09 [−.30; −.13]). These findings suggest that post-traumatic cognitions, post-traumatic safety-seeking behaviours and trauma identity indirectly and negatively predict CPTSD symptoms in the relationship between trauma memories and mental health. Moreover, CPTSD symptoms are significant negative predictors of mental health.

Alternative models

To determine the best multiple mediation model within the scope of this study, alternative models were tested in addition to the hypothesized model. In the first alternative model developed for PTSD, the mediating roles of trauma identity, post-traumatic cognitions and safety-seeking behaviours in the relationship between trauma memories and trauma symptoms were examined (Figure S1). In the second alternative model, the mediating role of trauma identity between trauma memories, safety-seeking behaviours and post-traumatic cognitions, as well as its effect on trauma symptoms, was investigated (Figure S2). Both alternative models were tested separately for PTSD and CPTSD symptoms. For PTSD symptoms, the fit indices of Alternative Model 1 [χ^2/df: 3.09; CFI: 0.87; RMSEA: 0.08; SRMR: 0.09] and Alternative Model 2 [χ^2/df: 2.69; CFI: 0.90; RMSEA: 0.07; SRMR: 0.08] were not superior to those of the hypothesized model (Table S1). Therefore, the hypothesized model was retained for PTSD. Similarly, the fit indices of Alternative Model 1 for CPTSD (Figure S3) [χ^2/df: 3.45; CFI: 0.88; RMSEA:

20448341, 0, Downloaded from https://bpspsychub.onlinelibrary.wiley.com/doi/10.1111/papt.70073 by Fatmanur Cimen - Ataturk University , Wiley Online Library on [27/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

0.09; SRMR: 0.09] and Alternative Model 2 (Figure S4) [χ^2/df: 2.88; CFI: 0.91; RMSEA: 0.08; SRMR: 0.08] also did not surpass the fit of the hypothesized model (Table S2). Thus, the hypothesized model for CPTSD was also accepted.

DISCUSSION

This study, conducted with individuals exposed to an earthquake, revealed that trauma-related memories lead to PTSD and CPTSD symptoms through post-traumatic cognitions, as well as via the mediating roles of post-traumatic safety-seeking behaviours and trauma identity. Moreover, PTSD and CPTSD symptoms were found to have a significantly negative impact on mental health. Specifically, the findings indicate that post-traumatic cognitions, post-traumatic safety-seeking behaviours, and trauma identity indirectly and negatively predict CPTSD symptoms in the relationship between trauma memories and mental health. Furthermore, CPTSD symptoms emerged as significant negative predictors of mental health, underscoring their profound role in psychological functioning following trauma exposure.

In explaining PTSD, trauma memories are regarded as a core component and are predictive of the progression of PTSD symptoms (Brewing, 2025). Although many individuals diagnosed with PTSD also experience depression and anxiety, trauma memories are reported to be the primary source of most psychological problems (Millon et al., 2018; Moore & Zoellner, 2007). In this context, considering the critical role of memory processes in PTSD, it is essential to understand the impact of trauma memories on PTSD (Dolan et al., 2020).

Due to their highly stressful nature, traumatic memories are stronger and more easily recalled than everyday memories (Clark & Mackay, 2015; Rubin, 2014). These memories tend to change over time and become associated with new contexts as they are recalled or avoided (Ehlers & Clark, 2000). In this regard, the repetition of traumatic memories has been shown to intensify trauma-related thoughts (Hu et al., 2014), and there is evidence of a reciprocal relationship between memory characteristics and negative appraisals (Beierl et al., 2020). A study by Kangaslampi and Peltonen (2020) demonstrated that positive changes in both the quality of traumatic memories and post-traumatic cognitions predicted reductions in PTSD symptoms. Furthermore, trauma-related negative appraisals have been found to precede changes in PTSD symptoms (Wiedemann et al., 2023), and it is well established that PTSD symptoms are maintained through avoidance of trauma-related cues and memories, as well as through negative beliefs (Foa et al., 2007). Although traumatized individuals often struggle to access and elaborate on positive autobiographical memories, therapeutic interventions targeting the recall of such memories have been shown to help address PTSD symptoms (Contractor et al., 2021, 2022). Additionally, it has been reported that negative post-traumatic cognitions may mediate changes in PTSD symptoms (Brown et al., 2019). Therefore, focusing on cognitive processes in the treatment of PTSD may lead to more effective and faster therapeutic outcomes (Nordahl et al., 2024).

