








The structure of PTSD. Development of the Post Traumatic Symptom scale from a clinician-based perspective

Cătălin Nedelcea ^a, Iulia D. Ciorbea ^b, Diana L. Vasile ^a, Șerban Ionescu^c, Claudiu Papasteri ^a, Ramona D. Letzner ^a, Ana Cosmoiu ^a and Teodora Georgescu ^a

^aUniversity of Bucharest, Bucharest, Romania; ^bOvidius University of Constanța, Constanța, Romania; ^cUniversité du Paris 8, Saint-Denis, France

ABSTRACT

Background: Nations marked by a Marxist-Leninist ideology have suffered greatly due to a culture of abuse emphasized by the absolute absence of psychology, thus contributing to a diminished ability in recognizing the consequences of traumatic experiences.

Objective: To improve the assessment of the presence and severity of posttraumatic stress disorder (PTSD) in such a cultural context, our paper aimed at developing an alternative self-report measure for PTSD - the *Post Traumatic Symptom Scale (PTSS)*, developed by clinicians with wide relevant expertise, based on the natural language people use to describe its subjective experience. This research used multiple samples consistent with the corresponding objectives. Mokken Scale Analysis and the Classical Test Theory were both employed. The proposed scale was tested against five competing PTSD models, whilst also investigating the symptoms' clusters in two different samples by using, to our knowledge, a network analysis approach for the first time.

Method: The results indicated excellent psychometric properties regarding internal consistency and temporal reliability, as well as convergent and discriminant validity. The results of MSA showed that the scale fully conforms to the assumptions of the monotone homogeneity model, interpreted as positive evidence for its use in clinical purposes. The factor analyses pointed that the newer models outperformed the standard DSM-5 model, with bifactor models displaying better fit indexes than second-order models. Finally, a distinct pattern of symptom activation in the high-risk group (i.e. first-responders) was found, bringing support for symptoms overlapping between PTSD and affective disorders, thus reinforcing the idea of bridge symptoms which has significant clinical implications.

Results: This study presents an alternative sound instrument for measuring PTSD symptomatology focused on how people naturally describe their subjective experiences. Theoretical and practical implications are discussed alongside limitations.

La estructura del TEPT. Desarrollo de la escala de Síntomas Postraumáticos desde una perspectiva basada en el clínico

Antecedentes: Las naciones marcadas por una ideología Marxista-Leninista han sufrido en gran manera debido a una cultura de abuso enfatizada por la ausencia absoluta de psicología, contribuyendo por tanto a una disminución de la habilidad para reconocer las consecuencias de las experiencias traumáticas.

Objetivo: Para mejorar la evaluación de la presencia y severidad del trastorno de estrés postraumático (TEPT) en tal contexto cultural, nuestro trabajo apuntó a desarrollar una medida alternativa de auto-reporte para el TEPT - La escala de síntomas postraumáticos (PTSS, por su sigla en inglés), desarrollada por clínicos con amplia experiencia relevante, basada en el lenguaje natural que utiliza la gente para describir las experiencias subjetivas.

Método: Esta investigación utilizó múltiples muestras consistentes con los correspondientes objetivos. Se utilizó tanto el Análisis de Escalas de Mokken (MSA, por su sigla en inglés) como la Teoría Clásica de los Tests. La escala propuesta fue probada contra 5 modelos alternativos de TEPT, a la vez que se investigaron las agrupaciones de síntomas en dos muestras diferentes expuestas a trauma utilizando, según nuestro conocimiento, un enfoque de análisis de red por primera vez.

Resultados: Los resultados indicaron excelentes propiedades psicométricas en lo que respecta a consistencia interna y confiabilidad temporal, así como también validez convergente y discriminante. Los resultados del MSA mostraron que la escala se ajusta totalmente a las presunciones del modelo de homogeneidad monótona, interpretado como evidencia positiva para su uso con fines clínicos.

Los análisis factoriales apuntaron a que los nuevos modelos superaron al modelo estándar DSM-5, con mejores índices de ajuste en los modelos bifactoriales que en los de segundo

ARTICLE HISTORY

Received 28 July 2021
Revised 3 March 2022
Accepted 25 March 2022

KEYWORDS

Posttraumatic stress disorder; PTSD factor structure; scale development; competing PTSD models; network analysis

PALABRAS CLAVE

Trastorno de Estrés Postraumático; estructura de factores del TEPT; desarrollo de escalas; modelos de TEPT alternativos; análisis de redes

关键词

创伤后应激障碍; PTSD因子结构; 量表发展; 竞争性 PTSD模型; 网络分析

HIGHLIGHTS

- The construction of PTSs encompasses cultural trauma and one's subjective experience.
- PTSs was tested against the five major competing models of PTSD.
- Network analyses suggest different patterns in a student sample vs. a first-responders one, with the accent on the negative alterations in cognitions and mood (NACM) model.

orden. Finalmente, se encontró un patrón distinto de activación sintomática en el grupo de alto riesgo (ej. equipos de primera respuesta), otorgando soporte a la superposición de síntomas entre el TEPT y los trastornos afectivos, reforzando por tanto la idea de síntomas puente que tiene implicaciones clínicas significativas.

Conclusiones: Este estudio presenta un instrumento alternativo para medir la sintomatología de TEPT enfocada en cómo la gente describe naturalmente sus experiencias subjetivas. Se discuten las implicancias teóricas y prácticas junto a las limitaciones.

PTSD的结构：从临床医生视角开发创伤后症状量表

背景: 以马克思列宁主义意识形态为标志的国家由于完全缺乏心理学所强调的虐待文化而遭受了巨大损失，从而导致识别创伤经历后果的能力下降。

目的: 为了在这样的文化背景下改进对创伤后应激障碍（PTSD）的存在和严重程度的评估，我们的论文旨在开发一种替代的PTSD自我报告测量方法——由具有广泛相关专业知识的临床医生开发的、基于人们用来描述主观体验的自然语言的创伤后症状量表（PTS）。

方法: 本研究采用多个符合相应目的的样本。Mokken 量表分析和经典测试理论都被采用。提出的量表检验了 5 个 PTSD 竞争模型，同时也首次使用了据我们所知的网络分析方法研究了两个不同创伤暴露样本中的症状簇。

结果: 结果表明，在内部一致性和时间信度以及收敛效度和判别效度方面具有优异的心理测量特性。MSA结果表明，该量表完全符合单调同质模型的假设，被解释为其临床应用的积极证据。因子分析表明，较新的模型优于标准 DSM-5 模型，双因子模型表现出比二阶模型更好的拟合指数。最后，在高危人群（即急救人员）中发现了一种独特的症状激活模式，为 PTSD 和情感障碍之间的症状重叠提供了支持，从而强化了具有显著临床意义的桥症状的想法。

结论: 本研究提出了一种用于测量 PTSD 症状的替代测量工具，重点关注人们如何自然地描述他们的主观体验。理论和实际意义与局限性一起讨论。

1. Introduction

Considering the imprint of communism in Eastern Europe in terms of cultural identity, with its legacy nowadays highlighted by a substantial lack of psychoeducation as well as a low ability in people to identify the consequences of trauma and abuse, international measures for PTSD may not always be appropriate when trying to identify the presence of symptomatology and clinical diagnosis. Consequently, we propose that an alternative instrument, one adapted to the underpinning particularities of Romanian culture, could produce better outcomes in this process.

From the view-point of our research, the main aspects of 42 years of communism that Romanian has gone through are best conveyed by the restrictions placed on individual freedoms and the prevalence of abuse in a myriad of forms (from physical to emotional abuse and/or neglect). These are ranging from forced imprisonment and labour, denial of ownership of property, lack of access to basic subsidy, goods and wants, to abortion being made illegal, denial and persecution of the intellectual class and systematic collectivization of the peasant class (Dennis, 2018; Irimie, 2014) – thus diminishing the individual to a ‘collective entity’, and, essentially, exposing the general population to a large number of *traumatic experiences* (Harper, 2005). Psychiatry was systematically used as an instrument of political oppression of dissent (van Voren, 2010), austerity measures led to generalized poverty and massive institutionalization of 170.0000 children, Romania earning second place in Europe for child abandonment (44%) between 1989 and 1994 (Greenwell, 2003; Rosapepe, 2001).

Among others, this social context of state-run orphanages still lingered after the official fall of the communist party, as it does today as well (Correll, Correll, & Predescu, 2006; Hogue et al., 2004). Concomitantly, psychology had undergone a ‘purification’ process by the removal of the last remaining psychology professors, whilst the word per se was prohibited from the official lexicon (Mihăilescu, 1992, Woodard, 1995; as cited in Stevens, 1998).

While trauma is fundamentally conceptualized as an individual affliction, systemic accounts emphasize that its subjective experience is contextualized by the social, cultural, and institutional environment within which it takes place (Goldsmith, Martin, & Smith, 2014; Norris, Stevens, Pfefferbaum, Wyche, & Pfefferbaum, 2008; Maercker & Hecker, 2016), as previously depicted. Within this framework, research has indicated that *systemic factors* influence every step of the unfolding of trauma, including the way it is expressed and communicated through language, calling for nuanced assessment procedures that take into account culturally-specific ‘idioms of distress’ (Kidron & Kir-mayer, 2019). *Language* becomes central in creating representations, with symbolic significance that is passed intergenerationally through complex narratives about the world and the community (Lehrner & Yehuda, 2018, p. 1763; Volkan, 2001).

A noteworthy factor in this context resides in the natural process of *habituation* (Kim et al., 2019). People tend to define *normality* based on the frequency and occurrence of a situation. As a result, in a society dominated by a myriad of wrongdoings, situations of maltreatment and abuse have become, in time, quite *normal* and hardly recognized as having

a traumatic nature. Therefore, systemic oppression and its cultural transmission through language and socialization interact and result in *the inability* or the *low ability to identify* the consequences of abuse and trauma for what they truly represent. Rather, such experiences are considered common place to occur throughout one's life span while their associated symptoms are commonly dismissed and potentially viewed as a weakness that must be simply repressed.

