Brazilian Journal of Psychiatry
bjp
Revista Brasileira de Psiquiatria

Braz J Psychiatry. 2023 Sep-Oct;45(5):423-430
doi:10.47626/1516-4446-2023-3143
Brazilian Psychiatric Association

ORIGINAL ARTICLE

The best of two worlds: Combining the DSM-5 and ICD-11 clusters of symptoms for posttraumatic stress disorder in a single screening scale

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Objectives: The most recent DSM-5 (2013) and ICD-11 (2018) diagnostic criteria for posttraumatic stress disorder (PTSD) encompass 20 and six symptoms, respectively, organized in different structures. This study aimed to investigate the dimensions of the Posttraumatic Stress Disorder Checklist 5 (PCL-5) according to the DSM-5's broader definition of PTSD and the ICD-11's narrower approach, as well as to explore an alternative restricted model that retains the core symptoms explicitly related to traumatic experiences.
Methods: Data were gathered from Brazilian employees (n=1,101) who had directly experienced traumatic life events or had been exposed to them because of their work activities. Confirmatory factor analysis (CFA) and exploratory structural equation modeling (ESEM) were used to evaluate the configural and metric structures of the models.
Results: We estimated seven models of the latent structure of PTSD including the four-factor DSM-5 and three-factor ICD-11 PTSD models. Given the lack of evidence of their validity, an alternative 10-symptom model was tested. The final seven-item PTSD model considerably improved estimation of the PTSD construct. This solution showed reliable items with non-redundant content, acceptable fit indices, and satisfactory configural and metric properties.
Conclusion: The more parsimonious one-dimensional model comprising the core PTSD symptoms has the potential to improve assessment of PTSD.

Keywords: Posttraumatic stress disorder; validity; configural structure; metric structure

Introduction

The posttraumatic stress disorder (PTSD) diagnosis was first introduced in the third edition of the DSM (American Psychiatric Association [APA]).[1] Since then, it has been refined in subsequent editions of the DSM.[2-4] The most recent diagnostic criteria[4] encompass 20 symptoms organized into four groups, namely: re-experiencing, avoidance, hyperarousal, and negative alterations to cognitions and mood.[5] This proposal adopted an expanded definition for PTSD based on the most typical features and the disorder's heterogeneous clinical presentation.[5,6] Despite changes in each version, a set of clusters of symptoms comprising re-experiencing, avoidance, and hyperarousal has been systematically included in characterizations of the disorder.[1-4]

An alternative arrangement of PTSD symptoms to that offered in the DSM-5[7,8] was adopted in the 11th version of the ICD.[9] The ICD-11 PTSD model is a narrower definition focused on a smaller number of PTSD symptoms and excluding those shared with other mental disorders.[7,10,11] The core elements were organized into three clusters of two symptoms each: re-experiencing (flashbacks, nightmares), avoidance (of internal reminders, of external reminders), and sense of current threat (hypervigilance, exaggerated startle response). This proposal[9] attempted to increase the specificity[12] of the PTSD and simplify diagnosis.[13]

The DSM-5 and ICD-11 criteria for PTSD differ in several ways and both continue to provoke controversy.[14] Two main points can be made about the broader approach to PTSD taken in the DSM-5. First, the recommendation for inclusion of the new group of symptoms labeled negative alterations in cognitions and mood was supported by studies designed to identify PTSD psychologically-related factors[15] and treatment

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Submitted Apr 03 2023, accepted Aug 16 2023.

