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Psychometric properties of the Global Psychotrauma Screen (GPS) in the Brazilian general population

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Abstract

Objective: To evaluate the psychometric properties of the Brazilian version of the Global Psychotrauma Screen (GPS).

Methods: The scale was tested on two Internet-based samples: GPS-CCC (*n* = 657) and GPS-Brazil (*n* = 431). Exploratory factor analysis (EFA) was conducted on GPS-CCC. Confirmatory factor analysis (CFA), correlational analysis and sensitivity and specificity analysis were performed on the GPS-Brazil sample.

Results: EFA indicated a three-factor structure. Regarding CFA, models with one to three factors fitted the data well but the three-factor model proposed by Rossi et al. (2021) showed the best fit. Convergent validity was established between the GPS subscales and scales measuring symptoms of posttraumatic stress disorder (PTSD), complex PTSD, anxiety and depression. The cut-off point of 4 on the GPS PTSD scale was found to be optimal to identify probable PTSD. Optimal cut-off scores for probable complex PTSD and significant symptoms of anxiety and depression were also identified.

Conclusions: The results show that the Brazilian version of the GPS is a valid tool to screen transdiagnostic posttraumatic reactions.

Keywords: trauma; PTSD; complex PTSD; anxiety; depression.

Introduction

Exposure to potentially traumatic events (PTEs) such as wars, sudden loss of a loved one, accidents, natural disasters and sexual/domestic violence have a high prevalence among the general population[1]. In Brazil, a study conducted in Rio de Janeiro and São Paulo found that nearly 90% of participants were confronted with traumatic events[2]. Reactions after exposure to a PTE include not only posttraumatic stress disorder (PTSD) and other trauma-related disorders, but also depression, anxiety, somatic symptoms, dissociative symptoms, self-mutilation and substance abuse[3–6].

Considering the great diversity of individuals' reactions to PTEs, it is important for clinicians and researchers to have a brief, validated instrument to allow transdiagnostic assessment of trauma-related consequences. Although instruments such as the International Trauma Questionnaire[7] and the PTSD Checklist[8] are already available in Brazilian Portuguese, none of them assess the full spectrum of posttraumatic reactions and may be lengthy for a first screening[9].

An international collaborative initiative, the "Global Collaboration on Traumatic Stress", developed a simple, cross-cultural valid instrument – the Global Psychotrauma Screen (GPS; available at https://global-psychotrauma.net/gps) which assesses transdiagnostic reactions following a PTEs. The GPS contains 22 questions that evaluate symptoms of PTSD, complex PTSD (CPTSD), anxiety, depression, sleep problems, self-destructive behaviors, dissociation, substance abuse and risk/protection factors (e.g., childhood trauma, history of mental disorders, social support and resilience). In addition, the GPS includes a self-assessment item on the individual's global functioning on a 10-point Likert scale. The instrument has been translated into more than 30 languages. Research on the validity of the GPS is being conducted in several countries and has already been published in Japan[10], the United States[9], Italy[11] and Iran[3].

In a study conducted in Italy, the GPS factorial structure was explored using an online survey completed by 18,147 individuals living in Italy during the first COVID-19 lockdown. The results showed that a three-factor model had the best fit to the data. The factors were: negative affect, core posttraumatic symptoms and dissociative symptoms. Preliminary validity studies were also carried out with English, Japanese and Persian (Farsi) speakers, resulting in a good internal consistency [Cronbach's α from 0.72 to 0.90[9,10,12]].

Considering the need for a brief, easy-to-administer tool that evaluates a broader range of outcomes following potentially traumatic events (PTEs), the present study aimed at examining the psychometric properties of the Brazilian version of the GPS in the Brazilian general population. Using two Internet-based samples, we conducted exploratory and confirmatory factor analysis, correlations with PTSD, CPTSD, anxiety and depression symptoms, as well as sensitivity and specificity analysis with other self-report measures of PTSD symptoms.

Method

Study design

The present study was developed using two samples. The first one is a subset of the open dataset "Global Psychotrauma Screen – Cross-cultural responses to COVID-19 versus other traumatic events (GPS-CCC)", available at: https://www.global-psychotrauma.net/data-sets. The total GPS-CCC sample comprises 7048 participants recruited in several countries between April and November 2020. The inclusion

criterion was to be exposed to at least one stressful event. Participants under the age of 16 years were excluded. Data collection was made through the Global Collaboration on Traumatic Stress website (https://global-psychotrauma.net/gps) and instruments included a sociodemographic questionnaire and the GPS. Only Brazilian participants (*n* = 657) were selected for the present study.