One additionally relevant area regarding abuse and traumatic experiences is the issue of *disclosure*. One of the most common obstacles noted in both qualitative and quantitative research is the fact that the victim is overwhelmed by feelings of shame, guilt, rejection, and stigmatization (Kantor, Knefel, & Lueger-Schuster, 2017). These are well-known factors that, among others, (1) represent a barrier for reaching out to mental health aid, (2) increase the risk for developing post-traumatic stress disorder (PTSD) and other disorders, and (3) represent a difficulty in identifying and addressing them by the specialists even when the person is already engaged in the (healing) process (Øktedalen, Hoffart, & Langkaas, 2015).

1.1 The overview of the current study

Therefore, our *main objective* was to develop and validate an alternative measure of PTSD – the Post Traumatic Symptoms scale (PTSS) rooted in the natural language people suffering from post-traumatic stress use to describe their experience. One important specific feature of the proposed measure is that all items were designed by clinicians based on their extensive practice with PTSD patients, in such a manner that they reflect the common and natural expressions used by people to describe their subjective experience of symptomatology, rather than based on scientific descriptors. In other words, our emphasis has been on the selection of items being made by clinicians in close connection with the very individuals without a psychology background, members of the community. The items were selected to reflect the PTSD symptoms and diagnostic criteria proposed by DSM – 5 (American Psychiatric Association, 2013), and designed to convey to respondents that mental health researchers and providers do have an accurate understanding of their subjective reality (Alves, Sales, & Ashworth, 2016). This decision is aimed at balancing the practical necessity for standardized measurement to facilitate self-awareness and disclosure (Galasiński & Kozłowska, 2010; Truijens, Van Nieuwenhove, De Smet, Desmet, & Meganck, 2021), particularly in contexts where these may be hindered by systemic factors.

This paper presents a multi-sample study – four samples – that were used to reach our *main objective*, including 1. Development of the Post Traumatic Symptoms scale (PTSS) by combining two competing

approaches in the scale construction process: the non-parametric item response theory (NIRT), i.e. Mokken Scale Analysis (MSA), and the classical test theory (CTT); 2. Validation of the PTSSs, including criterion validity; and 3. Confirmatory factor analysis on the PTSSs items against five major competing factor models on PTSD: (1) The four factors DSM-5 model (APA., 2013) comprising of Re-experiencing, Avoidance, Negative Alterations in Cognitions and Mood (i.e. NACM), and Hyperarousal; (2) The five factors Dysphoric Arousal model (Elhai et al., 2011) that separates Hyperarousal into Anxious and Dysphoric Arousal; (3) The six factors Anhedonia model (Liu et al., 2014) that stems from the Dysphoric Arousal model further separates NACM into Negative Affect and Anhedonia; (4) The six factors Externalizing Behaviour model (Tsai et al., 2014) that stems from the Dysphoric Arousal model differentiates Dysphoric Arousal from Externalizing Behaviours; (5) The seven factors Hybrid model (Armour et al., 2015) that proposes a mixed structure combining the features of the Anhedonia model with those of the Externalizing Behaviour model.

Out of the four samples, we further emphasize two of them in this section in order to accurately describe the second objective of the current study. All four samples are extensively described in the Methods section.

Furthermore, we aim to address another issue, regarding the similar or differentiated effect of simple and repeated exposure to traumatic events. Recent research, including a meta-analysis, found support for a higher 12 months prevalence of PTSD among first-responders (worldwide 10%) (Berger et al., 2012) compared to the general population (1.1% in Europe and 3.5% in the USA) (Darves-Bornoz et al., 2008; Kessler, Chiu, Demler, & Walters, 2005). Nevertheless, there are no explicit specifications regarding the differentiated symptomatology or its severity in DSM-5 conceptualization of PTSD according to distinct types of exposure (Friedman, 2013).

Hence, our *second objective* pertained to the exploration of the symptom's clusters in two distinct samples – an undergraduate student sample meeting DSM – 5 A criterion for PTSD diagnosis and a first responder sample, by using, for the first time to our knowledge, a network analysis approach of the latter. This approach is suited to examine whether, as previous work suggests (e.g. Phillips, Wilson, Sun, & Morey, 2018), populations characterized by specific types of exposure to traumatic events, such as first responders, are more likely to differ in their manifestations of PTSD, with stronger associations between individual symptoms creating self-reinforcing patterns of symptom activation that maintain and prolong distress. As this population is under specific occupational concerns that may encourage non-disclosure (Marshall et al., 2021), the PTSSs may prove particularly suited in this respect.

Table 1. Item content of PTSs and corresponding DSM-5 criteria for PTSD.

No.	Content	DSM – 5 Criterion
1	All kinds of memories come to my mind about the event, and I can't seem to control them. <i>Îmi vin în minte diverse amintiri despre eveniment pe care nu le pot controla.</i>	B1 – Intrusive memory
2	I relive the event, as if it were happening all over again. <i>Re trăiesc evenimentul ca și cum s-ar întâmpla din nou.</i>	B1 – Re-experience
3	I feel restlessness and internal struggle when I encounter stimuli that remind me of what happened. <i>Am o stare de neliniște și zburciun intern când întâlnesc stimuli care-mi amintesc de ce mi s-a întâmplat.</i>	B4 – Cued distress
4	I have very intense sensations in my body when something reminds me of the traumatic event. <i>Am senzații intense și neplăcute în corp atunci când ceva îmi amintește de evenimentul traumatic.</i>	B5 – Cued physical reaction
5	I strive to forget what happened. <i>Mă străduiesc să uit ceea ce s-a întâmplat.</i>	C1 – Avoidance – memory
6	I avoid coming into contact with something that can remind me of the event. <i>Evit să intru în contact cu ceva ce îmi poate aminti de acel eveniment.</i>	C2 – Avoidance – external
7	I don't like talking about things that remind me of the event. <i>Nu-mi place să stau de vorbă despre lucruri care-mi amintesc de acel eveniment.</i>	C2 – Avoidance – external
8	I have difficulty remembering important parts of the traumatic event. <i>Am dificultăți să-mi amintesc părți importante ale evenimentului traumatic.</i>	D1 – Amnesia
9	I lost my confidence in myself and others. <i>Mi-am pierdut sentimentul încrederii în mine și în ceilalți.</i>	D2 – Distortion – self & others
10	I think I am to blame for what's happening to me. <i>Cred că sunt de vină pentru ceea ce mi se întâmplă.</i>	D3 – Guilt
11	I can hardly enjoy the things that used to give me pleasure. <i>Mi-e greu să mă mai bucur de lucrurile care înainte îmi făceau plăcere.</i>	D5 – Loss of interest
12	I feel disconnected from the world. <i>Mă simt rupt de lume.</i>	D6 – Detachment / Estrangement
13	I feel like I lost my joy of living. <i>Parcă mi-am pierdut bucuria de viață.</i>	D7 – Dysphoria / Anhedonia
14	I get easily annoyed because of small things. <i>Pot fi scos ușor din sărite de lucruri de nimic.</i>	E1 – Irritability
15	I feel the urge to hurt myself or others. <i>Îmi vine să-mi fac rău mie sau altora.</i>	E2 – Auto- & hetero-aggression
16	I find it difficult to concentrate on my tasks. <i>Mi-e greu să mă concentrez pe ceea ce am de făcut.</i>	E5 – Concentration
17	I sleep very little and I can't really rest. <i>Dorm puțin și nu mă pot odihni cu adevărat.</i>	E6 – Sleep disturbance /Restlessness
18	I am almost always on my toes because I need to protect myself. <i>Stau aproape permanent în gardă, ca să mă pot proteja.</i>	E3 – Hypervigilance
19	I noticed I startle at unexpected sounds. <i>Am observat că tresar puternic la unele sunete care vin pe neașteptate.</i>	E4 – Startle response
20	I jump out of my skin sometimes. <i>Uneori sar ca un arc.</i>	E4 – Startle response

Note: Original Romanian items are presented in *italics*.

2. Method

2.1 Development of PTSs

The initial phase in the development of PTSs took place between 2014 and 2015. A number of five licensed clinicians and 30 clinical psychology students with a Master's degree were employed to generate items reflecting the DSM-5 diagnostic criteria for PTSD. An initial pool of 86 items tapping PTSD symptoms described in the DSM-5 has been developed and afterward analysed for content validity by a panel of four experts. Each of the 20 symptoms of PTSD described in the DSM-5 was represented by at least four items in order to make sure that all symptoms would be covered and depicted in the final version of the instrument. The 86 items were analysed in a small pilot study and 43 of them were retained, reduction based on internal consistency criteria.

In the following stage of its development, the scale was reduced to 20 items based on Mokken Scale Analysis (MSA; Mokken, 2011). Following the item selection, the structure of the resulting scale was tested against the most relevant factor models on PTSD by using confirmatory factor analysis (CFA).

Additionally, several correlations were computed, as they are informative for reliability and validity. The PTSs items were translated into English following the ITC Guidelines for Translating and Adapting Tests (International Test Commission, 2017) and are presented in Table 1.

2.2 Participants and procedure

To reach our objectives, a *multi-sample study* was proposed and approved by the ethics board of the first author's university (Research Ethics Board of the University of Bucharest). All data were collected between 2015 and 2020: data resulting from samples 1, 2, and 4 were collected in pen and paper format by a specially instructed group of Master's degree students in trauma psychology, while data resulting from sample 3 was collected through an online survey. The only sample that received compensation for the participation in the current study was sample 3, comprised of university students, who were granted extra credits in specific courses. The inclusion of the samples in specific analyses was based on the corresponding objectives and guided by the relevant scientific

literature. Due to the timeframe of the data collection, as well as for reasons of ensuring diversity in terms of population characteristics, different types of samples were included in the current research, as follows:

2.3 Sample 1: trauma-exposed clients of psychological services

The 43-item questionnaire was administered to a sample of 373 people, who at the time reported a significant stressor, meeting diagnostic criterion A for PTSD as specified in DSM-5. Participants were selected from registers of community members reporting psychological counselling or assessment needs, either in clinics or private practice. They were first referred by their primary clinician and invited by us to take part in a resilience survey, their inclusion in the study being made on a volunteer basis. The sample was 65.4% female, with ages between 18–81 ($M = 40.2$, $SD = 11.7$), mostly from urban areas of Romania (81.8%).