How to cite this article: Vasconcelos A, Reichenheim M, do Nascimento E, Lima E, Kristensen C, Mendlowicz M. The best of two worlds: Combining the DSM-5 and ICD-11 clusters of symptoms for posttraumatic stress disorder in a single screening scale. Braz J Psychiatry. 2023;45:423-430. http://doi.org/10.47626/1516-4446-2023-3143

effects[16]; they were not developed to support a conceptual framework for the PTSD construct. Moreover, its three new symptoms (negative beliefs, blame yourself and others, and negative emotions) were not correlated with the neurobiological components underlying the disorder.[17,18] Cognitive vulnerabilities to PTSD and reactions in the aftermath of traumatic events are not part of the operational conceptualization of the disorder.[8] The DSM-5 criteria included non-specific symptoms and resulted in heterogeneity of profiles among patients with PTSD.[8,19]

Second, there is also a debate about the latent structure of the DSM-5 PTSD concept, and no consensus has yet been reached.[20] The Posttraumatic Stress Disorder Checklist 5 (PCL-5)[21] is a self-report measure of PTSD based on the DSM-5 criteria. Most studies conducting confirmatory factor analysis of the PCL-5 have compared the four-factor DSM-5 model with alternative models to identify which latent structure best explains PTSD's underlying dimensionality.[14,22,23] However, these comparisons focused on the configural structure of the models (e.g., identifying better fitting global indices), rather than on more critical findings regarding their factor-based discriminant validity. To the best of our knowledge, these studies did not examine the sources of the high-factor correlations in depth.[14,20,23-25] Most of these factor correlations were over 0.80, thus showing poor factorial specificity and suggesting inconsistencies between the empirical structure and theoretical framework.[19] Further, no studies have examined the violation of the conditional independence assumption that suggests that items share common information beyond what is shared with other items, conditional on the supported factor they belong to.[26]

The narrower perspective on PTSD taken in the ICD-11 has also raised issues about simplification of the conceptualization of the disorder.[13] First, the ICD-11 model included three PTSD dimensions each represented by only two symptoms, whereas the literature recommends latent variables should be assessed with at least three items.[27] The ICD-11 removed intrusive memories and emotional and physiological reactivity from the re-experiencing cluster and excluded the dissociative amnesia symptom from the numbing cluster. However, these features have been considered central to both presentation and clinical recognition of the disorder,[28] as evidenced by these PTSD symptoms' inclusion since the construct was first added to the DSM.[1,10,11] The second issue concerns the latent structure of PTSD as represented by the ICD-11 criteria. The International Trauma Questionnaire (ITQ)[29] is a self-report measure of PTSD based on the ICD-11 criteria. Most confirmatory factor-analytic studies of the ITQ reported good fit indices for the tripartite model. However, as in the models for the full DSM-5 criteria, moderate to high factor correlations were also reported, again suggesting a lack of discriminant validity.[14,30]

In summary, while the DSM-5 adopted an expanded description, the ICD-11 simplified the conceptualization of PTSD.[8] The lack of consensus on the number and nature of the factors underlying the diagnosis is somewhat indicative that the operational definition of the PTSD construct still merits further elucidation.[26] The current study aimed to investigate the underlying dimensions of the PCL-5 items according to the DSM-5's broader definition of PTSD and the ICD-11's narrower approach and also to explore an alternative restricted model that retains the core symptoms explicitly related to traumatic experiences.

Methods

The present study was part of a larger project that assessed the relationship between trauma exposure and coping abilities among Brazilian employees from different economic sectors. An anonymous online assessment was conducted with a sample of first-responders and non-first-responders. Participants were recruited using a non-random convenience sampling method and were ineligible if they did not report experiencing at least one traumatic event personally or as part of their job as a first responder.

In addition to providing sociodemographic information, all participants completed the PCL-5[31,32] and the Life Events Checklist for DSM-5 (LEC-5)[31,32] to measure lifetime exposure to traumatic events. First responders also filled out the Checklist of Occupational Traumatic Events for Emergency Professionals to identify traumatic events that directly threatened their safety in the workplace.[33]

The first stage of the analysis tested the four-factor DSM-5 PTSD model (Model A_0) using confirmatory factor analysis (CFA) based on the responses to all 20 items of the PCL-5.[4,22] We adopted a correlation greater than 0.8 as the cutoff to demarcate a lack of factor-based discriminant validity,[34] while an upper confidence limit of 95% would be indicative of a borderline situation. To investigate potential high factor correlations in the CFA model, an exploratory approach was adopted to obtain more parsimonious structures that could be investigated in subsequent analyses. The exploratory evaluation began with a principal component analysis (PCA) to examine how many eigenvalues would be above 1.00.[35] Considering the number of factors thus delimited, an exploratory structural equation model (ESEM) was adjusted to evaluate the cross-loading pattern (assessing factor-item ambiguity) and possible residual correlations (assessing content redundancy). The analysis used geomin oblique rotation. An item's reliability was considered inadequate if its residual variance was greater than 0.70.