Alongside cognitive-behavioural approaches, Eye Movement Desensitization and Reprocessing (EMDR) therapy also addresses maladaptive trauma-related beliefs through techniques such as cognitive interweaves, which aim to promote adaptive reappraisal and integration of traumatic memories (Shapiro & Brown, 2019). Empirical evidence from randomized controlled trials and meta-analytic studies supports the effectiveness of EMDR in the treatment of PTSD. For example, a meta-analysis by Chen et al. (2015) found that EMDR was slightly superior to cognitive-behavioural therapy in reducing overall PTSD symptoms, particularly intrusion and arousal symptoms. Similarly, Shapiro (2014) reported that multiple randomized controlled trials have consistently demonstrated the positive effects of EMDR on emotional trauma and adverse life experiences. In addition, the use of EMDR has increased following earthquakes and mass traumas in Türkiye, yielding promising results in field studies (Bozkaya, 2025). EMDR may therefore represent an effective intervention approach for trauma-related symptoms, particularly in natural disaster contexts (Mukba et al., 2020).

20448341, 0, Downloaded from https://bpspsychub.onlinelibrary.wiley.com/doi/10.1111/papt.70073 by Fatmanur Cimen - Ataturk University , Wiley Online Library on [27/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Evidence suggests that improvements in trauma-related cognitions, intrusive symptoms, hyperarousal and safety-related avoidance processes are clinically relevant across trauma-exposed populations (Goodson et al., 2025).

Another key finding of this study is that post-traumatic cognitions significantly predict post-traumatic safety-seeking behaviours. A common feature across various cognitive-behavioural theories of PTSD is the emphasis on the role of maladaptive threat appraisals and behavioural coping strategies, such as safety-seeking behaviours, in the development and maintenance of PTSD symptoms. Studies conducted with individuals exposed to different traumatic events have linked safety-seeking behaviours to PTSD symptomatology and treatment outcomes (Beierl et al., 2020; Ehlers et al., 2020, 2023). In a study involving assault and traffic accident survivors, Beierl et al. (2020) found that negative trauma-related appraisals and fragmented memories predicted the persistence of symptom severity both directly and indirectly through maladaptive strategies such as safety-seeking behaviours, responses to intrusions and persistent dissociation. Similarly, in a study conducted by Bedford and Schmidt (2023) with trauma-exposed individuals, those in the experimental group who received a safety behaviour reduction intervention—Safety Behaviour Elimination for Trauma Stress (SBETS)—demonstrated a significant reduction in PTSD symptoms compared to the control group. While current treatment approaches for PTSD primarily focus on restructuring distorted cognitions and exposure to traumatic memories, the potential benefit of eliminating safety-seeking behaviours remains relatively underexplored (Bedford & Schmidt, 2023). Thus, another contribution of the current study aligns with the notion that traumatic memories exert a significant influence on PTSD symptoms through the mediating roles of post-traumatic cognitions and safety-seeking behaviours.

Another significant finding of this study is that post-traumatic safety-seeking behaviours were more strongly associated with PTSD symptoms than with CPTSD symptoms. However, this finding should be interpreted with caution. From a theoretical perspective, CPTSD includes the core PTSD symptom clusters (i.e., re-experiencing, avoidance and hyperarousal), alongside DSO. Therefore, safety-seeking behaviours would be expected to show associations with both PTSD and CPTSD symptoms. One possible explanation for the observed difference may relate to measurement limitations rather than true theoretical distinctions. Specifically, existing measures of safety-seeking behaviours are primarily designed to capture fear-based and threat-related responses, such as hypervigilance, checking and avoidance, which are more closely aligned with PTSD symptom clusters (Alberici et al., 2018; Foulser et al., 2024; Goodson et al., 2025). These measures may not adequately capture behaviours associated with DSO symptoms, such as affect dysregulation, negative self-concept or interpersonal disturbances. In addition, traditional conceptualizations of safety-seeking behaviours may be overly restrictive, focusing predominantly on anxiety-driven threat management strategies (Çimen, Seçer, Alberici, & Meiser-Stedman, 2025). It is possible that individuals with CPTSD engage in a broader range of regulatory or compensatory behaviours that are not fully captured by current PTSD-focused safety behaviour measures. Therefore, the weaker association observed with CPTSD symptoms in this study may reflect a measurement issue rather than a lack of relevance of safety-seeking behaviours for CPTSD. Future research should aim to develop and validate assessment tools that capture a wider range of safety-related behaviours relevant to both PTSD and CPTSD symptomatology.