2.4 Sample 2: 'Colectiv' (Collective in English)

The 'Colectiv' nightclub fire represented a horrific event in Bucharest, Romania, on 30 October 2015, which killed 64 people (26 on-site, 38 in hospitals) and injured 147, being the worst incident in Romania since 1995, with a strong national impact. Sample 2 was comprised of 27 participants aged between 23 and 51 ($M = 35$, $SD = 7.2$), mostly female participants (59.3%). 13 of them were exposed directly, being survivors of the incident, while the other 14 were exposed indirectly, by losing a significant other in the incident. Data were collected during a support programme taking place at the *Institute for Trauma Study and Treatment* in Romania, Bucharest, participants being included on a volunteer and availability basis. They responded repeatedly to PTSS, with the retest being taken three months after the initial test.

2.5 Sample 3: trauma-exposed university students

A total sample of 1102 participants from the general university student population took part in a resilience survey and filled a questionnaire battery. They were approached by fellow professors by email invitations. Of this sample, 578 reported direct exposure or being witness to a traumatic event, meeting diagnostic criterion A for PTSD as specified in DSM-5, and they were asked to fill PTSS and PCL-5. This sample was 86.1% female, with ages between 18 and 55 ($M = 23.6$, $SD = 6.5$), mostly from urban areas of Romania (78.9%).

For more detailed information on specific traumatic experiences reported by the participants from samples 1 and 3, see Table 2.

2.6 Sample 4: first-responders

Data was also collected from a total sample of 101 participants, part of a SMURD unit (an acronym for *Mobile Emergency Service for Resuscitation and Extraction*), mostly comprised of firemen and doctors, as well as a number of pilots and medical assistants. Participants were invited to take part in our study through a former student who was at that time a member of the unit, and they addressed the invitation by contacting and obtaining the approval of the board. The mean age for the total sample was $M = 35.6$ ($SD = 6.1$), ranging from 25 to 55 years old, while the male participants prevailed as a number ($N = 77$), with a percentage of 76.2 and only 23.8% female participants ($N = 24$).

3. Measures

The following scales were used to examine the convergent and discriminant validity of the proposed scale, the PTSS.

The *PTSD Checklist for DSM-5 – PCL-5* (Weathers et al., 2013; Blevins et al., 2015) is a 20-item self-report measure that assesses the presence and severity of PTSD symptoms. Following the DSM-5 conceptualization, the items correspond to the 20 criteria for PTSD and are traditionally (Blevins et al., 2015) grouped accordingly into four subscales representing the four symptom clusters (clusters B, C, D, and E). Responses are provided on a 5-point Likert scale (ranging from 0 to 4). PCL-5 is a revised version of the PCL-C.

The *PTSD Checklist – Civilian version – PCL-C* (Weathers et al., 1993) was also used in this study to

Table 2. Percentage of trauma-specific exposures within samples 1 and 3.

Traumatic experience	Students	Clients
Accident	18.68%	24.4%
Fire	10.55%	8.0%
Explosion	2.25%	1.1%
Disaster	21.97%	12.1%
Physical abuse	0.0%	8.3%
Psychological abuse	0.0%	15.0%
Attack	0.0%	9.1%
Sexual aggression	17.99%	0.8%
War	1.55%	0.5%
Incarceration	3.81%	2.9%
Torture	2.76%	0.0%
Terrorism	0.0%	0.0%
Injury	22.32%	9.9%
Threats	37.89%	7.8%
Abduction	2.59%	0.5%
Illness	28.37%	26.6%
Medical accident	14.36%	5.9%
Death of a close person	77.68%	37.6%
Other	22.31%	4.8%

assess the fire survivor sample of this study as PCL-5 was not available at the time for the Romanian public. The instrument contains 17 items and three subscales corresponding to the symptom clusters of the DSM-IV (clusters B, C, and D). Responses to PCL-C are provided on a 5-point Likert scale (ranging from 1 to 5).

The *Depression Anxiety Stress Scales* (DASS-21) is a self-report instrument that assesses three constructs: *Depression*, *Anxiety*, and *Stress* (Lovibond & Lovibond, 1995). Respondents record their answers on a 4-point Likert scale (ranging from 0 to 3). Items comprising each scale are summed and these total sums can be doubled in order to obtain equivalence to the longer DASS-42 version.

The *Dissociative Experiences Scale* (DES; Bernstein & Putnam, 1986) is a self-report 28-item questionnaire based on DSM conceptualization of dissociation. The instrument proved to have a strong ability to identify dissociative disorders or symptomatology in various contexts, being the most commonly used measure to investigate dissociative experiences (Lyssenko et al., 2018; Van IJzendoorn & Schuengel, 1996). Given that it is built on the premise of a continuum, participants are asked to choose the percentage that best suits them, ranging from 0% (never) to 100% (always).

The *Resilience Scale* (Wagnild & Young, 1993) is the first instrument ever designed to measure resilience. The scale consists of 25 items related to the five underlying characteristics of resilience described by Wagnild (2009): (1) self-reliance; (2) meaning; (3) equanimity; (4) perseverance; and (5) existential aloneness. Respondents answer on a 7-point Likert scale, ranging from 1 (disagree) to 7 (agree). The Resilience Scale taps two major factors named *Acceptance of self and life* and *Individual competence* (Wagnild & Young, 1993).

The *Connor-Davidson Resilience Scale* (CD-RISC; Connor & Davidson, 2003) is the most widely used instrument in terms of investigating resilience, composed of 25 items ranging from 1 (not true at all) to 5 (true all the time) on a 5-point Likert scale (Connor & Davidson, 2003; Velickovic et al., 2020). CD-RISC reflects a 5-factor structure, tapping into areas such as (1) *personal competence*, (2) *tolerance of negative affect*, (3) *positive acceptance of change*, (4) *control*, and (5) *spiritual influences*.

The *Emotion Regulation Questionnaire* (Gross & John, 2003) was used to measure respondents' tendency to regulate their emotions. The scale consists of 10 items with a 7-point Likert-type answer format ranging from 1 (strongly disagree) to 7 (strongly agree) tapping two dimensions: (1) *Cognitive Reappraisal* and (2) *Expressive Suppression*. The instrument has been used in various contexts internationally (Gouveia et al., 2018), displaying adequate internal consistency for both subscales, varying from $\alpha = .68$ to $\alpha = .82$ (Gross & John, 2003).

The *Difficulties in Emotion Regulation Scale* (DERS; Gratz & Roemer, 2004) was also employed regarding emotion regulation, an alternative self-report measure focusing on emotion dysregulation, model build upon an integrative framework encompassing six facets (Hallion, Steinman, Tolin, & Diefenbach, 2018). The instrument comprises 36 items measured on a 5-point Likert scale, ranging from 1 (almost never) to 5 (almost always). The internal consistency of the scale, measured by Cronbach's alpha, was high, $\alpha = .93$ (Gratz & Roemer, 2004).

4. Statistical procedures

The data collected were analysed following four main steps. In the first step, MSA was employed to select the final set of 20 items of the scale, out of the 43 items pool retained after the initial pilot study. In the second step, we performed several CFAs on the resulting scale, to examine the fit for the DSM-5 model on PTSD, as well as for the other five competing factor models proposed on PTSD (as described in the Introduction section). Third, several correlational analyses were employed to examine the reliability (e.g. internal consistency and temporal stability) and validity (e.g. convergent and discriminant). In the final step, a network analysis was performed, aiming to examine the potential differences in the network nodes in the student sample compared to the first-responders sample.

MSA is a psychometric technique used to develop multi-item scales and to test assumptions of the NIRT monotone homogeneity model (MHM), characterized by the assumptions of uni-dimensionality, local independence, and latent monotonicity (Mokkan & Lewis, 1982; Mokken, 2011; Sijtsma & Molenaar, 2002; Sijtsma, Meijer, & van der Ark, 2011). All analyses were conducted using the R package Mokken (Van der Ark, 2007, 2012). First, we employed the automated item selection procedure that selects items into scales using a hierarchical clustering algorithm or a particular genetic algorithm (both implemented in the function called AISP). All 20 items were assigned to the same scale. Next, we assessed item scalability coefficients H_i that convey information about the relation between the item and the latent trait, reflecting item discrimination and degree of association with the latent trait (Murray, McKenzie, Booth, & Murray, 2013).

The CFAs were performed in line with the recommendations of most structural equation modelling researchers (e.g. Brown, 2015). The CFAs were conducted using the *cfa* function with ML estimation in lavaan package (Rossee, 2012). Several fit indices were calculated to assess model fit, as it is generally considered that an adequate model fit would yield a $RMSEA < .05$, $CFI > .90$, $TLI > .90$ (Brown, 2015; Schumacker & Lomax, 2010).

The diagnostic utility of the PTSs was evaluated by conducting a logistic regression analysis. In order to identify the sensitivity, specificity, positive and negative predictive values for the PTS scale, receiver operating characteristic (ROC) curves analyses were effectuated, which show the percent of diagnostic accuracy. In other words, we investigated whether participants with PTSD diagnoses according to DSM-V will score similarly on PTSs and the reciprocal assumption. The determination process for an optimal cut-off score, along with sound specificity and sensitivity were based on Youden's J index.

As the PTSs comprised of polytomous items, EBIC-glasso was employed for network analyses (Epskamp & Fried, 2018). Within the two analysed networks (i.e. for students and first responders), nodes are taken to represent PTSD symptoms as assessed by PTSs individual items and edges represent the relationship between two individual nodes when controlling for all other relationships. Indicators of node centrality such as betweenness, closeness, and strength were primarily assessed.

5. Results

5.1 Mokken scale analysis

As recommended, all scalability coefficients calculated for the selected items were larger than .3 (Mokken, 2011), so we proceeded to inspect the total-scalability coefficient H . H is provided with a guideline for the discrimination power of the whole scale (Mokken, 2011, p. 185): $H < .3$ the items are unscalable, $.3 \leq H < .4$ the scale is weak, $.4 \leq H < .5$ the scale is moderate, $H > .5$ the scale is strong. PTSs has a total-scalability coefficient $H = .45$ and fully conforms to the properties of the MHM (Table 3).

Table 3. Item scalability coefficients (SE) and output of monotonicity assessment for the PTSs.

