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# PTSD and CPTSD in the new ICD-11 – A latent profile analysis

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## ARTICLE INFO

## ABSTRACT

In the 11th version of the WHOs International Classification of Diseases, complex post-traumatic stress disorder (CPTSD) is newly recognized as a variant of PTSD, characterized by additional and more severe symptoms and typically arising from prolonged or multiple traumatic experiences. Despite recent research supporting the differentiation between PTSD and CPTSD, studies also identify a third or even a fourth latent profile in trauma patients. This study employs latent profile analysis to identify the number of latent profiles within a clinical trauma population in Germany ($N = 588$) and aims to investigate their distinct symptomatology. The results of the present study reveal three latent profiles: two profiles similar to PTSD and CPTSD, and a third profile with a distinctively low quality of life that does not fit neatly into either category. This supports the updated classification in the ICD-11 but also aligns with previous research having identified more than two profiles. The present study provides a comprehensive examination of the distinct symptomatology of latent trauma profiles, enabling the development of tailored interventions.

## 1. Introduction

Approximately 70% of individuals worldwide have experienced at least one traumatic event in their lifetime (Benjet et al., 2016). Furthermore, approximately 31% of the general population have experienced four or more traumatic events (Benjet et al., 2016). Traumatic events, according to the International Classification of Diseases (ICD), are defined as experiencing or witnessing an exceptionally threatening or catastrophic stressful event (ICD-10, World Health Organization (WHO), 2019). The most common traumatic experiences are unexpected death of a loved one, robbery, car accidents, and illness, injury or death (Benjet et al., 2016).

Post-traumatic stress disorder (PTSD) is a common mental health disorder resulting from exposure to traumatic events and characterized by three main symptom clusters, namely recurring intrusive thoughts or images of the traumatic event, avoidance of anything associated with the traumatic event, and a state of hyperarousal (ICD-10, WHO, 2019). Other symptoms commonly associated with PTSD are symptoms of insomnia (Short et al., 2022; Werner et al., 2021), depression and

anxiety (Choi et al., 2023), contemplation of suicidal thoughts and intentions (Shannonhouse et al., 2022), and reduced quality of life (QoL) (Balayan et al., 2014; Pagotto et al., 2015). Women may be at risk for higher immediate psychological stress responses following traumatic experiences, including symptoms of anxiety, depression, or acute stress disorder, compared to men (Haering et al., 2024). Even though men are more susceptible to experiencing traumatic events (Tolin & Foa, 2006), in most countries, women tend to report a higher lifetime prevalence of PTSD than men (Ben-Ezra et al., 2018; Cloitre et al., 2019).

In the 11th Version of the WHO's International Classification of Diseases (ICD-11; WHO, 2022), a new diagnostic category of PTSD, the so-called complex post-traumatic stress disorder (CPTSD) has been recognized. CPTSD includes three additional symptom clusters to those of PTSD, namely affect dysregulation, negative self-concept (i.e., beliefs about oneself as diminished, defeated, or worthless), and difficulties in forming and maintaining relationships (ICD-11, WHO, 2022; Maercker et al., 2022). Generally, CPTSD has been associated with more severe functional impairment, greater comorbidity, and lower QoL than PTSD (Cloitre et al., 2020). Prevalence rates for CPTSD tend to be lower than

for PTSD and similar between women and men (Lonnen & Paskell, 2024).

Both PTSD and CPTSD diagnoses depend on the presence of a traumatic event (ICD-11, WHO, 2022). However, CPTSD is thought to result from multiple or prolonged exposures to traumatic events from which escape is difficult or impossible (polytrauma; ICD-11, WHO, 2022), particularly interpersonal trauma, such as repeated childhood sexual or physical abuse, prolonged domestic violence, or war violence (Ford, 2017; ICD-11, WHO, 2022), rather than from natural disasters or accidents (Brewin, 2020). However, the type of trauma is a risk factor rather than a requirement for the CPTSD diagnosis (Maercker et al., 2022).

The validity of the ICD-11 CPTSD diagnosis using latent class analysis (LCA) or latent profile analysis (LPA) has been subject to a scientific debate (Achterhof et al., 2019). Despite this debate, consistent evidence shows discriminant validity, differentiating between PTSD and CPTSD (Cloitre et al., 2020; Ford, 2020). However, a growing number of studies find that symptoms after a traumatic event can be classified into more than two profiles or clusters (e.g. Cloitre et al., 2013; Knefel et al., 2015; Liddell et al., 2019). For example, next to clusters/profiles resembling PTSD and CPTSD, a third cluster/profile was characterized through moderate to low (C)PTSD symptom severity but higher scores on disturbances in self-organization (Cloitre et al., 2020; Knefel et al., 2015; Liddell et al., 2019). The presence of this third cluster/profile suggests that trauma-exposed individuals may manifest distress and impairment beyond the scope of traditional PTSD diagnostic categories (Cloitre et al., 2020; Ford, 2020). More specifically, individuals in this third cluster/profile may exhibit symptoms reminiscent of other mental health conditions such as dysthymia, borderline personality disorder, or generalized anxiety disorder (Ford, 2020; Knefel et al., 2015). Other studies are even finding four or more LPA classes, next to classes representing PTSD and CPTSD, that do not fulfill all criteria for trauma-related disorders but rather present with similar symptomatology of PTSD/CPTSD (Ford 2020; Folke et al., 2019; Liddell et al., 2019). Thus, further research is needed to explore the specific symptomatology and correlates associated with the other clusters/profiles (Cloitre et al., 2020). The investigation of differential symptomatology and outcomes among individuals who have experienced traumatic events can help in informing more tailored and effective treatment protocols (Cloitre et al., 2020).