Another important finding of this study is that trauma identity has a stronger effect on CPTSD symptoms than on PTSD symptoms, according to the PTSD model. The concept of trauma identity is relatively new in the literature and has been conceptualized by Hyland et al. (2024) based on the M&I theory. According to this theory, trauma identities—formed or strengthened following exposure to traumatic experiences—play a causal role in the development of CPTSD symptom clusters. However, negative trauma identities have been reported to be unrelated to the re-experiencing dimension, which is one of the core symptoms of CPTSD. This aligns with the current study's finding that trauma identity is more strongly associated with CPTSD symptoms than with PTSD symptoms. To the best of the authors' knowledge, this is the first study to compare the associations of negative trauma identities with PTSD and CPTSD symptoms in line with the M&I theory.

20448341, 0, Downloaded from https://bpspsychub.onlinelibrary.wiley.com/doi/10.1111/papt.70073 by Fatmanur Cimen - Ataturk University , Wiley Online Library on [27/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

The final key finding of this study is that while both PTSD and CPTSD symptoms negatively impact mental health, the effect is significantly stronger for CPTSD symptoms. CPTSD is a severe mental health condition characterized not only by PTSD symptoms but also by disturbances in emotion regulation, self-concept and interpersonal relationships (Maercker et al., 2022). As such, CPTSD—when compared to PTSD alone—is associated with a broader range of psychological difficulties, including depression, anxiety, aggression, dissociation and borderline personality traits (Çimen & Seçer, 2025; Elklit et al., 2014; Hyland et al., 2018). Notably, CPTSD has been distinguished from PTSD by its association with higher levels of depression (Hyland et al., 2018). In line with this, individuals with CPTSD report significantly greater psychiatric burden and lower levels of psychological well-being compared to those with PTSD (Cloitre et al., 2019). Accordingly, CPTSD symptoms have been shown to be linked to reduced well-being (Ben-Ezra et al., 2018; Karatzias et al., 2018). Therefore, consistent with the findings of the present study, existing literature also indicates that CPTSD symptoms are more strongly associated with adverse mental health outcomes than PTSD symptoms.

Strengths and limitations

In this study, structural models based on both the cognitive model and the M&I model were tested to examine the emergence of PTSD and CPTSD symptoms and their effects on mental health in adults who experienced potentially traumatic events due to an earthquake. By integrating the cognitive model into the M&I framework, the study revealed that traumatic memories influence trauma identity and post-traumatic safety-seeking behaviours through post-traumatic cognitions. Moreover, by developing separate models for PTSD and CPTSD symptoms, it became possible to observe the distinct effects of traumatic memories, trauma-related cognitions, trauma identity and safety-seeking behaviours on each set of symptoms. The relationships of these structures with the mental health continuum were also examined comparatively. With these strengths, the study contributes to the limited literature by empirically testing theoretical models related to the development of PTSD and CPTSD symptoms, specifically within a sample of earthquake survivors.

However, the study has several limitations. The sample consisted solely of earthquake survivors, which limits the generalizability of the findings. It is therefore necessary to investigate PTSD and CPTSD symptoms in individuals exposed to other types of traumatic events, such as maltreatment, loss, bereavement and abuse. It should be noted that conducting the study online introduced certain limitations. Participation was limited to individuals with internet access and a device capable of completing the survey, which may have excluded some survivors in the affected areas. Additionally, distributing the survey link via social media may have introduced self-selection bias, as individuals who are more active online or more motivated to share their experiences could be overrepresented. These factors should be considered when interpreting the generalizability of the findings. Furthermore, the cross-sectional design of the study prevents the establishment of causal relationships between the variables. Longitudinal research is needed to better understand how these symptoms develop and are maintained over time.

AUTHOR CONTRIBUTIONS

Fatmanur Çimen: Conceptualization; investigation; writing – original draft; visualization; validation; methodology; formal analysis. **İsmail Seçer:** Supervision; project administration; writing – review and editing; methodology; conceptualization. **Abdurrahman Kasım Pakiş:** Data curation; writing – original draft. **Alice Alberici:** Supervision; writing – review and editing.