Item	H_i (item scalability)	Active comparisons	Violations	Significant violations
1	.494 (.021)	225	0	0
2	.464 (.022)	178	7	0
3	.526 (.019)	180	2	0
4	.491 (.021)	181	6	0
5	.465 (.023)	208	0	0
6	.439 (.023)	288	1	0
7	.439 (.024)	257	4	0
8	.302 (.029)	251	3	0
9	.491 (.021)	188	4	0
10	.410 (.026)	248	2	0
11	.468 (.023)	174	10	0
12	.490 (.021)	175	2	0
13	.500 (.021)	130	4	0
14	.446 (.023)	194	6	0
15	.422 (.028)	115	1	0
16	.428 (.026)	246	2	0
17	.422 (.024)	22	1	0
18	.400 (.026)	183	1	0
19	.452 (.023)	224	0	0
20	.418 (.024)	250	6	0

5.2 Confirmatory factor analysis – CFA

In this step, the five models described in the Introduction section were compared in terms of data fit: (1) The four factors DSM-5 model (American Psychiatric Association, 2013); (2) The five factors Dysphoric Arousal model (Elhai et al., 2011); (3) The six factors Anhedonia model (Liu et al., 2014); (4) The six factors Externalizing Behaviour model (Tsai et al., 2014); (5) The seven factors Hybrid model (Armour et al., 2015).

Results obtained for sample 3 ($N = 578$) indicated that the DSM-5 4-factor model does not provide an adequate fit to the sample data: $\chi^2(166 \text{ df}) = 806.48$, $p < .001$; TLI = .893; CFI = .907; RMSEA = .082, 90%-CI for RMSEA .076-.087, SRMR = .059. The Dysphoric Arousal 5 factor model presented an acceptable fit: $\chi^2(165 \text{ df}) = 644.39$, $p < .001$; TLI = .919; CFI = .930; RMSEA = .071, 90%-CI for RMSEA .065-.077, SRMR = .066. The Anhedonia model provided the best fit to the sample data: $\chi^2(164 \text{ df}) = 579.11$, $p < .001$; TLI = .930; CFI = .939; RMSEA = .066, 90%-CI for RMSEA .066-.072, SRMR = .062.

Nested models were compared using Chi-Square Difference Test and AIC, while non-nested models were compared using Vuong's test. Consistent with the literature (e.g. for the PCL-5; Blevins et al., 2015), the newer (hierarchical) models outperform the standard DSM-5 model. The Anhedonia 6 factor model presented a significantly superior fit to both the DSM-5 model and the Dysphoric Arousal model.

A recent resurgence of interest in the utility of the bifactor measurement model has primed the hypothesis that PTSD could confirm it (Byllesby et al., 2017). To test this hypothesis, the first three models (DSM-5, Dysphoric Arousal, and Anhedonia models) were modified to account for General Distress, specified as a bifactor. The DSM-5 bifactor model presented a good fit to the data: $\chi^2(150 \text{ df}) = 446.45$, $p < .001$; TLI = .945; CFI = .957; RMSEA = .058, 90% CI for RMSEA .052-.065, SRMR = .045. The fit of the Dysphoric Arousal bifactor model was similar: $\chi^2(150 \text{ df}) = 444.21$, $p < .001$; TLI = .946; CFI = .957; RMSEA = .058, 90% CI for RMSEA .052-.065, SRMR = .044. The Anhedonia bifactor model also fitted the data to a similar extent: $\chi^2(164 \text{ df}) = 450.52$, $p < .001$; TLI = .944; CFI = .956; RMSEA = .059, 90% CI for RMSEA .053-.065, SRMR = .046. As expected, these bifactor models fitted the data better than the higher-order models, even though we know that the statistical comparisons of model fits are biased in favour of the bifactor models (Murray & Johnson, 2013).

Using data from sample 1 ($N = 373$), we tested a broader range of competing PTSD models, presented in Table 4. Similar to the results obtained in sample 3, the 4 factor DSM-5 model demonstrated only a marginal fit, while the other models tested displayed an acceptable fit.

Table 4. Competing factor structures, factor loadings and fit indices for PTSs.

Item	DSM-5 (4 factors)		Dysphoric Arousal (5 factors)		Anhedonia (6 factors)		External Behaviours (6 factors)		Hybrid (7 factors)	
	Subscale	Loadings	Subscale	Loadings	Subscale	Loadings	Subscale	Loadings	Subscale	Loadings
1. B1	Rexp	.762	Rexp	.763	Rexp	.763	Rexp	.764	Rexp	.764
2. B1	Rexp	.747	Rexp	.747	Rexp	.748	Rexp	.747	Rexp	.748
3. B4	Rexp	.888	Rexp	.888	Rexp	.888	Rexp	.888	Rexp	.888
4. B5	Rexp	.849	Rexp	.848	Rexp	.848	Rexp	.848	Rexp	.847
6. C2	Avoid	.846	Avoid	.850	Avoid	.851	Avoid	.851	Avoid	.852
5. C1	Avoid	.661	Avoid	.658	Avoid	.658	Avoid	.657	Avoid	.657
7. C2	Avoid	.653	Avoid	.652	Avoid	.651	Avoid	.652	Avoid	.651
8. D1	NACM	.499	NACM	.496	NACM	.552	NACM	.493	NACM	.551
9. D2	NACM	.731	NACM	.728	NACM	.831	NACM	.725	NACM	.833
10. D3	NACM	.447	NACM	.442	NACM	.505	NACM	.439	NACM	.504
11. D5	NACM	.761	NACM	.765	Anhed	.783	NACM	.767	Anhed	.783
12. D6	NACM	.765	NACM	.764	Anhed	.759	NACM	.765	Anhed	.758
13. D7	NACM	.821	NACM	.822	Anhed	.835	NACM	.824	Anhed	.835
14. E1	HypA	.496	DysphA	.485	DysphA	.484	ExtB	.534	ExtB	.532
15. E2	HypA	.442	DysphA	.455	DysphA	.456	ExtB	.504	ExtB	.505
16. E5	HypA	.795	DysphA	.828	DysphA	.829	DysphA	.807	DysphA	.807
17. E6	HypA	.679	DysphA	.687	DysphA	.687	DysphA	.676	DysphA	.676
18. E3	HypA	.594	AnxA	.685	AnxA	.685	AnxA	.685	AnxA	.685
19. E4	HypA	.636	AnxA	.777	AnxA	.778	AnxA	.778	AnxA	.778
20. E4	HypA	.575	AnxA	.677	AnxA	.677	AnxA	.677	AnxA	.677
Second order model fit	$\chi^2(166) = 499.12, p < .001$ TLI = .896, CFI = .909, RMSEA = .073 with 95%CI = [.066, .081], SRMR = .055		$\chi^2(165) = 423.80, p < .001$ TLI = .919, CFI = .930, RMSEA = .065 with 95%CI = [.057, .072], SRMR = .051		$\chi^2(164) = 398.95, p < .001$ TLI = .926, CFI = .936, RMSEA = .062 with 95%CI = [.054, .070], SRMR = .051		$\chi^2(164) = 425.96, p < .001$ TLI = .917, CFI = .929, RMSEA = .065 with 95%CI = [.058, .073], SRMR = .052		$\chi^2(163) = 401.13, p < .001$ TLI = .924, CFI = .935, RMSEA = .063 with 95%CI = [.055, .070], SRMR = .052	
Bifactor model fit	$\chi^2(150) = 360.75, p < .001$ TLI = .927, CFI = .943, RMSEA = .061 with 95%CI = [.053, .069], SRMR = .051		$\chi^2(150) = 362.18, p < .001$ TLI = .927, CFI = .930, RMSEA = .062 with 95%CI = [.054, .070], SRMR = .050		$\chi^2(150) = 366.34, p < .001$ TLI = .925, CFI = .941, RMSEA = .062 with 95%CI = [.054, .070], SRMR = .048		$\chi^2(152) = 370.63, p < .001$ TLI = .926, CFI = .941, RMSEA = .062 with 95%CI = [.054, .070], SRMR = .051		$\chi^2(152) = 375.12, p < .001$ TLI = .924, CFI = .939, RMSEA = .063 with 95%CI = [.055, .071], SRMR = .049	

Note: Rexp, re-experiencing; Avoid, avoidance; NACM, negative alterations in cognitions and mood; HypA, hyperarousal; DysphA, dysphoric arousal; AnxA, anxious arousal; Anhed, anhedonia; ExtB, externalizing behaviours; Th, threat.

Using data from samples 1 and 3 we determined that the Anhedonia model also demonstrates ‘weak’ measurement invariance (i.e. the equivalence of the factor loadings for each item across groups) between samples (*n.s.* χ^2 and $\Delta CFI < .01$).

Testing competing factor structures is important for future decisions on diagnostic criteria. Using the newly developed PTSs, we found two main patterns relevant for present debates around this topic. First, in all hierarchical models, the highest loadings on PTSD were found for NACM and Hyperarousal, or their components, Anhedonia and Dysphoria. These factors are often used to explain the concurrence of PTSD with depression and anxiety and are not considered the core features of PTSD. Yet, they appear as crucial symptom clusters within the current conceptualization. Second, all bifactor models share the same four items to define the nature of the bifactor. The highest loadings on the bifactor (above .74 for all models), and lowest on specific factors, are for the loss of interest, detachment/estrangement, dysphoria/anhedonia, and concentration. The first three are the ones comprising the Anhedonia component, while concentration is part of Hyperarousal/Dysphoria. Clearly, the bifactor, used in PTSD research to represent general distress, was best defined by items pertaining to depressive symptoms.

5.3 Network interpretation

To determine the PTSs’ ability to distinguish between symptom structures in different populations, network analysis was employed to compare symptom configurations in sample 4 (first responders) and sample 3 (trauma-exposed university students). The two respective networks are presented in Figure 1, its visual inspection providing some important insights about their characteristics. Firstly, the first responder network seems to show overall higher connectivity than the student network. Secondly, while nodes in the student network seemed to cluster following the factorial structure of the PTSs, this pattern was less accentuated for the responder network.

Thirdly, as detailed below, different nodes emerged as more central in the two networks.