The current study focuses on investigating latent profiles in the symptoms of PTSD and CPTSD in a clinical population in Germany seeking treatment in a psychosomatic-psychotherapeutic outpatient clinic after traumatic experiences. Scientific debates about the validity of these (C)PTSD diagnoses (Achterhof et al., 2019) and the emergence of additional clusters/profiles (Knefel et al., 2015; Liddell et al., 2019) indicate the need for further exploration. The primary objective of this study is, therefore, to determine whether distinct latent profiles can be identified among individuals seeking treatment after traumatic events by using LPA. Specifically, the study aims to exploratively identify the number of distinct profiles within a clinical population and to characterize the symptomatology associated with each profile.

The study hypothesizes, in line with the ICD-11 classification system, the presence of two primary profiles: one representing PTSD symptoms and another representing the expanded symptoms characteristic of CPTSD (Cloitre et al., 2020; Ford, 2020; ICD-11, WHO, 2022). As CPTSD is associated with polytrauma (ICD-11; WHO, 2022), it is hypothesized that a profile representing CPTSD is characterized by high levels of trauma symptoms, a higher experience of childhood trauma, and a higher frequency of polytrauma. In contrast, a profile representing PTSD is hypothesized to be characterized by a lower symptomatic, lower childhood trauma experience, and a higher frequency of monotrauma. Additionally, the study will explore the existence and characteristics of potential additional profiles as found in previous studies (Knefel et al., 2015; Liddell et al., 2019).

## 2. Methods

### 2.1. Participants and procedure

This study is reported according to the 'Strengthening the Reporting of Observational Studies in Epidemiology' (STROBE) guidelines for cross-sectional studies (Von Elm et al., 2007) and received approval from the ethical committee of the Medical Faculty at the University of Duisburg-Essen (24–11,835-BO).

The study sample consisted of 588 German-speaking patients of the outpatient department of the Clinic for Psychosomatic Medicine and Psychotherapy, LVR-University Hospital Essen, University of Duisburg-Essen from July 2021 to January 2024. The patients approached the outpatient department for a consultation meeting after traumatic experiences and received routine questionnaires prior to the consultation regarding their sociodemographic characteristics, psychological health, and specifically related to traumatic experiences or trauma-related disorders. Within the consultation meeting, the presence of a trauma-related disorder as well as any other comorbid disorders has been evaluated based on clinical judgement and diagnostic criteria of the ICD-10. Electronic informed consent was obtained from all participants and data analysis was executed retrospectively.

### 2.2. Measures

Sociodemographic variables such as gender, age, education, relationship and occupational status were assessed. Additionally, the following standardized questionnaires were applied.

#### 2.2.1. Impact of event scale revised

The validated German version of the Impact of Events Scale revised version (IES-R) was used to measure PTSD symptoms (Maercker, & Schützwohl, 1998). The IES-R is the revised version of the original IES by Horowitz et al. (1979). In this questionnaire, participants are asked to describe their traumatic experience(s) in a few sentences. It consists of three sub-scales, which refer to the symptom clusters of PTSD: intrusion (7 items), avoidance (8 items), and hyperarousal (7 items). The 22 items of the instrument are rated on a 4-point Likert scale (from 0 = "not at all" to 5 = "often") and sums for each sub-scale are calculated. In this sample, the IES-R subscales intrusion, avoidance, and hyperarousal showed internal consistencies of α = 0.88, α = 0.73, and α = 0.84, respectively.

#### 2.2.2. Childhood trauma questionnaire

The validated German version of the Childhood Trauma Questionnaire (CTQ) was used to measure childhood adversity (Klinitzke et al., 2012). The original version has been developed by Bernstein et al. (2003). The questionnaire includes 28 items rated on a 5-point Likert scale (from 1 = "not at all" to 5 = "very often") and includes five sub-scales that assess childhood experiences of emotional abuse (5 items), physical abuse (5 items), sexual abuse (5 items), emotional neglect (5 items), and physical neglect (5 items). One additional sub-scale measures denial of childhood trauma (3 items). Sum scores are calculated for each subscale. The cut-off scores, determining whether a person's childhood adversity experiences classify as mild, moderate, severe, or extremely severe, vary per subscale. For emotional abuse, a sum score of 5–8 indicates minimal exposure, 9–12 moderate exposure, 13–15 severe exposure, and 16–25 very severe exposure. For physical abuse, a score of 5–7 indicates minimal exposure, 8–9 moderate exposure, 10–12 severe exposure, and 13–25 very severe exposure. For sexual abuse, a score of 5 indicates minimal exposure, 6–7 moderate exposure, 8–12 severe exposure, and 13–25 very severe exposure. For emotional neglect, a score of 5–9 indicates minimal exposure, 10–14 moderate exposure, 15–17 severe exposure, and 18–25 very severe exposure. For physical neglect, 5–7 minimal exposure, 8–9 moderate exposure, 10–12 severe exposure, and 13–25 very severe exposure. In this sample, the

CTQ subscales emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect showed internal consistencies of α = 0.92, α = .90, α = 0.95, α = 0.93, and α = 0.73, respectively.

### 2.2.3. World health organization's quality of life

The German translation of the short version of the World Health Organization's Quality of Life questionnaire (WHOQOL-BREF; Skevington et al., 2004) was employed. The questionnaire assesses participants' self-reported QoL over the past two weeks with 26 items that are rated on a 5-point Likert scale (e.g. from 1 = "not at all" to 5 = "totally"). The QoL is assessed in four health domains (physical health (7 items), psychological health (6 items), social relationships (3 items), and environment (8 items)) and a global QoL score (2 items) with sum scores ranging from 4–20. For interpretation, the scales are transformed to values ranging from 0–100 (Skevington et al., 2004). The WHOQOL-BREF scales global, physical health, psychological health, social relationships, and environment showed internal consistencies of α = 0.80, α = 0.81, α = 0.88, α = .85, and α = 0.94, respectively.