Item residual correlations were inspected to detect violations of conditional dependence, which would be indicative of item redundancy. To this end, we examined modification indices (MIs) associated with expected parameter changes (EPCs). Values above 20 and 0.20, respectively could be indicative of potential residual correlations.[36] The MIs show how much the chi-square of the model decreases if a specific parameter is freely estimated. An EPC projects the absolute magnitude of the change in the parameter is freely estimated.[34,37] We established that a residual correlation equal to or greater than 0.20 indicated presence of redundant items, provided it was supported by a substantive (theoretical) content of the items involved.[34] Following these analyses, reduced models excluding the redundant item with

the lowest factor loading from the pair were further investigated.

Since we foresaw plausible alternative dimensional structures, the next steps consisted of repeating the analyses for two other models to evaluate their configural and metric structures (Models B_0 and C_0). In the second stage of the analysis, the six-item ICD-11 model was explored using PCL-5 items (i) that covered the same symptoms and had similar content: i2, i3, i6, i7, i17, and i18 (Models B_0 and B_1). In the third stage, we explored an alternative model based on 10 items from the PCL-5 (i1, i2, i3, i4, i5, i6, i7, i8, i17, and i18) considered to be the theoretical core elements of the PTSD construct (Models C_0, C_1, and C_2).

In total, seven models of the latent structure of PTSD were estimated. All employed probit models on polychoric matrices, using the robust diagonally weighted least squares (WLS) estimator (WLS mean and variance [WLSMV]).[38] Model fit was evaluated with the root mean square error of approximation (RMSEA) < 0.06[34]; comparative fit index (CFI), and Tucker-Lewis index (TLI) > 0.95 indicating an acceptable fit.[34] Analyses were performed using *Mplus* software, version 8.3.[36]

Ethics statement

The study was designed in accordance with the Declaration of Helsinki guidelines and was approved by the national research ethics committee (study registration number: 15169813.1.0000.5149). Volunteers gave written consent to participation. No inducements or incentives for participation were offered.

Results

A convenience sample was recruited from February to June 2016 comprising 1,440 employees who completed the questionnaire and endorsed the DSM-5 PTSD Criterion A event. A total of 339 individuals were excluded for either no direct exposure or no occupational-related exposure to a traumatic event; therefore, the effective sample comprised 1,101 individuals: 35.3% first responders, 28.6% working in trade and services, 6% working in industry, 7.1% educational professionals, and 23% employed in other economic sectors. The average age of the participants was 31.5 years (SD = 8.9; range: 18-60); 80.6% were men, 47.3% were living with a partner, and 63.9% reported having high school education. The most frequently experienced traumatic event was traffic accident (42.9%) and the most frequent occupational events were disaster (42.2%) and multiple causalities (41.5%). Seventy-four (6.7%) participants met the criteria for a provisional DSM-5 PTSD diagnosis.

Table 1 provides an overview of the original DSM-5 CFA model (Model A_0) and an alternative ESEM (Model A_1) for the 20-item PCL-5. Model A_0 showed good fit, as indicated by the RMSEA, CFI, and TLI results. The standardized factor loadings ranged from 0.62 to 0.94; 80% of these factor loadings were equal to or above 0.80. All item residual variances were below 0.70. However, an inspection of the six factor correlations revealed that all except one were above 0.80. The MIs and respective EPCs (range: 0.28 to 0.43) suggested presence of item residual correlations for 11 pairs of items. When freely estimated, these residual correlations ranged from -0.31 to 0.40.