5.4 Psychometrics properties

5.4.1 Reliability

The internal consistency of the entire PTSs was .94 with 95%-CI [.93; .95] for the sample 3 and .93 with 95%-CI [.92; .94] for the sample 1, while Cronbach’s α was .92 for PTSs factor B, .84 for factor C, .88 for factor C, and, finally, .86 for factor D.

Three months’ test-retest reliability of the entire PTSs computed on sample 2 (‘Colectiv’) was .85 ($p < .001$),

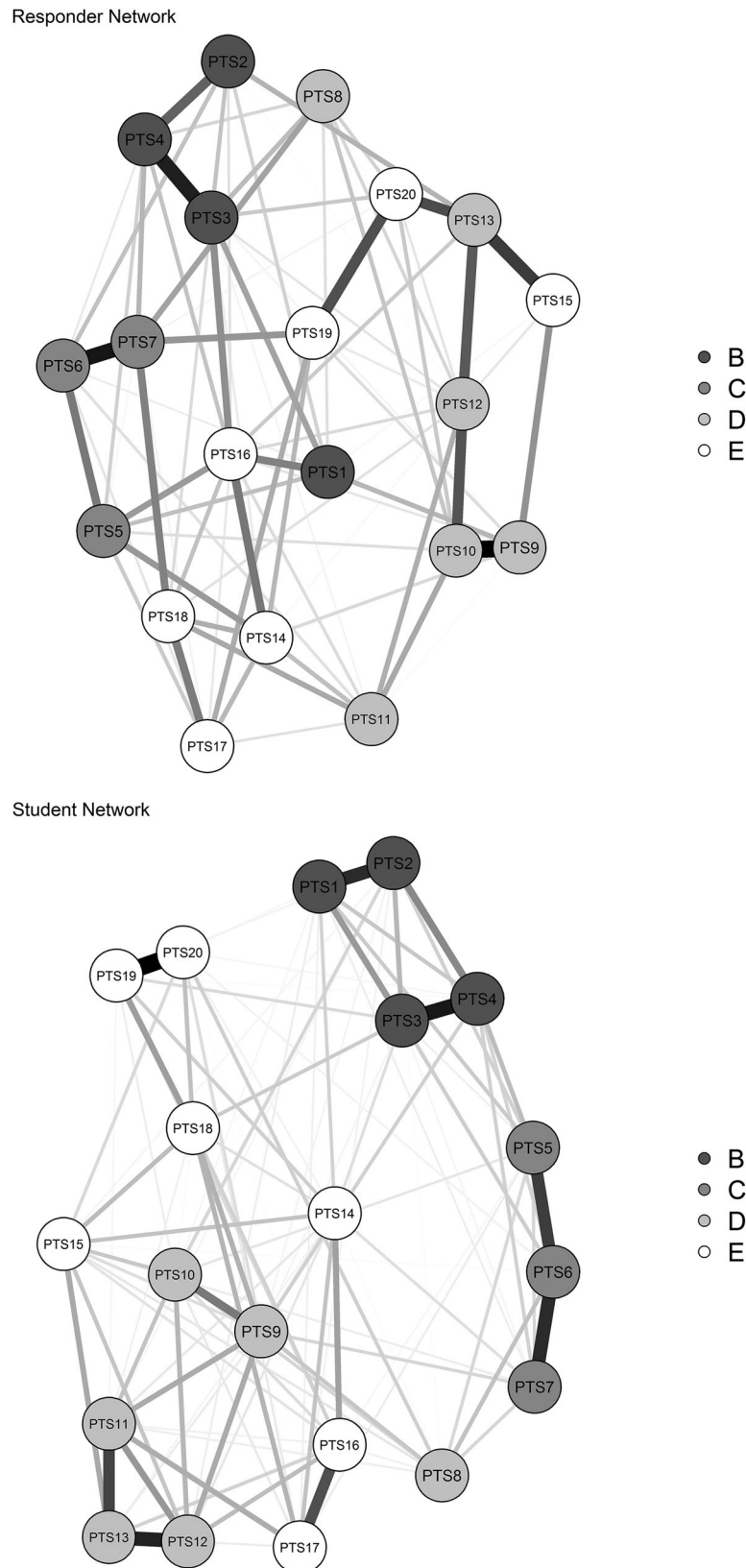


Figure 1. Correlations between PTSs' items in the first responders sample versus the student sample.

larger than that of PCL-C (.75, $p < .001$), and its subscales ranged between .65 and .82. This sample was selected in light of its particular characteristics that make it more suitable for a test-retest analysis by comparison to the other trauma-exposed samples, as follows: the 'Colectiv' sample was comprised of participants who have all been

exposed to the same incident at the same time, namely the fire at the nightclub bearing the same name. Our rationale is that this group of people is marked by (a) homogeneity in terms of the traumatic event, and (b) a good time delimitation, i.e. the period elapsed from the incident (Figures 2 and 3).

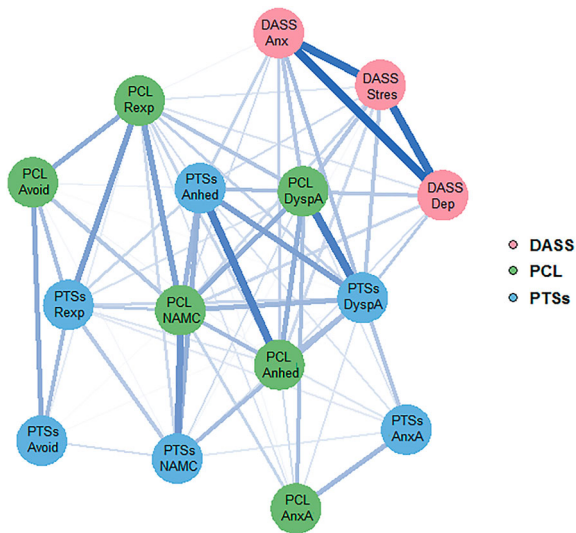


Figure 2. Correlations between subscales of PTSDs, PCL-5, and DASS.

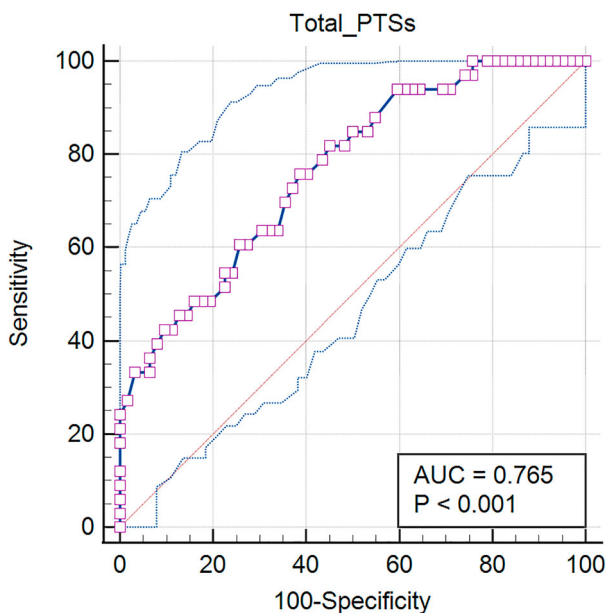


Figure 3. ROC Curve of the PCL-5 compared to SCID-5 diagnoses ($N = 95$).

5.4.2 Validity

5.4.2.1 Convergent validity. According to earlier findings, we expected that PTSDs will correlate highly with the PTSD measure, PCL-5, most likely at a moderate level with the symptomatology of anxiety and depression, while it will show inverse and reduced relations with the measures selected for discriminant validity (Ashbaugh, Houle-Johnson, Herbert, El-Hage, & Brunet, 2016; LeardMann et al., 2021).

First, global scores of PTSDs and PCL-5 were highly correlated ($.87, p < .001$). Correlations between corresponding subscales, according to the Anhedonia model, ranged between $.67$ and $.81$ ($p < .001$). Nevertheless, PTSDs was less correlated than PCL-5 with depressive and anxious symptoms assessed by DASS ($r = .61$ & $.63$ vs. $.67$ & $.66$). Moreover, the core

PTSD subscale of PTSDs seems to be less saturated by depressive and anxious symptoms.

PTSDs shows also a clear convergent correlation with the PCL-C ($r = .87$ and $.83$ at retest, $p < .001$). Criterion B as assessed by PCL-C was strongly linked to Rexp ($r = .70$), criterion C was strongly linked to NACM, Anhed and DyspA ($r = .72, .78, .73$), while criterion D was strongly related to DyspA and AnxA ($r = .80, .72$).

5.4.2.2 Discriminant validity. PTSDs presented similar inverse correlations with The Resilience Scale as the PCL-5 ($r = -.42$ vs. $r = -.41$), although some of the inter-scale correlations were mildly stronger for the PTSDs. Neither PTSDs, nor PCL-5 correlated with the cognitive reappraisal aspect of emotional regulation, but both showed significant inverse correlations with expressive suppression ($r = -.20$, and $-.17$, respectively). In line with the previous instrument, DERS showed positive correlations with the PTSDs ($r = .52$), given that high scores reflect increased emotion dysregulation. Moreover, PTSDs displayed inverse correlations with the alternative instrument used for resilience as well, namely CD-RISC, for the total scales and all of the subscales of the latter ($r = -.32$). As expected from the literature (Van IJzendoorn & Schuengel, 1996), PTSDs was only mildly correlated to Dissociation ($r = .30, p < .001$).

5.4.2.3 Criterion validity. To investigate the diagnostic utility of PTSDs, a sample comprised of 95 participants was assessed with the Structured Clinical Interview for DSM-5, the Clinician Version (SCID-5-CV; First, 2015). The participants were selected from sample 3 based on their availability and option to further take part in the study. No extra compensation was offered for this stage. Of these, 91.58% are female, having a mean age of 21.47 years old ($SD = 4.74$). The mean PTSDs score is 81.98 ($SD = 30.09$), and 33 participants (33.74%) were identified as having a PTSD diagnosis based on SCID-5. The clinical interviews were conducted by a team of trained clinical psychologists under the supervision of the 1st author. Participants completed the PTSDs before completing SCID-5.

A logistic regression analysis was performed in order to investigate the extent to which SCID-5 diagnoses are predicted by PTSDs total score. We found a significant association between them $\chi^2(1) = 5.31$ ($p < .000$). The unstandardized regression coefficient is $B = -.03$ ($SE = .01$), and 71.3% of the sample was accurately diagnosed.