### 2.2.4. Insomnia severity index

The validated German version of the Insomnia Severity Index (ISI) was used to assess sleep difficulties (Gerber et al., 2016). The original version was developed by Bastien et al. (2001). The questionnaire consists of seven items that are rated on a 5-point Likert scale (e.g. from 0 = "very satisfied" to 4 = "very dissatisfied") and then summed to a total score ranging from 0–28. A total score of 0–7 reflects absence of insomnia, 8–14 reflects sub-threshold insomnia, 15–21 reflects moderate insomnia, and 22–28 reflects severe insomnia. In this sample, the ISI showed an internal consistency of α = 0.87.

### 2.2.5. Patient health questionnaire-8

The validated German version of the Patient Health Questionnaire-8 (PHQ-8; Kroenke et al., 2009) is used to measure depressive symptoms in the last two weeks. The questionnaire consists of eight items that are rated on a 4-point Likert scale (from 0 = "not at all" to 3 = "nearly every day"). The scores are summed to a total score ranging from 0–24. A cut-off score of ≥ 10 indicates major depression, and ≥ 20 indicates severe major depression. In this sample, the PHQ-8 showed an internal consistency of α = 0.86.

### 2.2.6. Generalized anxiety disorder screener

Anxiety symptoms in the last two weeks were assessed using the validated German version of the 7-item Generalized Anxiety Disorder Screener (GAD-7; Löwe et al., 2008). The original English version was developed by Spitzer et al. (2006). Items are rated on a 4-point Likert scale (from 0 = "not at all" to 3 = "nearly every day") and summed to a total score ranging from 0–21. A cut-off score of 0–4 indicates no generalized anxiety, 5–9 indicates mild generalized anxiety, 10–14 moderate generalized anxiety, and 15–21 severe generalized anxiety. In this sample, the GAD-7 showed an internal consistency of α = 0.88.

### 2.2.7. Patient health questionnaire-stress

The validated German version of the Patient Health Questionnaire-Stress (PHQ-Stress) was used to assess psychosocial stress within the last 4 weeks (Gräfe et al., 2004). The scale consists of 10 items that are rated on a 3-point Likert scale (from 0 = "not impaired" to "severely impaired") and summed to a total score ranging from 0–20. A total score of 0–4 indicates minimal psychosocial stress, 5–9 indicates mild psychosocial stress, 10–14 indicates moderate psychosocial stress and 15–20 indicates severe psychosocial stress. In this sample, the PHQ-Stress showed an internal consistency of α = 0.74.

### 2.3. Data analysis

### 2.3.1. Preprocessing

Traumatic experiences reported in the IES-R were reviewed by two independent researchers and classified trauma frequency as "1 = monotrauma" or "2 = polytrauma", trauma exposure as "1 = primary trauma", "2 = secondary trauma" or "3 = both primary and secondary trauma" and into different types of trauma. Monotrauma was defined as a single traumatic experience (such as an accident or the death of a loved one), while polytrauma was defined as multiple or prolonged traumatic events (such as domestic violence or sexual abuse during childhood). Primary trauma describes a trauma experienced personally, while secondary trauma refers to being indirectly exposed to someone else's traumatic experience. Types of trauma were categorized by the most commonly reported traumas "1 = accident", "2 = mugging", "3 = war", "4 = death of loved ones", "5 = sickness", "6 = sexual violence", "7 = sexual violence in childhood", "8 = neglect/violence", "9 = other" (such as mobbing, separation, isolation, partner with narcissistic tendencies, sect, etc.), "10 = multiple" (meaning that several different traumatic experiences were reported). Cases that could not be clearly classified were discussed in the research group and in some cases labeled as "-66 = not clearly identifiable" (e.g. "helplessness" or "dad" as responses).

For the LPA, three participants that identified as inter/diverse were excluded from further analysis as this group was too small for a meaningful comparison. Additionally, four outliers on the scales were excluded based on a Mahalanobis Distance cutoff of α = 0.001 (Tabachnick & Fidell, 2019). There were no missing values in the data set. Thus, the requirements for the LPA were fulfilled and the final data set included $N = 581$ participants, thereby exceeding the recommended sample size of 500 by Spurk et al. (2020). Prior to the LPA, mean values of all questionnaires were standardized in order to clearer visualize differences between clusters in the plot. Additionally, means and standard deviations of the symptoms were calculated. In accordance with the *Sex and Gender Equity in Research* (SAGER) Guidelines (Heidari et al., 2016), data is also presented stratified by gender.

### 2.3.2. Latent profile analysis

The data analysis was carried out using R version 4.2.2 (R Core Team, 2022) and the R package mclust by Scrucca et al. (2023). To detect latent profiles in the data-set, an LPA with continuous symptom indicators was calculated using an expectation-maximization algorithm. The LPA models the probability of a case belonging to a profile and is therefore superior to an approach like k-means clustering, which uses distance algorithms (Spurk et al., 2020). The indicators included here were the subscales of the IES-R, subscales of the CTQ, subscales of the WHOQOL, the ISI, PHQ-8, GAD-7, and PHQ-Stress. The resulting LPA models vary based on whether the (co-)variance matrices of the indicator variables are fixed or allowed to differ both within and between classes, which is referred to as equal or variable volume, shape, and orientation (Wardenaar, 2021). To estimate the LPA solutions, the following information criteria were taken into account: Bayesian Information Criteria (BIC), Integrated Completed Likelihood criterion (ICL), and Bootstrap Likelihood Ratio Test (BLRT). The BLRT compares the model fit between k-1 and k cluster models and compares whether an increase in the number of profiles increases model fit. Based on simulations by Nylund et al. (2007), BIC and BLRT are the best indicators for the number of profiles. However, the decision for a model should, next to the statistical information criteria, also be based on interpretability, content considerations, and meaningfulness (Geiser, 2011). For the purpose of criterion validation, trauma frequency was looked at to check whether an association could be seen between frequency and profile type.