The second sample (GPS-Brazil) was recruited for this study using an online cross-section from April 2021 to July 2022. Participants were recruited through social media advertising. Ethical approval was obtained from the Institutional Review Board of the Pontifical Catholic University of Rio Grande do Sul (#4.640.205). All participants signed an online consent form and were informed that they could stop the survey at any time. The only inclusion criterion was to be at least 18 years old (self-report).

Instruments

Global Psychotrauma Screen (GPS)

The GPS is a posttraumatic transdiagnostic symptom screening instrument. Initially, the instrument includes four posttraumatic events screening questions: one open-ended question allowing participants to describe the event, and three closed-ended questions about the time since the event, whether the event was single or repeated and the nature of the event (e.g. physical violence, sexual violence, emotional abuse, among others). Following these, there are 22 *yes* or *no* items, including symptoms of PTSD (5 items; sum score range 0–5), CPTSD (2 items; sum score range 0–2), anxiety (2 items; sum score range 0–2), depression (2 items; sum score range 0–2), sleep problems (1 item), self-harm behavior (1 item), dissociation (2 items; sum score range 0–2), substance abuse (1 item) and other risk/protection factors such as childhood trauma, history of mental disorders, social support and resilience. The instrument also provides a functioning item scored on a 10-point scale (1 = poor functioning, 10 = excellent functioning).

The total symptom score is the sum of items 1–16 + 18 (range 0–17). Higher scores indicate higher symptom endorsement[4]. Other subdomains can also be scored, as indicated in the user manual (available at: https://www.global-psychotrauma.net/gps).

The Brazilian Portuguese version of the GPS is available online (https://gps.global-psychotrauma.net/home?lang=en_pt). The translation method included: (1) an English–Portuguese translation by a translator; (2) a retro-translation

by an independent translator who did not have access to the original instrument; and (3) verification of the re-translation by the original author of the study.

International Trauma Questionnaire (ITQ)

The ITQ[13] assesses PTSD and CPTSD according to the diagnostic criteria presented in the 11th edition of the International Classification of Diseases (ICD-11). With regard to the diagnosis of PTSD, this self-report instrument presents six symptoms grouped into three clusters: (a) re-experiencing in the here and now; (b) avoidance; and (c) sense of current threat. Each item is scored on a Likert scale, ranging from 0 (*not at all*) to 4 (*extremely*). Disturbances in Self-Organization (DSO) are assessed via three clusters (6 items): (a) affective dysregulation; (b) negative self-concept; and (c) disturbances in relationships. In addition, for each of the scales, there are three questions exploring functional impairments. A diagnosis of PTSD requires the endorsement of one of two symptoms from the three symptom clusters; a CPTSD diagnosis requires a PTSD diagnosis and the endorsement of one of two symptoms of the three DSO clusters. The Brazilian version of the ITQ was translated and adapted for Brazil in a multicenter study [14]. In the present study, the ITQ had excellent internal consistency (α = 0.91).

PTSD Checklist 5 (PCL-5)

The PCL-5 is a 20-item self-report questionnaire answered through a Likert scale ranging from 0 to 4. The instrument aims to measure the severity of symptoms and provide a diagnosis of PTSD. Severity scores can be calculated for each cluster (intrusions; avoidance; negative changes in cognition and mood; hyperarousal) or by a total sum score of the 20 items [the literature indicates a cut-off point of 33 for significant symptoms[15]]. The Brazilian version of the PCL-5[8] showed good internal consistency (α = 0.96) and test-retest reliability (ICC = 0.87 [95% CI = 0.65–0.95]). In the present study, Cronbach's alpha for the PCL-5 was excellent (α = 0.96).

Patient Health Questionnaire (PHQ-9) and Generalized Anxiety Disorder Scale (GAD-7)

The PHQ-9 and GAD-7 assess symptoms of depression and anxiety, respectively. Both scales are available in more than 80 languages and are widely used in the literature[16]. The PHQ-9 has nine items and assesses symptoms of depression using

a three-point scale. The GAD-7 has seven items and assesses symptoms of generalized anxiety, also using a three-point scale. The literature suggests a cut-off point of 10 for significant symptoms on both scales[17]. Regarding internal consistency for the present sample, Cronbach's α for the PHQ-9 and GAD-7 were 0.90 and 0.93, respectively.