To examine the diagnostic precision of the PTSDs as compared to SCID-5 diagnoses, as well as to determine an optimal cut-off score a ROC Curve analysis was performed, using *MedCalc Software*, version 19.5.3. Therefore, the area under the curve (AUC)

was .76 (SE = .05), 95%-CI = [.66; .84], indicating a good overall accuracy. The cut-off score of > 80 was identified based on Youden's J index, the score with the highest sensitivity and specificity (J = .37, Sn = 75.76, Sp = 61.69).

6. Discussion

The current study achieved two fundamental aims. Firstly, giving careful consideration to claims regarding the relevance of cultural and linguistic factors in psychological assessment, we developed a novel instrument for PTSD, the PTSs, which showed sound psychometric properties, deeming it fit for research and clinical practice. To additionally consider theoretical concerns regarding the latent structure of PTSD, we employed this instrument aimed to test competing factorial structures of PTSD, building upon the literature of overarching support for models that emphasize the comorbidity between PTSD and affective disorders. Secondly, the current findings highlight differences in the global and local network structure of PTSD between sample 3 and sample 4, with the latter network showing increased global connectivity and increased centrality of affective symptoms (i.e. detachment and anhedonia).

Concerning the *main objective*, (1) PTSs proved to be a psychometrically sound instrument, as it resulted from both of the approaches employed for the scale construction process, NIRT – Mokken Scale Analysis, and CTT respectively. Moreover, our data showed (2) *good reliability properties* as displayed by internal consistency and test-retest reliability, and *excellent validity*, including convergent validity with both PCL-5 and PCL-C, criterion validity (with SCID-5), and discriminant validity taking into account the Resilience Scale and the Emotion Regulation Questionnaire.

Regarding (2) *factor analyses*, the obtained data indicate that PTSs conform with the majority of the findings reported for the latent structure of PTSD. Given that our instrument was tested against 5 competing models, there are some specifications worth mentioning. The *DSM-5 4-factor model* provided a less than adequate fit for our sample data, *The Dysphoric Arousal 5-factor model* displayed an acceptable fit, while the *Anhedonia model* and the *Hybrid model* provided a superior fit compared to the previous two mentioned. This is an important finding given that research is scarce when it comes to comparisons with 6-factor and 7-factor models, and our results are in line with other studies (e.g. Armour et al., 2015; Bovin et al., 2016). To conclude, the 4-factors model proposed by DSM-5 displayed only a marginal fit in both samples, while other models tested (3-, 5-, 6- or 7-factors) displayed at least acceptable fit indexes, supporting the other existent findings (Armour, Müllerová, & Elhai, 2016). Thus, the results

of this study suggest that bifactor models, which were found to fit better than second-order models, could be used to explain the comorbidity between affective, anxious, and post-traumatic stress disorders.

Concerning our *second objective*, results show stronger global connectivity in the first responders' network, as opposed to the students' network, a finding which is aligned with the robust empirical findings that first responders are at significantly higher risk of developing PTSD than the general population (Berger et al., 2012; Petrie et al., 2018; Trudgill, Gorey, & Donnelly, 2020), and builds upon them with insights from a network approach of psychopathology (Borsboom, 2017). The two analysed networks also differed in relevant ways in terms of their local connectivity patterns. While the students' network (sample 3) showed a pattern that is broadly more consistent with theoretical conceptualizations of PTSD (i.e. symptoms clustered in accordance to DSM-5 designated criteria), in first responders' networks (sample 4), symptoms pertaining to criterion E (i.e. alterations in arousal and reactivity) and criterion D (i.e. negative alterations in cognitions and mood, NACM) grouped with all the other clusters, showing particularly strong associations with each other.

6.1 Theoretical and practical implications

From a clinical standpoint, PTSs can prove to be useful in contexts that are particularly related to the areas of abuse and trauma that lead to the development of post-traumatic symptomatology. More specifically, one differentiation between PTSs and PCL resides in the fact that PTSs is less loaded in depression and anxiety, thus being a more valuable instrument in capturing the subtle distinction in symptoms regarding the aforementioned disorders and PTSD.

Shame, guilt, and fear of stigmatization are well-known barriers to disclosure and talking about such overwhelming experiences (Bonfils et al., 2018; Lee, Scragg, & Turner, 2001). These strong emotions can reach extreme levels when a community lacks the supporting, encouraging narrative, and collective frameworks for allowing people to (a) share more freely between themselves aspects about abuse and/or trauma and (b) reach the appropriate institutions in order to receive the mental health aid both being connected to (c) holding/lacking the basic education regarding the injured psyche that comes along with certain events (Goldsmith et al., 2014).

The characteristics of the Romanian culture share a common ground with other nations that have been ruled according to a Marxist-Leninist state ideology after World War II, such as Bulgaria, Czechoslovakia, Poland, etc. Consequently, although the sample used for PTSs validation is comprised solely of Romanian participants, we firmly believe that the instrument's

accuracy in clinical contexts is not confined by our specific geographical borders. Whilst the first discussed obstacles are, as one can say, enhanced by the lingering culturally transmitted factors and still represent today a language impediment in ‘simply’ expressing one’s subjective reality. PTSs may bypass these issues and help people recognize their inner reality through more natural and habitual phrasing.

Using the newly developed PTSs, we found two main patterns relevant for present debates around this topic. First, in all hierarchical models, the highest loadings on PTSD were found for NACM and Hyperarousal, or their components, Anhedonia and Dysphoria. These factors are often used to explain the concurrence of PTSD with depression and anxiety and are not considered the core features of PTSD. Yet, they appear as crucial symptom clusters within the current conceptualization. Second, all bifactor models share the same four items to define the nature of the bifactor. The highest loadings on the bifactor (above .74 for all models), and lowest on specific factors, are for loss of interest, detachment/estrangement, dysphoria/anhedonia, and concentration. The first three are the ones comprising the Anhedonia component, while concentration is part of Hyperarousal/Dysphoria. Clearly, the bifactor, used in PTSD research to represent general distress, was best defined by items pertaining to depression.

Furthermore, the pattern of differences uncovered between the trauma-exposed university student network (sample 3) and the first-responders network (sample 4) is of theoretical and clinical relevance, as it provides, at least for specific high-risk samples, tentative evidence contradicting the notion of symptom equivalence. For example, for first responders three NACM symptoms (i.e. detachment/estrangement, dysphoria/anhedonia, and distortion in worldview concerning self and others) showed the highest centrality in the network while, amnesia, another cluster D symptom, showed the lowest centrality in both analysed samples, as well as in a robust body of literature examining the network structure of PTSD (Birkeland, Greene, & Spiller, 2020). This finding, emerging from both a network and a CFA approach, clearly indicates that not all symptoms within a cluster can be treated as interchangeable indicators of an underlying disorder (Fried, Epskamp, Nesse, Tuerlinckx, & Borsboom, 2016).

The high centrality of detachment, anhedonia and distorted worldview within the responder network is consistent with the factor analytic structure and also replicates previous work, including that in other high-risk samples such as veterans (Benfer et al., 2018; Mitchell et al., 2017; von Stockert, Fried, Armour, & Pietrzak, 2018). This brings forth relevant implications. From the perspective of network theories of psychopathology, as these symptoms show

some degree of conceptual overlap with those of Major Depressive Disorder, they would be considered bridge symptoms, not only maintaining the PTSD network but also being indicative of potential comorbidities and overall elevated vulnerability (Borsboom, 2017). By contrast, the students’ network showed high centrality for symptoms that could be considered more indicative of ‘pure’ PTSD, such as difficulty concentrating and avoidance of external traumatic reminders.

In broader terms, this claim also weighs in current debates regarding the clinical assessment and treatment of PTSD. More specifically, as the latest version of the International Classification of Disease (ICD-11) has excluded negative alterations in cognitions and mood (NACM) symptoms from the PTSD diagnosis due to their lack of specificity, concerns have been raised with regard to a potential underestimation of the real prevalence and severity of the disorder (Wisco et al., 2016). Our results, alongside a solid body of work, indicate that these symptoms are central to the activation of PTSD networks, as well as indicative of a core vulnerability to psychopathology and, therefore, should be considered integral to the diagnosis of PTSD (Mitchell et al., 2017). Additionally, the high centrality of detachment and anhedonia highlights the importance of specifically targeting them in PTSD interventions. While most evidence-based treatments focus primarily on reducing anxiety and intrusive thoughts, they do not directly address lack of trust and connection, which might be an explanation for the limited rates of remission (Morina, Wicherts, Lobrecht, & Priebe, 2014).

6.2 Limitations and future directions

A few limitations must be noted along with prospective solutions/suggestions. One limitation of the study pertains to samples’ characteristics, regarding which we note the following: (a) sample 3, although large and multi-site, was a convenience one; (b) sample 2 was very small and with very specific event-related features, prompting the need for further explorations of the PTSs on clinical samples; (c) sample 4 was comprised of people working at ‘SMURD’ which, in Romania, represents a system of emergency rescue services with both paramedical and technical support that deal with the worst situations. Therefore, other at-risk occupations, such as military and law enforcement officers and personnel should be addressed in future research given the particularities of such populations, especially when compared to other ER units from different countries. Last, out of the four samples, only data from sample 3 was collected using an online format, whilst the others were via pen-and-pencil methodologies. Nevertheless, a recent meta-analysis focused on addressing the

potential inconsistencies between the two formats showed equivalence across conditions (Weigold, Weigold, & Natera, 2018).

PTSs was developed with careful consideration to the way people naturally express their subjective experience of symptomatology. Therefore, we encourage that future assessment instruments are to integrate not only the researcher's perspective but also the clinician's, who spends their time more closely with the people suffering from various hurtful wounds and face difficulties in expressing the pain. Hence, they have a more all-encompassing experience, with both of the advantages of textbook knowledge and the real-life and naturalistic practice.

Since the PTSs has, to date, only been applied on a Romanian sample, examining the measurement invariance of this assessment instrument in a multicultural context is warranted. This would include countries that share specific cultural and historical similarities, but also different cultural spaces which may require specific cultural adaptations.