## 3. Results

### 3.1. Study sample

Of the study sample, 194 (33.4%) identified as men and 387 (66.6%) as women. The age ranged from 18 to 80 and had a mean of 39.96 ($SD$ = 13.49; $M_{men}$ = 41.07, $SD_{men}$ = 12.10; $M_{women}$ = 39.40, $SD_{women}$ = 11.19).

More detailed information on the sociodemographic characteristics of the study sample can be found in Table 1.

### 3.2. Latent profile analysis

Based on the BIC, the best three models include a model with nine clusters and equal volume, shape, and orientation (EEE,9), a model with eight clusters and equal volume, shape, and orientation (EEE,8), and a model with three clusters and equal volume and shape and variable orientation (EEV,3; Table 2). The ICL comes to the same result. The BLRT indicates that there are five profiles. Considering that BIC and BLRT are the best indicators for the number of profiles (Nylund et al., 2007) while at the same time showing no overlap in the number of plausible clusters, the profile analysis objectively does not favor any specific number of clusters. Thus, a reliable distinction of specific sub-groups is not warranted. However, a decision for a model should, next to statistical criteria, also be based on interpretability, content consider-ations, and meaningfulness (Geiser, 2011). Thus, taking BIC, ICL, and theoretical considerations of (C)PTSD research showing three LPA pro-files (Cloitre et al., 2020) into account, the EEV,3 model was further explored.

### 3.3. Explorative analyses of EEV,3

The summary of the EEV,3 model indicates that the participants are roughly divided into thirds into the three profiles with 214 (37%) belonging to the first profile, 210 (36%) to the second, and 157 (27%) to the third profile (Table 3). The three latent profiles are depicted in Fig. 1. Additionally, an interactive plot can be viewed in the Supplements (Appendix A).

In Table 4 and Fig. 1, means of the symptom scales are displayed for each profile. Profile 1 showed moderate childhood trauma experiences and moderate insomnia, generalized anxiety, and psychosocial stress. Profile 2 showed the highest symptom burden on all areas except for QoL, with very severe childhood trauma experiences, moderate insomnia, major depression, and moderate generalized anxiety and psychosocial stress. Profile 3 showed the lowest QoL with extremely low levels on the global, social, and environment sub-scales. Childhood trauma experiences were moderate to severe in Profile 3. It showed

**Table 1**
Sociodemographic characteristics stratified by gender.

| | N (%) 581 (100) | Men 194 (33.4) | Women 387 (66.6) |
|---|---|---|---|
| **Education** | | | |
| University degree | 117 (20.1) | 56 (28.9) | 61 (15.8) |
| University entrance qualification | 163 (28.1) | 39 (20.1) | 124 (32.0) |
| Upper secondary school[a] | 158 (27.2) | 51 (26.3) | 107 (27.6) |
| Lower secondary school[b] | 94 (16.2) | 32 (16.5) | 62 (16.0) |
| Special school certificate | 10 (1.7) | 4 (2.1) | 6 (1.6) |
| No school certificate | 27 (4.6) | 11 (5.7) | 16 (4.1) |
| Other | 12 (2.1) | 1 (0.5%) | 11 (2.8) |
| **Relationship status** | | | |
| Single | 263 (45.3) | 96 (49.5) | 167 (43.2) |
| Married | 144 (24.8) | 53 (27.3) | 91 (23.5) |
| Living separately from spouse | 23 (4.0) | 6 (3.1) | 17 (4.4) |
| Divorced | 59 (10.2) | 10 (5.2) | 49 (12.7) |
| Widowed | 9 (1.5) | 4 (2.1) | 5 (1.3) |
| Partnered | 73 (12.6) | 23 (11.9) | 50 (12.9) |
| Other | 10 (1.7) | 2 (1.0) | 8 (2.1) |
| **Occupational status** | | | |
| Paid work | 308 (53.0) | 108 (55.7) | 200 (51.7) |
| Unpaid work/Not occupied | 210 (36.2) | 68 (35.1) | 142 (36.7) |
| In education | 63 (10.8) | 18 (9.3) | 45 (11.6) |
| **Work status** | | | |
| Unable to work | 290 (49.9) | 104 (53.6) | 186 (48.1) |
| Able to work | 291 (50.1) | 90 (46.4) | 201 (51.9) |

[a] 10 years of school education
[b] mandatory 9 years of school education

**Table 2**
Results of information criteria.

| Information criteria | EEE,9 | EEE,8 | EEV,3 |
|---|---|---|---|
| BIC | -23,454.56 | -23,474.65 | -23,534.44 |
| BIC diff | 0.00 | -20.09 | -79.88 |
| ICL | -23,530.45 | -23,544.02 | -23,553.57 |
| ICL diff | 0.00 | -13.58 | -23.13 |

| BLRT | No. of profiles | LRTS | Bootstrap p-value |
|---|---|---|---|
| | 4 vs 5 | 1549.57 | 0.001 |
| | 5 vs 6 | 23.36 | 1.000 |

Note. BIC, Bayesian Information Criteria; ICL, Integrated Completed Likelihood criterion; BLRT, Bootstrap Likelihood Ratio Test; LRTS, Likelihood Ratio Test Statistic.