Sociodemographic questionnaire

The sociodemographic questionnaire was designed for this research and comprised the following items: age, gender, ethnic group, education, marital status and family status (number of children).

Data analysis

The number of respondents varied between 301 and 429 across the different scales. The Little's Missing Completely at Random (MCAR) test indicated that the missing data in our sample were not missing completely at random, $\chi^2(638) = 716.407$, $p = .017$. Instruments presented at the end of the survey received fewer responses (see Table 1 in the supplemental material for more details). Missing data for the GPS (one item/one case) and ITQ were imputed using R package Missforest (normalized root-mean-square error = 0.19; proportion of falsely classified entries = 0.009).

The GPS factor analysis was explored on two different samples. We conducted an exploratory factor analysis (EFA) with the first sample (GPS-CCC) and a confirmatory factor analysis (CFA) with the second sample (GPS-Brazil).

EFA was performed using principal axes and oblique rotation methods (promax). Considering that the GPS items are dichotomic, EFA was conducted with a polychoric covariance matrix. The factor retention decision was based on scree plot inspection and eigenvalues. Barlett's sphericity test and the Kaiser-Meyer-Olkin (KMO) measure were inspected to ascertain data suitability for factor analysis.

The "lavaan" package[18] was used to perform CFA, which was conducted on four models using weighted least-squares (WLS) estimation as the model parameter appraisal. First, we tested three models (one to three factors) based on the EFA conducted with the GPS-CCC sample. The subsequent model was a three-factor model based on a previous study [19]. The factors are: (1) core PTSD symptoms (i.e., re-experience, hyperarousal and avoidance); (2) DSO symptoms, anxiety, depression, sleep problems and other physical and psychological problems; and (3) dissociative

symptoms. The following parameters were used to assess the fit of the CFA models: chi-square statistic, comparative fit index (CFI > 0.90), Tucker-Lewis index (TLI > 0.90) and root-mean-square error of approximation (RMSEA < 0.06).

Concurrent validity was tested using Spearman correlations between the GPS subscale scores and the total scores of the following instruments: PCL-5, PHQ-9, GAD-7 and ITQ-CPTSD. We also performed sensitivity and specificity analysis to establish optimal values for determining concurrent validity with the PCL-5 (cut-off score of 33), PHQ-9 (cut-off score of 10), GAD-7 (cut-off score of 10) and ITQ-CPTSD.

Results

Participants

The Brazilian subset of the GPS-CCC sample comprised 657 participants, 79.8% women (*n* = 524) and 20.2% (*n* = 133) as men, aged 16–82 years (M = 43.9, SD = 14.43).

Regarding the GPS-Brazil sample, 431 participants aged 18–83 years (M = 39.59; SD = 14.32) completed at least the GPS. The majority of the participants identified themselves as women (*n* = 340; 79.3%), 20% as men (*n* = 86) and 0.07% as another gender (*n* = 3). Regarding marital status, 44% of the participants were married or in a stable relationship (*n* = 189) and 42.9% (*n* = 184) were single. Most participants reported having an undergraduate degree (*n* = 315; 53.4%).

Symptomatology and item-level endorsement

Regarding traumatic event exposure, the most frequent event was emotional abuse (44%; *n* =189), followed by threat to life (31.5%; *n* = 135), physical violence (22.6%; *n* = 97), sexual violence (13.8%; *n* = 62) and serious injury (11%; *n* = 47). In the GPS-Brazil sample, 23.5% (*n* = 76) presented symptoms indicating PTSD (according to the PCL-5; cut-off score of 33), 7.2% (n = 31) showed symptoms indicating CPTSD (according to ITQ) and 29.9% (*n* = 90) and 24.3% (*n* = 73) reported significant symptoms of anxiety and depression (according to GAD and PHQ), respectively.

The GPS symptom means for the GPS-Brazil sample and the GPS-CCC sample were, respectively, 7.95 (SD = 5.0) and 7.53 (SD = 4.38). Regarding the other scales (only answered by the GPS-Brazil participants), the mean results for PTSD measures were 7.12 (SD = 6.24) and 19.42 (SD = 18.90) for the ITQ-PTSD and PCL-5, respectively. The CPTSD symptom mean (ITQ-CPTSD) was 14.56 (SD = 11.04).

Depression (PHQ) and anxiety (GAD) symptom means were, respectively, 7.7 (SD = 6.5) and 6.6 (SD = 5.6). More information regarding descriptive symptom results is presented in Table 1 in the Supplementary Material.