The pattern of high factor correlations for the four-factor A_0 model prompted further exploratory analyses, and an alternative model was tested. The preliminary PCA results indicated only two eigenvalues above 1.00 (12.13 and 1.36, respectively), strongly suggesting a two-dimensional structure at most. As shown in Table 1, the results for a two-factor ESEM (Model A_1) showed four cross-loadings (i10, i11, i17, i18). The factor correlation was high (0.76), and the CI upper bound exceeded 0.80. These values could indicate a potential violation of factor-based discriminant validity. Eight pairs of items showed MIs (EPCs) ranging from 21.34 (0.23) to 74.84 (0.50); and freely estimated residual correlations ranged from 0.23 to 0.45.

Table 2 shows the global fit indices for the original three-factor CFA ICD-11 PTSD model (B_0) and a modified PTSD model (B_1). The three-factor model presented good fit; all items showed standardized factor loadings above 0.70 and residual variances below 0.50.

However, the factor correlations were all above 0.80, which elicited an exploratory type analysis to assess the underlying dimensional structure and item distribution across factors. The preliminary PCA indicated that the first two eigenvalues were 3.99 and 0.65, respectively, suggesting a one-dimensional structure. A two-factor ESEM corroborated this structure, showing an unintelligible second factor. The CFA one-factor solution (Model B_1) based on the six PCL-5 items also used in the ICD-11 indicated a poor fit. Residual correlations for four pairs of items were identified according to the diagnostic MIs and respective EPCs (the values of the latter ranged from 0.42 to 0.49) and when freely estimated they ranged from 0.05 to 0.38.

Finally, we also tested an alternative model based on 10 PCL-5 items that represent the core elements of PTSD: i1, i2, i3, i4, i5, i6, i7, i8, i17, and i18. The preliminary PCA indicated eigenvalues of 6.70 and 0.72 for the first and second component, respectively. Following the suggestion of a one-dimensional structure, three alternative CFA solutions were then fitted (Models C_0, C_1, and C_2, summarized in Table 3).

Inspection of the simple 10-item one-factor Model C_0 revealed that all standardized factor loadings were above 0.60, entailing residual variances below the 0.70 threshold. However, the global fit indices suggested an unsatisfactory model fit. Additionally, the MIs and EPCs (values ranging from 0.21 to 0.42) suggested presence of item residual correlations for four pairs of items. The freely estimated residual correlations involving i1 $\leftrightarrow$ i2, i6 $\leftrightarrow$ i7, i7 $\leftrightarrow$ i8, and i17 $\leftrightarrow$ i18 are shown in Model C_1. This model showed adequate fit. Following the criteria described in the Methods section, items i2, i7, and i17 were excluded from the pairs of redundant items. Items i2 and i17 were removed because they had the lower factor loadings in their respective pairs; item i7 was excluded because it simultaneously presented residual correlations

Table 1 Analysis of the dimensional structure of the PCL-5 using CFA and ESEM (n=1,101)