**Table 3**
Summary of the EEV,3.

| Log-likelihood | n | df | BIC | ICL |
|---|---|---|---|---|
| -10,071.01 | 581 | 533 | -23,534.44 | -23,553.57 |
| Clustering table | | | | |
| Profile | 1 | 2 | | 3 |
| n (%) | 214 (37) | 210 (36) | | 157 (27) |

Note. BIC, Bayesian Information Criteria; ICL, Integrated Completed Likelihood criterion.

moderate insomnia and generalized anxiety, major depression, and mild psychosocial stress.

Due to the extremely low QoL levels in Profile 3, pain was explored as a possible influencing variable. The subjectively experienced level of pain (scale 0–10) was not significantly higher in Profile 3 ($M = 4.63$, $SD = 3.04$) compared to Profile 1 ($M = 4.40$, $SD = 3.00$, $p > .05$) and even lower than in Profile 2 ($M = 5.34$, $SD = 2.72$, $p > .05$).

Symptom means and $t$-tests were exploratively calculated for women and men. Women reported significantly higher values in avoidance ($p < .05$, $d = 0.28$), sexual abuse ($p < .001$, $d = 0.43$), depression ($p < .01$, $d = 0.35$), anxiety ($p < .05$, $d = 0.28$), and stress ($p < .01$, $d = 0.34$). The according table can be viewed in the supplements (Appendix B). For an LPA calculation specifically for each gender, subsample sizes were insufficient ($n < 500$).

### 3.4. Criterion validation of profiles

For the purpose of criterion validation of profiles the outcome trauma frequency was investigated in relation to profiles. The fre-quencies and percentages of the trauma categories and sociodemo-graphics are depicted for each profile in Table 5. As predicted, monotrauma occurs most often in the profile with low CTQ scores and high QoL (Profile 1), while polytrauma occurs most often in the profile with high CTQ, IES, and mental health scores (ISI, PHQ-8, GAD-7, PHQ-Stress; Profile 2) also with half of the share. Within the profile with low QoL (Profile 3) monotrauma occurs the most. Primary trauma occurs most often in the second profile, while secondary and both primary and secondary trauma occurs most often in the first profile. While accident and mugging are the trauma types with the highest frequencies in the first profile, it is sexual abuse in childhood and neglect/violence in the second profile, and death of loved ones and accident in the third profile.

## 4. Discussion

The aim of the present study was to detect latent profiles of post-traumatic symptoms in individuals having experienced traumatic events. More specifically, the current study aimed to investigate the number of latent profiles and their characteristics and symptomatology in comparison to the recent ICD-11 PTSD classifications.

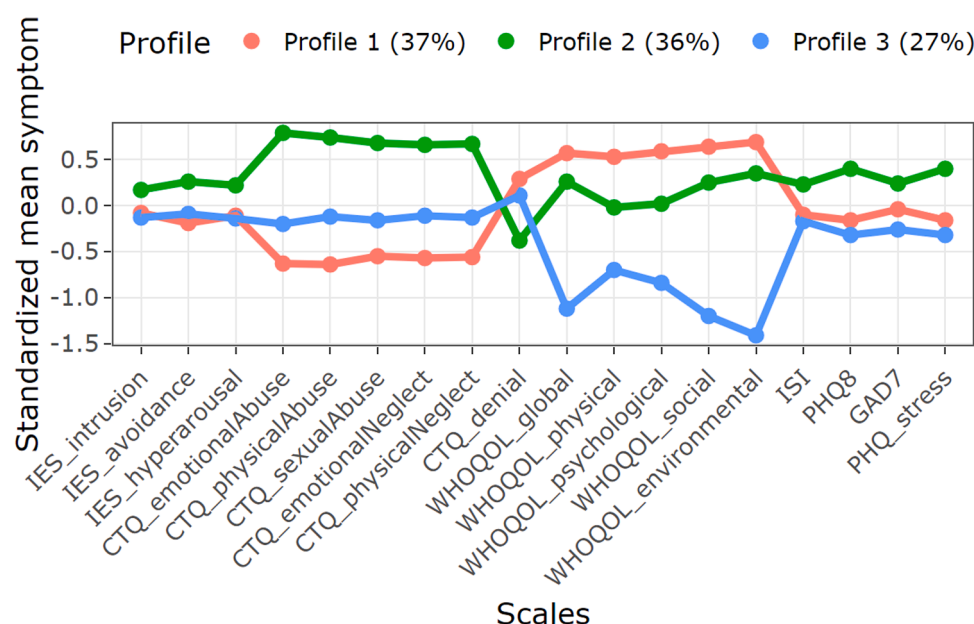Results of the LPA indicate that, according to the information criteria

**Fig. 1.** Latent profile solution EEV,3.
Note. IES, Impact of Event Scale-revised; CTQ, Childhood Trauma Questionnaire; WHOQOL, World Health Organization's Quality of Life questionnaire; ISI, Insomnia Severity Index; PHQ, Patient Health Questionnaire; GAD, Generalized Anxiety Disorder screening.