7. Concluding remarks

Consequently, the current work contributes to the growing literature on PTSD by proposing a novel, psychometrically sound instrument aimed at assessing symptomatology in a manner that is more consistent with the way people naturally express their subjective experiences. Additionally, by employing this instrument within both a latent factor and a network psychometric framework, we also provide tentative evidence for the current debates regarding the factor structure of PTSD and the overlap between affective and post-traumatic symptoms.


Disclosure statement

No potential conflict of interest was reported by the author(s).

Data availability statement

The data that support the findings of the current study are openly available in OSF at <https://osf.io/mptxv/>, with identifier: [Doi:10.17605/OSF.IO/MPTXV](https://doi.org/10.17605/OSF.IO/MPTXV).

ORCID

Cătălin Nedelcea  <http://orcid.org/0000-0001-5951-1401>
 Iulia D. Ciorbea  <http://orcid.org/0000-0003-4499-0096>
 Diana L. Vasile  <http://orcid.org/0000-0002-9700-0271>
 Claudiu Papasteri  <http://orcid.org/0000-0001-7047-0620>
 Ramona D. Letzner  <http://orcid.org/0000-0003-3730-7180>
 Ana Cosmoiu  <http://orcid.org/0000-0002-4119-3019>
 Teodora Georgescu  <http://orcid.org/0000-0002-1105-4392>

References

- Alves, P. C. G., Sales, C. M. D., & Ashworth, M. (2016). "It is not just about the alcohol": service users' views about individualised and standardised clinical assessment in a therapeutic community for alcohol dependence. *Substance Abuse Treatment, Prevention, and Policy*, 11(1), 1–7. doi:10.1186/s13011-016-0070-5
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). <https://doi.org/10.1176/appi.books.9780890425596>.
- Armour, C., Müllerová, J., & Elhai, J. D. (2016). A systematic literature review of PTSD's latent structure in the Diagnostic and Statistical Manual of Mental Disorders: DSM-IV to DSM-5. *Clinical Psychology Review*, 44, 60–74.
- Armour, C., Tsai, J., Durham, T. A., Charak, R., Biehn, T. L., Elhai, J. D., & Pietrzak, R. H. (2015). Dimensional structure of DSM-5 posttraumatic stress symptoms: Support for a hybrid Anhedonia and Externalizing Behaviors model. *Journal of Psychiatric Research*, 61, 106–113.
- Ashbaugh, A. R., Houle-Johnson, S., Herbert, C., El-Hage, W., & Brunet, A. (2016). Psychometric validation of the English and French versions of the posttraumatic stress disorder checklist for DSM-5 (PCL-5). *PLoS one*, 11(10), 1–16.
- Benfer, N., Bardeen, J. R., Cero, I., Kramer, L. B., Whiteman, S. E., Rogers, T. A., ... Weathers, F. W. (2018). Network models of posttraumatic stress symptoms across trauma types. *Journal of Anxiety Disorders*, 58, 70–77. doi:10.1016/j.janxdis.2018.07.004
- Berger, W., Coutinho, E. S. F., Figueira, I., Marques-Portella, C., Luz, M. P., Neylan, T. C., ... Mendlowicz, M. V. (2012). Rescuers at risk: A systematic review and meta-regression analysis of the worldwide current prevalence and correlates of PTSD in rescue workers. *Social Psychiatry and Psychiatric Epidemiology*, 47(6), 1001–1011. doi:10.1007/s00127-011-0408-2
- Bernstein, E. M., & Putnam, F. W. (1986). Development, reliability, and validity of a dissociation scale. *The Journal of Nervous and Mental Disease*, 174(12), 727–735. doi:10.1097/00005053-198612000-00004
- Birkeland, M. S., Greene, T., & Spiller, T. R. (2020). The network approach to posttraumatic stress disorder: A systematic review. *European Journal of Psychotraumatology*, 11(1), 1–15. doi:10.1080/20008198.2019.1700614
- Blevins, C. A., Weathers, F. W., Davis, M. T., Witte, T. K., & Domino, J. L. (2015). The posttraumatic stress disorder checklist for DSM-5 (PCL-5): Development and initial psychometric evaluation. *Journal of Traumatic Stress*, 28(6), 489–498.
- Bonfils, K. A., Lysaker, P. H., Yanos, P. T., Siegel, A., Leonhardt, B. L., James, A. V., ... Davis, L. W. (2018). Self-stigma in PTSD: Prevalence and correlates. *Psychiatry Research*, 265, 7–12. doi:10.1016/j.psychres.2018.04.004
- Borsboom, D. (2017). A network theory of mental disorders. *World Psychiatry*, 16(1), 5–13. doi:10.1002/wps.20375
- Bovin, M. J., Marx, B. P., Weathers, F. W., Gallagher, M. W., Rodriguez, P., Schnurr, P. P., & Keane, T. M. (2016). Psychometric properties of the PTSD checklist for diagnostic and statistical manual of mental disorders-fifth edition (PCL-5) in veterans. *Psychological Assessment*, 28(11), 1379–1391. doi:10.1037/pas0000254
- Brown, T. A. (2015). *Confirmatory Factor Analysis for Applied Research*. New York: Guilford publications.
- Byllesby, B. M., Elhai, J. D., Tamburrino, M., Fine, T. H., Cohen, G., Sampson, L., ... Calabrese, J. R. (2017). General distress is more important than PTSD's

- cognition and mood alterations factor in accounting for PTSD and depression's comorbidity. *Journal of Affective Disorders*, 211, 118–123.
- Connor, K. M., & Davidson, J. R. T. (2003). Development of a new resilience scale: The Connor-Davidson Resilience Scale (CD-RISC). *Depression and Anxiety*, 18(2), 76–82. doi:10.1002/da.10113
- Correll, L., Correll, T., & Predescu, M. (2006). *USAID and Child Welfare Reform in Romania: Challenges, Successes, and Legacy*. Washington, DC: USAID/DGST/E&E, JBS International, Aguirre Division. Retrieved October, 27, 2016.
- Darves-Bornoz, J.-M., Alonso, J., de Girolamo, G., de Graaf, R., Haro, J.-M., Kovess-Masfety, V., ... ESEMED/MHEDEA 2000 Investigators (2008). Main traumatic events in Europe: PTSD in the European study of the epidemiology of mental disorders survey. *Journal of Traumatic Stress*, 21(5), 455–462. doi:10.1002/jts.20357
- Dennis, D. (2018). *Romania Under Communism: Paradox and Degeneration*. London: Routledge.
- Elhai, J. D., Biehn, T. L., Armour, C., Klopper, J. J., Frueh, B. C., & Palmieri, P. A. (2011). Evidence for a unique PTSD construct represented by PTSD's D1–D3 symptoms. *Journal of Anxiety Disorders*, 25(3), 340–345.
- Epskamp, S., & Fried, E. I. (2018). A tutorial on regularized partial correlation networks. *Psychological Methods*, 23(4), 617–634.
- First, M. B. (2015). Structured clinical interview for the DSM (SCID). In R. L. Cautin & S. O. Lilienfeld (Eds.), *The Encyclopedia of Clinical Psychology*. doi:10.1002/9781118625392.wbecp351
- Fried, E. I., Epskamp, S., Nesse, R. M., Tuerlinckx, F., & Borsboom, D. (2016). What are 'good' depression symptoms? Comparing the centrality of DSM and non-DSM symptoms of depression in a network analysis. *Journal of Affective Disorders*, 189, 314–320. doi:10.1016/j.jad.2015.09.005
- Friedman, M. J. (2013). Finalizing PTSD in DSM-5: Getting here from there and where to go next. *Journal of Traumatic Stress*, 26(5), 548–556. doi:10.1002/jts.21840
- Galasiński, D., & Kozłowska, O. (2010). Questionnaires and lived experience: Strategies of coping with the quantitative frame. *Qualitative Inquiry*, 16(4), 271–284. doi:10.1177/1077800409354068
- Goldsmith, R. E., Martin, C. G., & Smith, C. P. (2014). Systemic trauma. *Journal of Trauma & Dissociation*, 15(2), 117–132. doi:10.1080/15299732.2014.871666
- Gouveia, V. V., Moura, H. M. D., Oliveira, I. C. V. D., Ribeiro, M. G. C., Rezende, A. T., & Brito, T. R. D. S. (2018). Emotional regulation questionnaire (ERQ): evidence of construct validity and internal consistency. *Psico-USF*, 23, 461–471.
- Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessment*, 26(1), 41–54.
- Greenwell, K. F. (2003). *The effects of child welfare reform on levels of child abandonment and deinstitutionalization in Romania, 1987-2000* [Ph.D. Thesis].
- Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology*, 85(2), 348–362.
- Hallion, L. S., Steinman, S. A., Tolin, D. F., & Diefenbach, G. J. (2018). Psychometric properties of the difficulties in emotion regulation scale (DERS) and its short forms in adults with emotional disorders. *Frontiers in Psychology*, 9, 1–12. doi:10.3389/fpsyg.2018.00539
- Harper, L. (2005). Epigenetic inheritance and the intergenerational transfer of experience. *Psychological Bulletin*, 131(3), 340–360. doi:10.1037/0033-2909.131.3.340
- Hogue, A., Lickfelt, S., Mylet, S., Perris, T., Thomas, S., & Young, A. (2004). *An organizational assessment of children's social service agencies in Romania*.
- International Test Commission. (2017). *The ITC Guidelines for Translating and Adapting Tests* (2nd ed.). [www.InTestCom.org].
- Irimie, R. C. (2014). Everydy life under communism. The case of Romania. *SEA-Practical Application of Science*, 2(03), 266–283.
- Kantor, V., Knepfel, M., & Lueger-Schuster, B. (2017). Perceived barriers and facilitators of mental health service utilization in adult trauma survivors: A systematic review. *Clinical Psychology Review*, 52, 52–68. doi:10.1016/j.cpr.2016.12.001
- Kessler, R. C., Chiu, W. T., Demler, O., & Walters, E. E. (2005). Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the national comorbidity survey replication. *Archives of General Psychiatry*, 62(6), 617–627. doi:10.1001/archpsyc.62.6.617
- Kidron, C. A., & Kirmayer, L. J. (2019). Global mental health and idioms of distress: The paradox of culture-sensitive pathologization of distress in Cambodia. *Culture, Medicine, and Psychiatry*, 43(2), 211–235. doi:10.1007/s11013-018-9612-9
- Kim, Y. J., Rooij, S. J. H., Ely, T. D., Fani, N., Ressler, K. J., Jovanovic, T., & Stevens, J. S. (2019). Association between posttraumatic stress disorder severity and amygdala habituation to fearful stimuli. *Depression and Anxiety*, 36(7), 647–658. doi:10.1002/da.22928
- LeardMann, C. A., McMaster, H. S., Warner, S., Esquivel, A. P., Porter, B., Powell, T. M., ... Millennium Cohort Study Team (2021). Comparison of posttraumatic stress disorder checklist instruments from diagnostic and statistical manual of mental disorders, vs fifth edition in a large cohort of US military service members and veterans. *JAMA Network Open*, 4(4), e218072–e218072.
- Lee, D. A., Scragg, P., & Turner, S. (2001). The role of shame and guilt in traumatic events: A clinical model of shame-based and guilt-based PTSD. *British Journal of Medical Psychology*, 74(4), 451–466. doi:10.1348/000711201161109
- Lehrner, A., & Yehuda, R. (2018). Cultural trauma and epigenetic inheritance. *Development and Psychopathology*, 30(5), 1763–1777. doi:10.1017/S0954579418001153
- Liu, W. H., Wang, L. Z., Shang, H. R., Shen, Y., Li, Z., Cheung, E. F., & Chan, R. C. (2014). The influence of anhedonia on feedback negativity in major depressive disorder. *Neuropsychologia*, 53, 213–220.
- Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy*, 33, 335–343.
- Lyssenko, L., Schmahl, C., Bockhacker, L., Vonderlin, R., Bohus, M., & Kleindienst, N. (2018). Dissociation in psychiatric disorders: A meta-analysis of studies using the dissociative experiences scale. *American Journal of Psychiatry*, 175(1), 37–46.
- Maercker, A., & Hecker, T. (2016). Broadening perspectives on trauma and recovery: A socio-interpersonal view of PTSD. *European Journal of Psychotraumatology*, 7(1), 29303.
- Marshall, R. E., Milligan-Saville, J., Petrie, K., Bryant, R. A., Mitchell, P. B., & Harvey, S. B. (2021). Mental health