CONFLICT OF INTEREST STATEMENT

There are no conflicts of interest to declare.

DATA AVAILABILITY STATEMENT

The dataset related to the study is available from the authors upon request.

20448341, 0, Downloaded from https://bpspsychub.onlinelibrary.wiley.com/doi/10.1111/papt.70073 by Fatmanur Cimen - Ataturk University , Wiley Online Library on [27/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

ETHICS STATEMENT

This study complies with the 1964 Declaration of Helsinki and its subsequent amendments or comparable ethical standards and ethical approval for the research process was obtained from Atatürk University Scientific Research and Publication Ethics Committee.

ORCID

Fatmanur Çimen https://orcid.org/0000-0001-6068-430X

REFERENCES

AFAD. (2023). *06 Şubat 2023 Pazarcık-Elbistan (Kahramanmaraş) Mw: 7.7 – Mw: 7.6 Depremleri Raporu. 140 s*. https://deprem.afad.gov.tr/assets/pdf/Kahramanmara%C5%9F%20Depremi%20%20Raporu_02.06.2023.pdf

Akbari, M., Seydavi, M., Hosseini, Z. S., Krafft, J., & Levin, M. E. (2022). Experiential avoidance in depression, anxiety, obsessive-compulsive related, and posttraumatic stress disorders: A comprehensive systematic review and meta-analysis. *Journal of Contextual Behavioral Science*, *24*, 65–78. https://doi.org/10.1016/j.jcbs.2022.03.007

Alberici, A., Meiser-Stedman, R., Claxton, J., Smith, P., Ehlers, A., Dixon, C., & Mckinnon, A. (2018). The preliminary development and validation of a trauma-related safety-seeking behavior measure for youth: The child safety behavior scale (CSBS). *Journal of Traumatic Stress*, *31*(5), 643–653. https://doi.org/10.1002/jts.22332

Andualem, F., Melkam, M., Takelle, G. M., Nakie, G., Tinsae, T., Fentahun, S., Rtbey, G., Begashaw, T. D., Seid, J., Tegegn, L. F., Gedef, G. M., Bitew, D. A., & Godana, T. N. (2024). Prevalence of posttraumatic stress disorder and associated factors among displaced people in Africa: A systematic review and meta-analysis. *Frontiers in Psychiatry*, *15*, 1336665. https://doi.org/10.3389/fpsyt.2024.1336665

Bedford, C. E., & Schmidt, N. B. (2023). Efficacy of a novel safety behavior elimination intervention for posttraumatic stress symptoms: Results from a randomized controlled trial. *Journal of Affective Disorders*, *339*, 640–647. https://doi.org/10.1016/j.jad.2023.07.002

Beierl, E. T., Böllinghaus, I., Clark, D. M., Glucksman, E., & Ehlers, A. (2020). Cognitive paths from trauma to posttraumatic stress disorder: A prospective study of Ehlers and Clark's model in survivors of assaults or road traffic collisions. *Psychological Medicine*, *50*, 2172–2181. https://doi.org/10.1017/S0033291719002253

Ben-Ezra, M., Karatzias, T., Hyland, P., Brewin, C. R., Cloitre, M., Bisson, J. I., Roberts, N. P., Lueger-Schuster, B., & Shevlin, M. (2018). Posttraumatic stress disorder (PTSD) and complex PTSD (CPTSD) as per ICD-11 proposals: A population study in Israel. *Depression and Anxiety*, *35*, 264–274. https://doi.org/10.1002/da.22723

Birkley, E. L., Eckhardt, C. I., & Dykstra, R. E. (2016). Posttraumatic stress disorder symptoms, intimate partner violence, and relationship functioning: A meta-analytic review. *Journal of Traumatic Stress*, *29*(5), 397–405. https://doi.org/10.1002/jts.22129

Bisson, J. I., Wright, L. A., Jones, K. A., Lewis, C., Phelps, A. J., Sijbrabdij, M., Varker, T., & Roberts, N. P. (2021). Preventing the onset of post traumatic stress disorder. *Clinical Psychology Review*, *86*, 102004. https://doi.org/10.1016/j.cpr.2021.102004

Bozkaya, A. (2025). Post-traumatic stress disorder and the effectiveness of EMDR therapy. *International Journal of Multidisciplinary Research and Growth Evaluation*, *6*(4), 1378–1384. https://doi.org/10.54660/.IJMRGE.2025.6.4.1378-1384