**Table 4**
Means of symptom scales per profile.

| | Profile 1 M (SD) | Profile 2 M (SD) | Profile 3 M (SD) |
|---|---|---|---|
| IES-intrusion | 23.68 (8.13) | 26.07 (8.22) | 23.32 (10.51) |
| IES-avoidance | 21.25 (9.23) | 25.74 (8.94) | 22.30 (10.63) |
| IES-hyperarousal | 23.22 (8.81) | 26.28 (7.52) | 23.04 (10.49) |
| CTQ-emotional abuse | 8.71 (4.51) | 18.48 (4.98) | 11.70 (6.64) |
| CTQ-physical abuse | 5.43 (0.89) | 12.59 (5.35) | 8.11 (4.79) |
| CTQ-sexual abuse | 5.43 (1.21) | 12.03 (6.28) | 7.51 (4.62) |
| CTQ-emotional neglect | 11.08 (5.76) | 19.10 (4.10) | 14.10 (6.50) |
| CTQ-physical neglect | 7.29 (2.66) | 12.80 (4.12) | 9.24 (4.39) |
| CTQ-denial | 0.63 (0.93) | 0.11 (0.31) | 0.48 (0.85) |
| WHOQOL-global | 38.20 (21.00) | 31.19 (16.91) | 0.00 (0.00) |
| WHOQOL-physical | 48.71 (17.79) | 39.93 (15.94) | 28.64 (0.86) |
| WHOQOL-psychological | 42.21 (18.22) | 31.94 (16.30) | 16.64 (0.33) |
| WHOQOL-social | 56.43 (24.86) | 44.17 (21.84) | 0.16 (2.00) |
| WHOQOL-environment | 62.54 (18.52) | 52.26 (15.59) | 0.08 (1.00) |
| ISI | 15.58 (6.29) | 17.57 (5.56) | 15.07 (7.08) |
| PHQ-8 | 13.58 (5.41) | 16.85 (4.81) | 12.65 (6.75) |
| GAD-7 | 12.35 (5.04) | 13.88 (4.73) | 11.18 (6.29) |
| PHQ-Stress | 9.99 (4.19) | 12.51 (3.67) | 9.27 (4.97) |

Note. IES, Impact of Event Scale; CTQ, Childhood Trauma Questionnaire; WHOQOL, World Health Organization's Quality of Life questionnaire; ISI, Insomnia Severity Index; PHQ, Patient Health Questionnaire; GAD, General Anxiety Disorder screening.

BIC and ICL, 3, 8, or 9 latent profiles are plausible. In addition to BIC and ICL, BLRT was investigated and showed the best model fit with 5 profiles. Due to the lack of overlap in the information criteria, the LPA objectively does not favor any specific number of profiles. However, taking theoretical considerations of (C)PTSD research and previous results into account, which indicate three or four distinct latent profiles (Cloitre et al., 2020; Knefel et al., 2015; Liddell et al., 2019), the model suggesting three latent profiles was chosen as the model for further explorative analyses.

The three latent profiles have nearly equal shares of the sample. The first profile shows the lowest CTQ scores with minimal to moderate exposure to childhood trauma and the highest QoL scores with a medium reported level of QoL. Trauma (IES-R) and mental health variables (ISI, PHQ-8, GAD-7, PHQ-Stress) show lower scores compared to profile

2 but higher scores compared to profile 3 and indicate moderate symptom severity. Based on these values, the first profile is characterized by a moderate burden and can be called the "moderate burden group".

The second profile exhibits the highest levels of IES-R, CTQ, and mental health variables scores with moderate to high trauma symptoms, very severe exposure to childhood trauma, and moderate insomnia, anxiety, and psychosocial stress levels. Additionally, it shows medium QoL levels. Accordingly, the second profile is characterized by severe (childhood) trauma and can be called the "severe (childhood) trauma group".

The third profile is characterized by medium levels of IES-R and CTQ scores in comparison to the other profiles. Additionally, it has the lowest QoL and mental health scores compared to the other profiles with very low QoL, moderate insomnia and anxiety, and mild psychosocial stress. Based on these values, the third profile is characterized by the low QoL and can be called the "low QoL group".

In addition to evaluating the profiles with regard to symptom scores, profiles were further investigated regarding trauma frequencies. This also serves the purpose of criterion validation. As hypothesized, the first profile, which was characterized as the "moderate burden group", showed the highest proportion of monotrauma, indicative of a symptom profile matching PTSD. Moreover, the second profile, which was characterized as the "severe (childhood) trauma group", showed the highest proportion of polytrauma, indicative of a symptom profile matching CPTSD (ICD-11, WHO, 2022). Not only the higher frequency of polytrauma, but also the more severe impairment in the second profile point towards the presence of a CPTSD symptom profile (Cloitre et al., 2020; ICD-11, WHO, 2022). Thus, results of the current study suggest, based on trauma frequency and symptom severity, two distinct symptom profiles that indicate a distinction between PTSD and CPTSD, thereby supporting the new classification of PTSD and CPTSD of the ICD-11 (ICD-11, WHO, 2022). However, the distinction could also reflect not distinct clinical subgroups like PTSD and CPTSD, but rather a less vs. more severe PTSD. This way, the first profile would represent a less severe PTSD after monotrauma with a moderate symptom severity, while the second profile would represent a more severe PTSD after polytrauma with a high symptom burden. Additionally, there could also be differences in psychiatric comorbidity underlying the differences in