Item-level endorsement is illustrated in Figure 1. Both samples showed a similar pattern, with a higher prevalence of anxiety/depression symptoms and stressors and lower rates of self-harm, depersonalization and "lack of resilience".

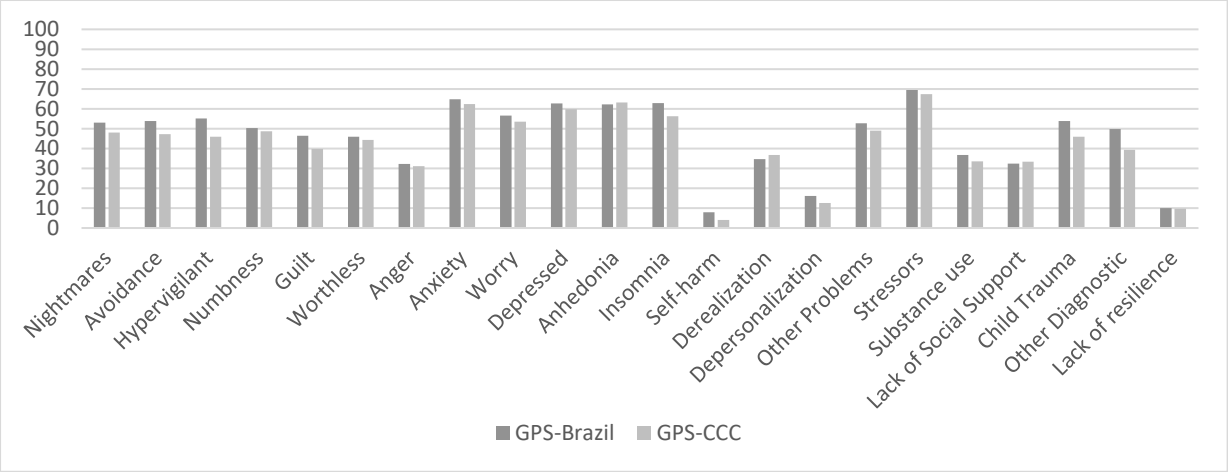

Figure 1. Item-level endorsement percentage by sample

Exploratory factor analysis

Before conducting EFA, we tested the sampling adequacy for the analysis. The Kaiser-Meyer-Olkin (KMO) test indicated an overall measure of sampling adequacy (MSA) of 0.86. However, all items had MSA > 0.70 and Bartlett's test of sphericity was significant ($p < 0.001$), suggesting that the sample was adequate for factor analysis.

Based on scree plot examination, one- and three-factor solutions were considered. A two-factor solution was also tested (see Supplementary Material). Regarding the single-factor model, the factor accounted for 43% of the variance in item scores. The factor loadings are described in Table 1 and all items showed factor loadings above 0.3. Six items (*re-experiencing, insomnia, self-harm, derealization, depersonalization* and *substance abuse*) showed communalities below 0.4. The models' RMSR was acceptable (0.06).

In the three-factor solution, the factors accounted for, respectively, 22%, 16% and 13% of the variance in item scores. The first factor comprised depressed mood, worry, dissociation and numbing; the second factor was composed of anger, anxiety,

other physical, emotional or social problems, and substance abuse; and the third factor included the PTSD core symptoms (re-experience, avoidance, hyperarousal and numbing) and insomnia.

The factor loadings are described in Table 2 and all items showed factor loadings above 0.3. One item showed low loadings in two factors: hyperarousal (0.32 on factor 2 and 0.36 on factor 3). The item “numbing” loaded on factors 1 (0.73) and 2 (0.36). Four items (self-harm, derealization, depersonalization and substance abuse) showed communalities below 0.4. The model’s RMSR was acceptable (0.06).

Factors loadings regarding the two-factor model are presented in Table 2 (Supplementary Material). The two-factor solution was composed of one factor that included mood symptoms, anxiety, dissociation, numbing, other problems and substance abuse (items 4–11 and 13–18) and a second factor that comprised the PTSD core symptoms (re-experiencing, avoidance, hyperarousal) and insomnia (items 1–3 and 12). In the two-factor model, the item “hyperarousal” also loaded in two factors (0.32 and 0.37).