		Model A_0 (DSM-5) Four-factor CFA					Model A_1 Two-factor ESEM		
		f1	f2	f3	f4		f1	f2	
Item	Item wording	$\lambda_{i(1)}$[†]	$\lambda_{i(2)}$	$\lambda_{i(3)}$	$\lambda_{i(4)}$	δ_i[‡]	$\lambda_{i(1)}$[†]	$\lambda_{i(2)}$	δ_i[‡]
i1	Intrusive thoughts	0.86				0.25	0.88	-0.03	0.25
i2	Nightmares	0.83				0.30	0.71	0.12	0.34
i3	Flashbacks	0.84				0.29	0.87	-0.04	0.29
i4	Emotional reactivity	0.94				0.12	0.90	0.03	0.14
i5	Physiological reactivity	0.87				0.25	0.82	0.04	0.26
i6	Avoidance of internal reminders		0.80			0.36	0.77	-0.02	0.43
i7	Avoidance of external reminders		0.88			0.23	0.82	0.00	0.32
i8	Dissociative amnesia			0.68		0.54	0.52	0.17	0.55
i9	Negative beliefs			0.82		0.33	0.14	0.70	0.33
i10	Blame yourself and others			0.81		0.35	0.48	0.37	0.37
i11	Negative emotions			0.89		0.20	0.33	0.59	0.24
i12	Diminished interest			0.83		0.31	0.00	0.84	0.30
i13	Detachment			0.86		0.25	0.17	0.99	0.18
i14	Restricted affect			0.86		0.26	0.01	0.87	0.25
i15	Irritability				0.85	0.28	0.11	0.75	0.31
i16	Reckless behavior				0.72	0.48	0.21	0.51	0.53
i17	Hypervigilance				0.68	0.53	0.29	0.37	0.61
i18	Exaggerated startle response				0.85	0.27	0.44	0.41	0.36
i19	Problems with concentrating				0.81	0.34	0.04	0.76	0.37
i20	Sleep disturbance				0.72	0.48	0.09	0.62	0.52
	$\Phi_{(f1,f2)}$[§]			0.91 (0.87-0.95)				0.76 (0.71-0.81)	
	$\Phi_{(f1,f3)}$			0.84 (0.80-0.88)				-	
	$\Phi_{(f1,f4)}$			0.83 (0.78-0.87)				-	
	$\Phi_{(f2,f3)}$			0.82 (0.77-0.87)				-	
	$\Phi_{(f2,f4)}$			0.76 (0.70-0.83)				-	
	$\Phi_{(f3,f4)}$			0.90 (0.87-0.93)				-	
	RMSEA[‖]			0.06 (0.06-0.07)				0.06 (0.06-0.07)	
	CFI			0.97				0.97	
	TLI			0.98				0.97	

CFA = confirmatory factor analysis; CFI = comparative fit index; ESEM = exploratory structural equation modeling; PCL-5 = Posttraumatic Stress Disorder Checklist-5; RMSEA = root mean square error of approximation; TLI = Tucker-Lewis index.
[†] Loadings (standardized).
[‡] Measurement errors (uniqueness).
[§] Factor correlations (in brackets: 95%CI).
[‖] In brackets: 90%CI.

Table 2 Analysis of the dimensional structure of the PCL-5 using CFA according to the ICD-11 proposal (n=1,101)

		Model B_0 (ICD-11) Three-factor CFA				Model B_1 (ICD-11) One-factor CFA	
		f1	f2	f3		f1	
Item	Item wording	$\lambda_{i(1)}$[†]	$\lambda_{i(2)}$	$\lambda_{i(3)}$	δ_i[‡]	$\lambda_{i(1)}$[†]	δ_i[‡]
i2	Nightmares	0.83			0.31	0.81	0.34
i3	Flashbacks	0.85			0.28	0.82	0.33
i6	Avoidance of internal reminders		0.82		0.33	0.77	0.40
i7	Avoidance of external reminders		0.86		0.26	0.81	0.34
i17	Hypervigilance		-	0.72	0.49	0.66	0.57
i18	Exaggerated startle response		-	0.90	0.18	0.80	0.35
	$\Phi_{(f1,f2)}$[§]		0.88 (0.82-0.94)			-	
	$\Phi_{(f1,f3)}$		0.84 (0.77-0.91)			-	
	$\Phi_{(f2,f3)}$		0.78 (0.70-0.85)			-	
	RMSEA[‖]		0.03 (0.00-0.05)			0.10 (0.08-0.12)	
	CFI		0.99			0.98	
	TLI		0.99			0.96	

[†] Loadings (standardized).
[‡] Measurement errors (uniqueness).
[§] Factor correlations (in brackets: 95%CI).
[‖] In brackets: 90%CI.
CFA = confirmatory factor analysis; CFI = comparative fit index; PCL-5 = Posttraumatic Stress Disorder Checklist-5; RMSEA = root mean square error of approximation; TLI = Tucker-Lewis index.