**Table 5**
Descriptives per profile.

| | Profile 1 n (%) | Profile 2 n (%) | Profile 3 n (%) | Total N (%) |
|---|---|---|---|---|
| | 214 (100) | 210 (100) | 157 (100) | 581 (100) |
| **Frequency of trauma** | | | | |
| Monotrauma | 107 (50.0) | 38 (18.1) | 65 (41.4) | 210 (36.1) |
| Polytrauma | 69 (32.2) | 131 (62.4) | 46 (29.3) | 246 (42.3) |
| Not clear | 16 (7.5) | 24 (11.4) | 15 (9.6) | 55 (9.5) |
| Missing | 22 (10.3) | 17 (8.1) | 31 (19.7) | 70 (12.1) |
| **Experience of trauma** | | | | |
| Primary | 146 (68.2) | 162 (77.1) | 94 (59.9) | 402 (69.2) |
| Secondary | 18 (8.4) | 1 (0.5) | 13 (8.3) | 32 (5.5) |
| Both | 8 (3.7) | 3 (1.4) | 3 (1.9) | 14 (2.4) |
| Not clear | 20 (9.4) | 27 (12.9) | 16 (10.2) | 63 (10.8) |
| Missing | 22 (10.3) | 17 (8.1) | 31 (19.7) | 70 (12.1) |
| **Type of trauma** | | | | |
| Accident | 23 (10.7) | 3 (1.4) | 16 (10.2) | 42 (7.2) |
| Mugging | 22 (10.3) | 7 (3.3) | 9 (5.7) | 38 (6.5) |
| War | 4 (1.9) | 2 (0.9) | 0 (0.0) | 6 (1.0) |
| Death of loved ones | 19 (8.9) | 13 (6.2) | 18 (11.5) | 50 (8.6) |
| Sickness | 9 (4.2) | 1 (0.5) | 3 (1.9) | 13 (2.2) |
| Sexual abuse | 11 (5.1) | 13 (6.2) | 13 (8.3) | 37 (6.4) |
| Sexual abuse in childhood | 4 (1.9) | 14 (6.7) | 3 (1.9) | 21 (3.6) |
| Neglect/violence | 17 (7.9) | 21 (10.0) | 14 (8.9) | 52 (9.0) |
| Other | 21 (9.8) | 13 (6.2) | 7 (4.5) | 41 (7.1) |
| Multiple | 40 (18.7) | 69 (32.9) | 27 (17.2) | 136 (23.4) |
| Not clear | 22 (10.3) | 37 (17.6) | 16 (10.2) | 75 (12.9) |
| Missing | 22 (10.3) | 17 (8.1) | 31 (19.7) | 70 (12.1) |
| **Gender** | | | | |
| Women | 139 (65.0) | 147 (70.0) | 101 (64.3) | 387 (66.6) |
| Men | 75 (35.0) | 63 (30.0) | 56 (35.7) | 194 (33.4) |
| **Age** | | | | |
| Young (18–30) | 66 (31.0) | 72 (34.4) | 40 (25.8) | 178 (30.8) |
| Middle-aged (31–50) | 95 (44.6) | 86 (41.1) | 68 (43.9) | 249 (43.2) |
| Older-aged (51–80) | 52 (24.4) | 51 (24.4) | 47 (30.3) | 150 (26.0) |
| **Education** | | | | |
| University degree | 49 (22.9) | 32 (15.2) | 36 (22.9) | 117 (20.1) |
| University entrance qualification | 60 (28.0) | 57 (27.1) | 46 (29.3) | 163 (28.1) |
| Upper secondary school[a] | 55 (25.7) | 63 (30.0) | 40 (25.5) | 158 (27.2) |
| Lower secondary school[b] | 28 (13.1) | 41 (19.5) | 25 (15.9) | 94 (16.2) |
| Special school certificate | 3 (1.4) | 5 (2.4) | 2 (1.3) | 10 (1.7) |
| No school certificate | 13 (6.1) | 8 (3.8) | 6 (3.8) | 27 (4.6) |
| Other | 6 (2.8) | 4 (1.9) | 2 (1.3) | 12 (2.1) |
| **Relationship status** | | | | |
| Single | 90 (42.0) | 106 (50.5) | 67 (42.7) | 263 (45.3) |
| Married | 67 (31.3) | 42 (20.0) | 35 (22.3) | 144 (24.8) |
| Living separately from spouse | 10 (4.7) | 8 (3.8) | 5 (3.2) | 23 (4.0) |
| Divorced | 19 (8.9) | 26 (12.4) | 14 (8.9) | 59 (10.2) |
| Widowed | 3 (1.4) | 2 (1.0) | 4 (2.5) | 9 (1.5) |
| Partnered | 24 (11.2) | 24 (11.4) | 25 (15.9) | 73 (12.6) |
| Other | 1 (0.5) | 2 (1.0) | 7 (4.5) | 10 (1.7) |
| **Occupational status** | | | | |
| Paid work | 118 (55.1) | 100 (47.6) | 83 (52.9) | 301 (51.8) |
| Unpaid work/Not occupied | 91 (42.5) | 94 (44.8) | 71 (45.2) | 256 (44.1) |
| In education | 5 (2.3) | 16 (7.6) | 3 (1.9) | 24 (4.1) |
| **Work status** | | | | |
| Unable to work | 99 (46.3) | 121 (57.6) | 70 (44.6) | 290 (49.9) |
| Able to work | 115 (53.7) | 89 (42.4) | 87 (55.4) | 291 (50.1) |

[a] 10 years of school education

[b] mandatory 9 years of school education

symptom severity or QoL, which could also explain the low levels of QoL in the third profile. To verify or falsify the different explanations, a comparison with official psychiatric diagnoses of PTSD and CPTSD is necessary, which would be interesting for further research.