Brewing, C. R. (2025). Key concepts, methods, findings, and questions about traumatic memories. *Journal of Traumatic Stress*, *38*, 1–10. https://doi.org/10.1002/jts.23164

Brown, L. A., Belli, G. M., Asnaani, A., & Foa, E. B. (2019). A review of the role of negative cognitions about oneself, others, and the world in the treatment of PTSD. *Cognitive Therapy and Research*, *43*(1), 143–173. https://doi.org/10.1007/s10608-018-9938-1

Chen, L., Zhang, G., Hu, M., & Liang, X. (2015). Eye movement desensitization and reprocessing versus cognitive-behavioral therapy for adult posttraumatic stress disorder: Systematic review and meta-analysis. *The Journal of Nervous and Mental Disease*, *203*(6), 443–451. https://doi.org/10.1097/NMD.0000000000000306

Çimen, F., & Seçer, İ. (2025). The psychometric properties of the international trauma questionnaire–child and adolescent version in Turkish culture. *European Journal of Psychotraumatology*, *16*(1), 2590402. https://doi.org/10.1080/20008066.2025.2590402

Çimen, F., Seçer, İ., Alberici, A., & Meiser-Stedman, R. (2025). Psychometric evaluation of the Turkish adapted post-traumatic safety-seeking Behaviours scale (CSBS) and network analysis of PTSD symptoms in earthquake-exposed children and adolescents. *Clinical Child Psychology and Psychiatry*, *31*, 13591045251396299. https://doi.org/10.1177/13591045251396299

Çimen, F., Seçer, İ., & Pakiş, A. K. (2025). Assessment of PTSD and CPTSD symptoms in children and adolescents exposed to earthquakes: An evaluation using latent profile. *Clinical Psychology & Psychotherapy*, *32*(6), e70168. https://doi.org/10.1002/cpp.70168

Clark, I. A., & Mackay, C. E. (2015). Mental imagery and post-traumatic stress disorder: A neuroimaging and experimental psychopathology approach to intrusive memories of trauma. *Frontiers in Psychiatry*, *6*, 104. https://doi.org/10.3389/fpsyt.2015.00104

20448341, 0, Downloaded from https://bpspsychub.onlinelibrary.wiley.com/doi/10.1111/papt.70073 by Fatmanur Cimen - Ataturk University , Wiley Online Library on [27/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Cloitre, M., Hyland, P., Bisson, J. I., Brewin, C. R., Roberts, N. P., Karatzias, T., & Shevlin, M. (2019). ICD-11 posttraumatic stress disorder and complex posttraumatic stress disorder in the United States: A population-based study. *Journal of Traumatic Stress*, *32*(6), 833–842. https://doi.org/10.1002/jts.22454

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

Contractor, A. A., Banducci, A. N., & Weiss, N. H. (2022). Critical considerations for the positive memory-posttraumatic stress disorder model. *Clinical Psychology & Psychotherapy*, *29*(1), 81–91. https://doi.org/10.1002/cpp.2599

Contractor, A. A., Weiss, N. H., & Shea, M. T. (2021). Processing of positive memories technique (PPMT) for posttraumatic stress disorder: A primer. *Journal of Psychotherapy Integration*, *31*(2), 195–207. https://doi.org/10.1037/int0000239

Demirci, I., & Akın, A. (2015). The validity and reliability of the mental health continuum short form. *Ankara University, Journal of Faculty of Educational Sciences*, *48*(1), 49–56.

Dolan, M., Contractor, A. A., Ryals, A. J., & Weiss, N. H. (2020). Trauma, posttraumatic stress disorder severity, and positive memories. *Memory*, *28*(8), 998–1013. https://doi.org/10.1080/09658211.2020.1809679

Ehlers, A., & Clark, D. M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research and Therapy*, *38*, 319–345. https://doi.org/10.1016/S0005-7967(99)00123-0

Ehlers, A., Wild, J., Warnock-Parkes, E., Grey, N., Murray, H., Kerr, A., Rozental, A., Beierl, E. T., Tsiachristas, A., Perera-Salazar, R., Andersson, G., & Clark, D. M. (2020). A randomised controlled trial of therapist-assisted online psychological therapies for posttraumatic stress disorder (STOP-PTSD): Trial protocol. *Trials*, *21*(1), 355. https://doi.org/10.1186/s13063-020-4176-8