- screening amongst police officers: Factors associated with under-reporting of symptoms. *BMC Psychiatry*, 21(1), 1–8. doi:10.1186/s12888-021-03125-1
- Mitchell, K. S., Wolf, E. J., Bovin, M. J., Lee, L. O., Green, J. D., Rosen, R. C., ... Marx, B. P. (2017). Network models of DSM-5 posttraumatic stress disorder: Implications for ICD-11. *Journal of Abnormal Psychology*, 126(3), 355–366. doi:10.1037/abn0000252
- Mokkan, R. J., & Lewis, C. (1982). A nonparametric approach to the analysis of dichotomous item responses. *Applied Psychological Measurement*, 6(4), 417–430.
- Mokken, R. J. (2011). *A Theory and Procedure of Scale Analysis*. New York: De Gruyter Mouton.
- Morina, N., Wicherts, J. M., Lobbrecht, J., & Priebe, S. (2014). Remission from post-traumatic stress disorder in adults: A systematic review and meta-analysis of long term outcome studies. *Clinical Psychology Review*, 34(3), 249–255. doi:10.1016/j.cpr.2014.03.002
- Murray, A. L., & Johnson, W. (2013). The limitations of model fit in comparing the bi-factor versus higher-order models of human cognitive ability structure. *Intelligence*, 41(5), 407–422. doi:10.1016/j.intell.2013.06.004
- Murray, A., McKenzie, K., Booth, T., & Murray, G. (2013). Estimating the level of functional ability of children identified as likely to have an intellectual disability. *Research in Developmental Disabilities*, 34(11), 4009–4016.
- Norris, F. H., Stevens, S. P., Pfefferbaum, B., Wyche, K. F., & Pfefferbaum, R. L. (2008). Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. *American Journal of Community Psychology*, 41(1–2), 127–150. doi:10.1007/s10464-007-9156-6
- Økstedalen, T., Hoffart, A., & Langkaas, T. F. (2015). Trauma-related shame and guilt as time-varying predictors of posttraumatic stress disorder symptoms during imagery exposure and imagery rescripting—A randomized controlled trial. *Psychotherapy Research*, 25(5), 518–532. doi:10.1080/10503307.2014.917217
- Petrie, K., Milligan-Saville, J., Gayed, A., Deady, M., Phelps, A., Dell, L., ... Harvey, S. B. (2018). Prevalence of PTSD and common mental disorders amongst ambulance personnel: A systematic review and meta-analysis. *Social Psychiatry and Psychiatric Epidemiology*, 53(9), 897–909. doi:10.1007/s00127-018-1539-5
- Phillips, R. D., Wilson, S. M., Sun, D., VA Mid-Atlantic MIRECC Workgroup, & Morey, R. (2018). Posttraumatic stress disorder symptom network analysis in U.S. Military veterans: Examining the impact of combat exposure. *Frontiers in Psychiatry*, 9, 1–12. doi:10.3389/fpsy.2018.00608
- Rosapepe, J. C. (2001). Halfway home: Romania's abandoned children ten years after the revolution. *Report of the US Ambassador to Romania*. Accessed 12 May, 2004.
- Rosseel, Y. (2012). Lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, 48(2), 1–36.
- Schumacker, R. E., & Lomax, R. G. (2010). *A Beginner's Guide to Structural Equation Modeling*. (3rd ed). New York: Psychology Press.
- Sijtsma, K., Meijer, R. R., & van der Ark, L. A. (2011). Mokken scale analysis as time goes by: An update for scaling practitioners. *Personality and Individual Differences*, 50(1), 31–37.
- Sijtsma, K., & Molenaar, I. W. (2002). *Introduction to Nonparametric Item Response Theory* (Vol. 5). Thousand Oaks, CA: Sage.
- Stevens, M. J. (1998). Professional psychology after communism: The case of Romania. *Professional Psychology: Research and Practice*, 29(3), 300–304. doi:10.1037/0735-7028.29.3.300
- Trudgill, D. I. N., Gorey, K. M., & Donnelly, E. A. (2020). Prevalent posttraumatic stress disorder among emergency department personnel: Rapid systematic review. *Humanities and Social Sciences Communications*, 7(1), 1–7. doi:10.1057/s41599-020-00584-x
- Truijens, F. L., Van Nieuwenhove, K., De Smet, M. M., Desmet, M., & Meganck, R. (2021). How questionnaires shape experienced symptoms. A qualitative case comparison study of questionnaire administration in psychotherapy research. *Qualitative Research in Psychology*, 19, 1–25. doi:10.1080/14780887.2021.1886383
- Tsai, J., Harpaz-Rotem, I., Armour, C., Southwick, S. M., Krystal, J. H., & Pietrzak, R. H. (2014). Dimensional structure of DSM-5 posttraumatic stress disorder symptoms: Results from the national health and Resilience in veterans study. *The Journal of Clinical Psychiatry*, 76(5), 0–0.
- Van der Ark, L. A. (2007). Mokken scale analysis in R. *Journal of Statistical Software*, 20, 1–19.
- Van der Ark, L. A. (2012). New developments in mokken scale analysis in R. *Journal of Statistical Software*, 48(5), 1–27.
- Van IJzendoorn, M. H., & Schuengel, C. (1996). The measurement of dissociation in normal and clinical populations: Meta-analytic validation of the Dissociative Experiences Scale (DES). *Clinical Psychology Review*, 16(5), 365–382.
- van Voren, R. (2010). Political abuse of psychiatry—An historical overview. *Schizophrenia Bulletin*, 36(1), 33–35. doi:10.1093/schbul/sbp119
- Velickovic, K., Rahm Hallberg, I., Axelsson, U., Borrebaeck, C. A. K., Rydén, L., Johnsson, P., & Månsson, J. (2020). Psychometric properties of the Connor-Davidson Resilience Scale (CD-RISC) in a non-clinical population in Sweden. *Health and Quality of Life Outcomes*, 18(1), 1–10. doi:10.1186/s12955-020-01383-3
- Volkan, V. D. (2001). Transgenerational transmissions and chosen traumas: An aspect of large-group identity. *Group Analysis*, 34(1), 79–97. doi:10.1177/05333160122077730
- von Stockert, S. H. H., Fried, E. I., Armour, C., & Pietrzak, R. H. (2018). Evaluating the stability of DSM-5 PTSD symptom network structure in a national sample of U.S. Military veterans. *Journal of Affective Disorders*, 229, 63–68. doi:10.1016/j.jad.2017.12.043
- Wagnild, G. (2009). A review of the resilience scale. *Journal of Nursing Measurement*, 17(2), 105–113. doi:10.1891/1061-3749.17.2.105
- Wagnild, G. M., & Young, H. M. (1993). Development and psychometric evaluation of the resilience scale. *Journal of Nursing Measurement*, 1(2), 165–178.
- Weathers, F. W., Litz, B. T., Herman, D. S., Huska, J. A., & Keane, T. M. (1993, October). The PTSD checklist (PCL): Reliability, validity, and diagnostic utility. In *Annual convention of the international society for traumatic stress studies, San Antonio, TX* (Vol. 462).
- Weathers, F. W., Litz, B. T., Keane, T. M., Palmieri, P. A., Marx, B. P., & Schnurr, P. P. (2013). *The PTSD Checklist for DSM-5 (PCL-5)*. National Center for PTSD. www.ptsd.va.gov.
- Weigold, A., Weigold, I. K., & Natera, S. N. (2018). Mean scores for self-report surveys completed using paper-and-pencil and computers: A meta-analytic test of equivalence. *Computers in Human Behavior*, 86, 153–164.
- Wisco, B. E., Miller, M. W., Wolf, E. J., Kilpatrick, D., Resnick, H. S., Badour, C. L., ... Friedman, M. J. (2016). The impact of proposed changes to ICD-11 on estimates of PTSD prevalence and comorbidity. *Psychiatry Research*, 240, 226–233. doi:10.1016/j.psychres.2016.04.043