Table 3 Analysis of the dimensional structure of the PCL-5 according to a 10-item model (n=1,101)

		Model C_0 One-factor ESEM		Model C_1 One-factor ESEM		Model C_2 One-factor ESEM	
		f1		f1		f1	
Item	Item wording	$\lambda_{i(1)}$[†]	δ_i[‡]	$\lambda_{i(1)}$	δ_i[‡]	$\lambda_{i(1)}$	δ_i[‡]
i1	Intrusive thoughts	0.86	0.26	0.86	0.27	0.86	0.26
i2	Nightmares	0.82	0.33	0.80	0.35	-	-
i3	Flashbacks	0.85	0.28	0.85	0.27	0.85	0.27
i4	Emotional reactivity	0.93	0.14	0.93	0.13	0.94	0.13
i5	Physiological reactivity	0.86	0.26	0.87	0.25	0.87	0.25
i6	Avoidance of internal reminders	0.77	0.41	0.75	0.43	0.75	0.44
i7	Avoidance of external reminders	0.83	0.32	0.80	0.35	-	-
i8	Dissociative amnesia	0.66	0.57	0.64	0.59	0.64	0.59
i17	Hypervigilance	0.62	0.62	0.59	0.65	-	-
i18	Exaggerated startle response	0.79	0.38	0.77	0.41	0.77	0.41
	$\rho_{(i1,i2)}$[§]	-		0.28		-	
	$\rho_{(i6,i7)}$[§]	-		0.25		-	
	$\rho_{(i7,i8)}$[§]	-		0.21		-	
	$\rho_{(i17,i18)}$[§]	-		0.38		-	
	RMSEA[‖]	0.07 (0.07-0.08)		0.05 (0.04-0.06)		0.06 (0.04-0.07)	
	CFI	0.98		0.99		0.99	
	TLI	0.97		0.99		0.99	

CFI = comparative fit index; ESEM = exploratory structural equation modeling; PCL-5 = Posttraumatic Stress Disorder Checklist-5; RMSEA = root mean square error of approximation; TLI = Tucker-Lewis index.
[†] Loadings (standardized).
[‡] Measurement errors (uniqueness).
[§] Residual correlations.
[‖] In brackets: 90%CI.

as part of two different pairs of items. Model C_2 comprising the remaining seven items showed a satisfactory global fit. All items except i8 showed standardized factor loadings above 70, and none of the residuals were below 0.70. No further MI suggested any residual correlation.

Discussion

The publication of the DSM-5 and ICD-11 intensified the debate about the latent structure of PTSD. Both manuals were released with several modifications to the previous diagnostic criteria. The present study aimed to assess the configurational and metric structures underlying the PTSD construct according to the APA model, to the World Health Organization (WHO) model, and to an alternative restricted model that retains only the core symptoms explicitly related to traumatic experiences.

A CFA indicated that the original four-factor DSM-5 model provided acceptable model fit, as expected. However, the high factor correlations and item residual correlations indicated a lack of factor-based discriminant validity and possible item redundancies, respectively.[35] This evidence supported the hypothesis that PTSD symptoms are, perhaps, best captured by a configural structure substantially different from that originally proposed by the DSM-5. Similar results were discussed based on the previous version of the instrument (PCL-C). These findings could partially explain the plethora of factor-analytic studies in the literature and the alternative models underlying the DSM-5 PTSD conceptualization.[26]

Notably, the ESEM indicated that the two-factor solution included eight pairs of items exhibiting potential residual correlations due to closely related contents or overlapping wordings (i1↔i2, i6↔i7, i7↔i8, i9↔i10, i9↔i11, i16↔i17, i17↔i18, and i19↔i20). For example, two re-experiencing symptoms – item i1 (intrusive thoughts) and item i2 (nightmares) – refer to disturbing and involuntarily reproduced memories related to the traumatic experience. Additionally, the wordings of item i6 (avoidance of internal reminders) and item i7 (avoidance of external reminders) are very similar, both emphasizing the behavior of avoiding cues that remind the patient of the traumatic event.