Ehlers, A., Wild, J., Warnock-Parkes, E., Grey, N., Murray, H., Kerr, A., Rozental, A., Thew, G., Janecka, M., Beierl, E. T., Tsiachristas, A., Perera-Salazar, R., Andersson, G., & Clark, D. M. (2023). Therapist-assisted online psychological therapies differing in trauma focus for post-traumatic stress disorder (STOP-PTSD): A UK-based, single-blind, randomised controlled trial. *The Lancet Psychiatry*, *10*(8), 608–622. https://www.thelancet.com/journals/lanpsy/article/PIIS2215-0366(23)00181-5/fulltext

Elklit, A., Hyland, P., & Shevlin, M. (2014). Evidence of symptom profiles consistent with posttraumatic stress disorder and complex posttraumatic stress disorder in different trauma samples. *European Journal of Psychotraumatology*, *5*, 24221. https://doi.org/10.3402/ejpt.v5.24221

Fekete, M. (2024). Updating a social cognitive model of PTSD: Implications for cross-group PTSD research. *Current Psychology*, *43*, 18951–18959. https://doi.org/10.1007/s12144-024-05707-0

Foa, B. E., Hembree, E. A., & Rothbaum, B. O. (2007). *Prolonged exposure for PTSD emotional processing of traumatic experiences*. Oxford.

Foa, E. B., Ehlers, A., Clark, D. M., Tolin, D. F., & Orsillo, S. M. (1999). The posttraumatic cognitions inventory (PTCI): Development and validation. *Psychological Assessment*, *11*(3), 303–314.

Ford, J. D., Grasso, D. J., Elhai, J. D., & Courtois, C. A. (2015). *Posttraumatic stress disorder: Scientific and professional dimensions*. Academic Press.

Foulser, A. A., Rubin, M., & Telch, M. J. (2024). Psychometric evaluation of a measure of posttraumatic safety behaviors. *Cognitive and Behavioral Practice*, *32*(4), 474–486. https://doi.org/10.1016/j.cbpra.2024.03.003

Futterman, I. D., Grace, H., Weingarten, S., Borjian, A., & Clare, C. A. (2021). Maternal anxiety, depression and posttraumatic stress disorder (PTSD) after natural disasters: A systematic review. *The Journal of Maternal-Fetal & Neonatal Medicine*, *36*(1), 2199345. https://doi.org/10.1080/14767058.2023.2199345

Goodson, J. T., Fraizer, M. E., Haeffel, G. J., Brewczynski, J., Baker, L., Woolston, C., Asnaani, A., & Roberge, E. M. (2025). Development and validation of the safety behavior assessment form-PTSD scale. *Behavioral Science*, *15*(9), 1248. https://doi.org/10.3390/bs15091248

Gündoğmuş, İ., Ünsal, C., Alma, L., & Par, A. (2023). Psychometric properties of the Turkish version of the international trauma questionnaire. *Journal of Aggression, Maltreatment & Trauma*, *32*(12), 1847–1865. https://doi.org/10.1080/10926771.2023.2177571

Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford publications.

Hu, E., Koucky, E. M., Brown, W. J., Bruce, S. E., & Sheline, Y. I. (2014). The role of rumination in elevating perceived stress in posttraumatic stress disorder. *Journal of Interpersonal Violence*, *29*, 1953–1962. https://doi.org/10.1177/0886260513511697

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., Fyvie, C., & Karatzias, T. (2018). Posttraumatic stress disorder and complex posttraumatic stress disorder in DSM-5 and ICD-11: Clinical and behavioral correlates. *Journal of Traumatic Stress*, *31*, 1–7. https://doi.org/10.1002/jts.22272

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*, 102898. https://doi.org/10.1016/j.janxdis.2024.102898

Jellestad, L., Vital, N. A., Malamud, J., Taeymans, J., & Mueller-Pfeiffer, C. (2021). Functional impairment in posttraumatic stress disorder: A systematic review and meta-analysis. *Journal of Psychiatric Research*, *136*, 14–22. https://doi.org/10.1016/j.jpsychires.2021.01.039

20448341, 0, Downloaded from https://bpspsychub.onlinelibrary.wiley.com/doi/10.1111/papt.70073 by Fatmanur Cimen - Ataturk University , Wiley Online Library on [27/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Jones, K., Boschen, M., Devilly, G., Vagler, J., Flowers, H., Winkleman, C., & Wullschleger, M. (2024). Risk and protective factors that predict posttraumatic stress disorder after traumatic injury: A systematic review. *Health Sciences Review*, *10*, 100147. https://doi.org/10.1016/j.hsr.2023.100147