Similar to previous research (e.g. Cloitre et al., 2013; Knefel et al., 2015) there seems to be a third group that cannot be disregarded and that does not fit neatly into either category. The moderate trauma levels in this "low QoL group" are similar to previous research, which also found clusters/profiles with moderate to low PTSD symptom severity (Knefel et al., 2015; Liddell et al., 2019). The current study showed that this profile was associated with distinctively low QoL scores in all domains, which indicates that trauma symptoms may not be primarily the focus of this profile, but rather a low quality of life. Considering a clinical perspective, the exposure to traumatic events does not necessarily result in developing a symptom profile that matches (C)PTSD (Auxéméry, 2018; Benjet et al., 2016). Other psychopathological symptoms such as depression, anxiety, psychosomatic issues, chronic pain, and especially low quality of life can emerge as well and display a high subjective burden (Kind & Otis, 2019; Moergeli et al., 2012; Wang et al., 2005; McFarlane Ao & Graham, 2021). Moreover, the existence of a different mental health disorder such as borderline personality disorder, which is associated with exposure to traumatic events, might be possible (Golier et al., 2003). Another possible explanation is that, in this sample, the higher frequency of a specific type of traumatic event experienced within this "low QoL group", i.e. death of loved ones and accident, resulted in the lower QoL (Schou-Bredal et al., 2022). Future research is needed to investigate the above mentioned hypotheses related to the "low QoL group" profile. Overall, individuals in this third group could benefit from interventions aimed at addressing their compromised QoL, rather than focusing on specific trauma-symptomology. There remains a lack of understanding regarding the low QoL within this third group, necessitating further investigation examining the varied symptomatology and outcomes experienced by these individuals to ensure appropriate treatment (Cloitre et al., 2020).

There are some limitations in this study that should be noted. First of all, the present study did not investigate the psychiatric diagnoses of the participants. It would be interesting for further research to compare and verify the assignment of participants to latent profiles of (C)PTSD with official psychiatric diagnoses given by mental health professionals. In addition to that, the inclusion of the CTQ as a measure of childhood trauma in the LPA leads to the theory of the etiology of CPTSD being incorporated into the analysis itself. This may have contributed to a biased analysis towards the identification of at least two distinct profiles, one with lower and one with higher childhood trauma. Additionally, sexual orientation was not assessed and gender minorities were not included due to the very small sub-sample size, even though prevalence rates of trauma are higher among non-binary individuals, with reported rates of up to 42% (Livingston et al., 2020). As gender minority individuals reportedly experience higher rates of sexual abuse, harassment, and trauma exposure than cisgender individuals (Lefevor et al., 2019), elevated (C)PTSD diagnoses could be expected (Lonnen & Paskell, 2024). In the future, gender minorities and other variables such as sexual orientation should be further examined to have a more thorough insight into possible influencing factors. Furthermore, the sample size in this study was insufficient to investigate LPA profiles separately for men and women, even though it would be interesting to do so as previous research suggests that there might be differences in trauma symptomatology depending on sex and gender (Haering et al., 2024). However, the symptomatology between women and men was exploratively and descriptively investigated (Appendix B) in accordance with the SAGER Guidelines (Heidari et al., 2016) and was in line with previous research

indicating higher prevalence rates and psychological stress responses of PTSD in women (Ben-Ezra et al., 2018; Cloitre et al., 2019; Haering et al., 2024). Additionally, results showed that women had the highest frequency in the "severe (childhood) trauma group" whereas men had the highest frequency in the "moderate burden group". In the future, latent profiles should be investigated for each sex/gender separately with a sufficient sample size.

*4.1. Conclusion*

The findings of this study reveal the presence of three distinct latent profiles among patients seeking treatment after a traumatic experience, aligning with previous research that also identified three distinct profiles (Cloitre et al., 2020; Knefel et al., 2015; Liddell et al., 2019). This supports the new classification system introduced in the ICD-11 (WHO, 2022), distinguishing between PTSD and CPTSD in relation to their respective trauma frequency and symptomatology. Additionally, the presence of a third profile suggests that there is a third group of traumatized individuals where another symptomatology is in the foreground and who may require a different treatment focus. By elucidating these underlying profiles, our study contributes to the growing body of research investigating this updated diagnostic framework. It will encourage further research in this area and pave the way for new insights into specific trauma symptomatology.

## Abbreviations

DSM = Diagnostic and Statistical Manual of Mental Disorders
PTSD = Post-Traumatic Stress Disorder
QoL = Quality of Life
ICD = International Classification of Diseases
CPTSD = Complex Post-Traumatic Stress Disorder
LCA = Latent Class Analysis
LPA = Latent Profile Analysis
IES-R = Impact of Event Scale revised
CTQ = Childhood Trauma Questionnaire
WHOQOL = World Health Organization's Quality of Life
ISI = Insomnia Severity Index
PHQ = Patient Health Questionnaire
GAD = Generalized Anxiety Disorder Screener
BIC = Bayesian Information Criteria
ICL = Integrated Completed Likelihood criterion
BLRT = Bootstrap Likelihood Ratio Test

## Data statement

The data are available from the CA on reasonable request.

## Ethical standards

This study was approved by the ethical committee of the Medical Faculty of the University of Duisburg-Essen (24–11835-BO).

## Financial support

## CRediT authorship contribution statement

**Jil Beckord:** Writing – review & editing, Writing – original draft, Visualization, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Jennifer Birke:** Writing – review & editing, Writing – original draft, Project administration, Methodology, Data curation, Conceptualization. **Julia Barbara Krakowczyk:** Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Conceptualization. **Samira Hesse:** Writing – review & editing, Writing – original draft, Methodology, Data curation. **Anke Hinney:** Writing – review & editing. **Nora Dörrie:** Writing – review & editing, Investigation. **Johanna Sophie Schneider:** Writing – review & editing, Investigation. **Nikola Komlenac:** Writing – review & editing, Supervision. **Alexander Bäuerle:** Writing – review & editing, Supervision, Project administration, Investigation, Conceptualization. **Martin Teufel:** Writing – review & editing, Supervision, Investigation.

## Declaration of competing interest

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All authors declare that they have no competing interests.

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## Supplementary materials

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