We also observed correlations between items i9 (negative beliefs) and i10 (blame yourself and others), and between items i9 and i11 (negative emotions). One possibility is that they represent a pattern of negative cognitions common to depressive disorder.[13] In line with this conjecture, the correlation between items i17 (hypervigilance) and i18 (exaggerated startle response) could be due to an overrepresentation of the increased alertness for threat behavior as perceived by respondents. These item redundancies could indicate that the DSM-5 symptoms tend to overrepresent some of the characteristics on the spectrum of the PTSD construct.[37] This is especially critical for the PCL-5 overall score. Since the total symptom severity score is obtained by summing the responses to all 20 items, overlapping symptoms would tend to overrepresent certain features in the PTSD assessment.

According to the CFA results, the three-factor ICD-11 PTSD model fitted well (PCL-5 PTSD items: i2, i3, i6, i7, i17, and i18) and all items showed highly standardized factor loadings. Nevertheless, high factor correlations emerged again. The one-factor solution demonstrated measurement problems as well. Four pairs of items exhibited residual correlations, as mentioned above. One approach to dealing with the redundant content would be

to remove two items. However, this procedure would further deplete the set of symptoms from six to four, possibly leading to under-representation of the PTSD construct.

Given the lack of factor-based discriminant validity and item redundancies for both the full DSM-5 and ICD-11 PTSD set, the next step was to test an alternative empirically and theoretically driven model. This model was operationalized with 10 symptoms that were explicitly anchored to the traumatic event (PCL-5 PTSD items: i1, i2, i3, i4, i5, i6, i7, i8, i17, and i18).[5] To our knowledge, all editions of the DSM and most alternative factor solutions for the DSM PTSD diagnosis usually retain the intrusive thoughts, nightmares, flashbacks, avoidance of reminders (internal and external), hypervigilance, and exaggerated startle response symptoms as well as the inability to remember.[10,28] In contrast to the ICD-11 PTSD set, all four of the symptoms were retained in this model (i1, i4, i5, i8) because evidence emphasizes their importance as manifestations of PTSD and suggests the need to reconsider them in construct investigations.[6,8,28] Specifically, intrusive memories are common in patients with PTSD,[11,12] even as emotional and physiological disturbances that are considered typical stress-related responses. They are present in the definition of the disorder and in clinical observations of patients with PTSD,[28] since re-experiencing of a traumatic event frequently induces bodily reactions and feelings associated with the event.[6] In the absence of these disturbances, a disruptive memory would likely barely affect a patient.[28] The difficulty of intentionally retrieving a coherent memory of the traumatic event also requires careful reconsideration. Dissociative amnesia in PTSD is an important mechanism involved in development and maintenance of symptoms and appears to be a strong predictor of the disorder's severity.[5]

Similar to previous models, this 10-item structure showed residual correlations pertaining to four pairs of items (i1↔i2, i6↔i7, i7↔i8, and i17↔i18). Items i2 (nightmares) and i17 (hypervigilance) showed the lowest factor loadings among the pairs of redundant items and were excluded from the set of items. Notably, item i7 (avoidance of people or objects) showed residual correlations with two pairs of items simultaneously (i6↔i7 and i7↔i8). First, it shares the active behavior of avoiding traumatic cue events with item i6 (avoidance of thoughts). Additionally, items i7 and item i8 (dissociative amnesia) refer to two mechanisms that protect patients with PTSD against reliving the emotional stress related to trauma: escape from external reminders (i7) and impaired voluntary memory of traumatic event (i8). The decision to remove item i7 from the set of items precluded two residual correlations and retained important features of the PTSD construct, *viz.*, the avoidance behavior and dissociative memory. As such, dissociative amnesia might represent an important clinical diagnostic symptom of the disorder.[9] Additionally, we suggest merging the two avoidance items into one to capture information more effectively. Both item i6 (avoidance of thoughts) and item i7 (avoidance of people or objects) could be replaced with a new item "avoidance of trauma reminders" that would encompass both internal and external reminders of the trauma. Our evidence corroborated a final alternative one-factor model composed of 7 DSM-5 PTSD symptoms: i1 (intrusive thoughts), i3 (flashbacks), i4 (emotional reactivity), i5 (physiological reactivity), i6-i7 (avoidance of thoughts, people or objects), i8 (dissociative amnesia), and i18 (exaggerate startle response). In our opinion, the more parsimonious unidimensional model comprising seven selected symptoms has the potential to improve assessment of PTSD. This proposal may facilitate identification of potential PTSD cases and reduce psychiatric comorbidity based on theoretical and empirical evidence.