Kangaslampi, S., & Peltonen, K. (2020). Changes in traumatic memories and posttraumatic cognitions associate with PTSD symptom improvement in treatment of multiply traumatized children and adolescents. *Journal of Child & Adolescent Trauma*, *13*, 103–112. https://doi.org/10.1007/s40653-019-00255-3

Karaarslan, İ., Yavuz, B., Özdemir, S., Çakar, S., & Tatlı, M. (2023). Investigation of state anxiety levels of primary school teachers after 6 February Kahramanmaraş earthquakes. *International Journal of Social and Humanities Sciences Research (JSHSR)*, *10*(97), 1560–1564. https://doi.org/10.5281/zenodo.8200759

Karatzias, T., Hyland, P., Ben-Ezra, M., & Shevlin, M. (2018). Hyperactivation and hypoactivation affective dysregulation symptoms are integral in complex posttraumatic stress disorder: Results from a nonclinical Israeli sample. *International Journal of Methods in Psychiatric Research*, *27*, e1745. https://doi.org/10.1002/mpr.1745

Kenny, D. A. (2015). Measuring model fit. https://davidakenny.net/cm/fit.htm

Keyes, C. L. M. (2005). Mental illness and/or mental health? Investigating axioms of the complete state model of health. *Journal of Consulting and Clinical Psychology*, *73*, 539–548. https://doi.org/10.1037/0022-006X.73.3.539

Kline, R. B. (2011). *Principles and practice of structural equation modeling*. The Guilford Press.

Lai, B. S., Greca, A. M. L., Brincks, A., Colgan, C. A., D'Amico, M. P., Lowe, S., & Kelley, M. L. (2021). Trajectories of posttraumatic stress in youths after natural disasters. *JAMA Network Open*, *4*(2), e2036682. https://doi.org/10.1001/jamanetworkopen.2020.36682

Lewis, C., Lewis, K., Kitchiner, N., Isaac, S., Jones, I., & Bisson, J. I. (2019). Sleep disturbance in post-traumatic stress disorder (PTSD): A systematic review and meta-analysis of actigraphy studies. *European Journal of Psychotraumatology*, *11*(1), 1767349. https://doi.org/10.1080/20008198.2020.1767349

Liu, H., Petukhova, M. V., Sampson, N. A., Aguilar-Gaxiola, S., Alonso, J., Andrade, L. H., Bromet, E. J., De Girolamo, G., Haro, J. M., Hinkov, H., & Kawakami, N. (2017). Association of DSM-IV posttraumatic stress disorder with traumatic experience type and history in the World Health Organization world mental health surveys. *JAMA Psychiatry*, *74*(3), 270–281. https://doi.org/10.1001/jamapsychiatry.2016.3783

Lofthouse, K., Beeson, E., Dalgleish, T., Danese, A., Hodgekins, J., Mahoney-Davies, G., Smith, P., Stallard, P., Wilson, J., & Meiser-Stedman, R. (2024). Characteristics of complex posttraumatic stress disorder (PTSD) in young people with PTSD following multiple trauma exposure. *Journal of Child Psychology and Psychiatry*, *65*(6), 822–831. https://doi.org/10.1111/jcpp.13918

Maercker, A., Bernays, F., Rohner, S. L., & Thoma, M. V. (2022). A cascade model of complex posttraumatic stress disorder centered on childhood trauma and maltreatment, attachment, and socio-interpersonal factors. *Journal of Traumatic Stress*, *35*(2), 446–460. https://doi.org/10.1002/jts.22756

Millon, E. M., Chang, H. Y. M., & Shors, T. J. (2018). Stressful life memories relate to ruminative thoughts in women with sexual violence history, irrespective of PTSD. *Frontiers in Psychiatry*, *9*, 311. https://doi.org/10.3389/fpsyt.2018.00311

Moore, S. A., & Zoellner, L. A. (2007). Overgeneral autobiographical memory and traumatic events: An evaluative review. *Psychological Bulletin*, *133*, 419–437. https://doi.org/10.1037/0033-2909.133.3.419