Our findings should be interpreted in the light of their strengths and limitations. One of the positive aspects of the present study was the large sample assessed using version of the PCL-5 validated in the Brazilian context. In addition, the one-factor alternative model endorsed a narrower perspective on PTSD than is taken by the DSM-5 criteria, while expanding the repertoire of core symptoms compared to the ICD-11 criteria. The exclusion of redundant items contributed to an adequate representation of PTSD symptoms and prevented one specific aspect of the construct from being overestimated or overlapping with other disorders. Our proposed model provides a characterization of the spectrum of the PTSD diagnosis and contributes to recognition of its specific clinical features. Third, a one-dimensional PTSD model could be a possible solution to the plethora of factor analytic findings and lack of consensus.

Nevertheless, some limitations should be considered when interpreting the results. First, PTSD symptoms were assessed using the PCL-5. Despite the close resemblance between the ICD-11 PTSD symptoms and the DSM-5 criteria, potential bias connected to using a DSM-5-based measurement cannot be ruled out. Notably, the instrument is a self-report measure and it is possible that the PTSD latent structure differs if a clinical interview is administered. Second, in contrast with the DSM-5, the ICD-11 criteria require exposure to an extremely threatening or horrific event prior to the symptoms and we did not assess the presence of fear and horror in the current sample.[12] Future research should be conducted with specific DSM-5 and ICD-11 clinical instruments. Third, the participants were all adults and the sample was mainly composed of men who had experienced at least one direct traumatic life event or work-related traumatic event and thus it is unknown whether the current model would also emerge among samples that have just witnessed or learned about a traumatic event. It is important that future studies test the proposed latent structure in populations of different nationalities, sex distributions, ages, types of trauma exposure, and related to other types of trauma (e.g., veterans, victims of disasters, and sexual violence survivors). For instance, men and women experience different patterns of trauma exposure, with women experiencing more interpersonal violence, such as sexual assaults.[39] Furthermore, women report higher levels of most PTSD symptoms compared to men.[40,41] Despite the sex-specific differences in trauma exposure and prevalence of symptoms, previous studies of measurement

invariance of PTSD scales suggested no or minimal gender differences in the factor structure of PTSD, meaning that the instruments measure the PTSD symptoms in both genders equally well.[41] Since the sample of the present study predominantly consisted of men, further evidence is still needed to explore the measurement invariance of the alternative seven-item PTSD model.[34]

Fourth, the exclusion of the two redundant items from the 10-item model (nightmares and hypervigilance) could result in lost information about the construct. Future studies should also test the new properties. Beyond replicating evidence related to configural and metric structures, thoroughly assessing scalar properties would be one way forward. In addition, validity evidence based on the relationship between the proposed PTSD model and conceptually related constructs should be investigated, for example, *vis-à-vis* psychopathology symptoms.

In summary, the current study investigated the latent structures of PTSD proposed by the DSM-5 and ICD-11. Our alternative model is unidimensional and encompasses the core PTSD symptoms. We expect this model to be further investigated to assess the consistency of our findings and its pertinence and suitability for use in other sociolinguistic and cultural contexts.

Disclosure

The authors report no conflicts of interest.

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