Mukba, G., Tanrıverdi, S., & Tanhan, F. (2020). Investigation of the efficacy of EMDR in earthquake trauma: Case report. *Cukurova Universıty Faculty of Educatıon Journal*, *49*(1), 477–500. https://doi.org/10.14812/cufej.567439

Nordahl, J., Johnson, S. U., & Evi, O. (2024). Cognitions and metacognitive beliefs in posttraumatic stress disorder. *Clinical Psychology & Psychotherapy*, *31*(4), e3031. https://doi.org/10.1002/cpp.3031

Quan, L., Lu, W., Zhen, R., & Zhou, X. (2023). Post-traumatic stress disorders, anxiety, and depression in college students during the COVID-19 pandemic: A cross-sectional study. *BMC Psychiatry*, *23*, 228. https://doi.org/10.1186/s12888-023-04660-9

Rubin, D. C. (2014). Schema-driven construction of future autobiographical traumatic events: The future is much more troubling than the past. *Journal of Experimental Psychology. General*, *143*, 612–630. https://doi.org/10.1037/a0032638

Shapiro, F. (2014). The role of eye movement desensitization and reprocessing (EMDR) therapy in medicine: Addressing the psychological and physical symptoms stemming from adverse life experiences. *The Permanente Journal*, *18*(1), 71–77. https://doi.org/10.7812/TPP/13-098

Shapiro, R., & Brown, L. S. (2019). Eye movement desensitization and reprocessing therapy and related treatments for trauma: An innovative, integrative trauma treatment. *Practice Innovations*, *4*(3), 139–155. https://doi.org/10.1037/pri0000092

Taşkın, M., Baş, k., & Uçak, E. F. (2025). Post-traumatic stress disorder (PTSD) in disaster survivors 1 year after the 2023 Kahramanmaras earthquake in Turkey. *European Journal of Trauma & Dissociation*, *9*(1), 100504. https://doi.org/10.1016/j.ejtd.2025.100504

Wells, S. Y., Morland, L. A., Torres, E. M., Kloezeman, K., Mackintosh, M. A., & Aarons, G. A. (2019). The development of a brief version of the posttraumatic cognitions inventory (PTCI-9). *Assessment*, *26*(2), 193–208. https://doi.org/10.1177/1073191116685401

Wiedemann, M., Janecka, M., Wild, J., Warnock-Parkes, E., Stott, R., Grey, N., Clark, D. M., & Ehlers, A. (2023). Changes in cognitive processes and coping strategies precede changes in symptoms during cognitive therapy for posttraumatic stress disorder. *Behaviour Research and Therapy*, *169*, 104407. https://doi.org/10.1016/j.brat.2023.104407

20448341, 0, Downloaded from https://bpspsychub.onlinelibrary.wiley.com/doi/10.1111/papt.70073 by Fatmanur Cimen - Ataturk University , Wiley Online Library on [27/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Wiseman, T. A., Curtis, K., & Foster, K. (2015). Incidence of depression, anxiety and stress following traumatic injury: A longitudinal study. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine*, *23*, 29. https://doi.org/10.1186/s13049-015-0109-z

World Health Organization. (2018). *ICD-11: International classification of diseases 11th revision*. WHO.

Yalım, E., & Ünsal, C. (2025). Post-traumatic stress disorder (PTSD) and complex PTSD (C-PTSD) according to ICD-11: A study conducted in Turkiye following the Kahramanmaras earthquake. *Turkish Journal of Traumatic Stress*, *1*(1), 37–45. https://doi.org/10.63175/tjts.14

Zhao, J.-J., Chen, Q., Yang, Y.-H., & Xu, Q. (2023). Coseismic faulting model and post-seismic surface motion of the 2023 Turkey–Syria earthquake doublet revealed by InSAR and GPS measurements. *Remote Sensing*, *15*(13), 3327.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

Appendix S1

How to cite this article: Çimen, F., Seçer, İ., Pakiş, A. K., & Alberici, A. (2026). Determinants of mental health in earthquake survivors: Trauma memories, cognitions, identity and safety-seeking behaviours in PTSD and CPTSD models. *Psychology and Psychotherapy: Theory, Research and Practice*, *00*, 1–18. https://doi.org/10.1111/papt.70073

20448341, 0, Downloaded from https://bpspsychub.onlinelibrary.wiley.com/doi/10.1111/papt.70073 by Fatmanur Cimen - Ataturk University , Wiley Online Library on [27/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License