Table 1. Standardized Factor loadings for the GPS – 1 factor model

		Factor 1	h^2
GPS1	***Re-experiencing***	.60	.36
GPS2	***Avoidance***	.67	.45
GPS3	***Hyperarousal***	.64	.40
GPS4	***Numbing***	.65	.42
GPS5	***Guilt***	.70	.48
GPS6	***Worthlessness***	.73	.54
GPS7	***Anger***	.65	.42
GPS8	***Anxiety***	.76	.58
GPS9	***Worry***	.78	.60
GPS10	***Depressed mood***	.82	.67
GPS11	***Anhedonia***	.71	.51
GPS12	***Insomnia***	.54	.29
GPS13	***Self-harm***	.57	.32
GPS14	***Derealization***	.55	.30
GPS15	***Depersonalization***	.55	.31
GPS16	***Other problems***	.64	.42
GPS18	***Substance Abuse***	.47	.22

Note. h^2 = *communalities*

Confirmatory factor analysis

Following the EFA results, the three models (one to three factors) were tested through CFA on the GPS-Brazil sample. All models showed an adequate fit (Table 2). The one-factor model showed an excellent fit (CFI = 0.98; TLI = 0.97). Very similar fit results were found for the three-factor model (CFI = 0.98; TLI = 0.98). Correlations between factors varied between $r = 0.45$ and $r = 0.58$ and were significant ($p < 0.001$) for the two- and three-factor models.

Rossi et al's (2021) model presented a slightly better fit than the other tested models (CFI = 0.99; TLI = 0.98). Correlations between factors varied between $r = 0.45$ and $r = 0.56$ and were significant ($p < 0.001$).

Table 2. Standardized Factor loadings for the GPS – 3 factors model

		Factor 1	Factor 2	Factor 3	H2
GPS1	***Re-experiencing***			.84	.59
GPS2	***Avoidance***			.67	.57

GPS3	***Hyperarousal***			.36	.44
GPS4	***Numbing***	.73			.44
GPS5	***Guilt***	.60			.51
GPS6	***Worthlessness***	.66			.51
GPS7	***Anger***		.84		.62
GPS8	***Anxiety***		.84		.73
GPS9	***Worry***	.46			.60
GPS10	***Depressed mood***	.80			.74
GPS11	***Anhedonia***	.79			.60
GPS12	***Insomnia***			.60	.40
GPS13	***Self-harm***		.38		.34
GPS14	***Derealization***	.44			.31
GPS15	***Depersonalization***	.46			.35
GPS16	***Other problems***		.51		.47
GPS18	***Substance Abuse***		.44		.26

Note. h^2 = *communalities*

Reliability, concurrent validity and sensitivity-specificity analysis

The GPS showed good internal consistency on both samples (GPS-CCC: α = 0.85; GPS-Brazil sample: α = 0.90). For both samples, no improvement in Cronbach's α was observed upon deleting items. The item–scale correlations were significant and varied between 0.40 and 0.69 for GPS-Brazil and between 0.37 and 0.68 for GPS-CCC (Table 3 in Supplementary Material). Item–item correlations ranged between 0.11 and 0.53 for GPS-Brazil and between 0.07 and 0.50 for GPS-CCC (Tables 4 and 5 in Supplementary Material).

The optimal cut-off points were tested for the following GPS subscales: PTSD, CPTSD, anxiety and depression (Table 4). The count of 4 was required for predicting PTSD with the GPS-PTSD subscale (Youden index = 0.71, sensitivity = 0.90, specificity = 0.80).

Regarding the GPS-CPTSD subscale, the optimal cut-off point for predicting CPTSD was 6 (Youden index = 0.66, sensitivity = 0.84, specificity = 0.82). Finally, the optimal cut-off point for GPS anxiety and depression was 2 (anxiety: Youden index = 0.47, sensitivity = 0.75, specificity = 0.71; depression: Youden index = 0.42, sensitivity = 0.82, specificity = 0.60). The correlations between the GPS subscales and other symptom measures are presented in Table 5. All correlations were significant and ranged between 0.46 and 0.79.

Table 3. Goodness-of-fit for each model – GPS-Brazil sample

Fit statistic	One-factor model	Two-factor model	Three-factor model	Rossi et al[+]
X^2	$X^2_{(119)}$ = 232.434**	$X^2_{(118)}$ = 201.504**	$X^2_{(116)}$ = 198.094**	$X^2_{(116)}$ =172.133**
RMSEA [90%CI]	.047 [.038 - .056]	.041 [.031- .050]	.041 [.031 - .050]	.034 [.022 - .044]
CFI	.98	.98	.98	.99
TLI	.97	.98	.98	.98
SRMR	.068	.064	.064	.059

Note. [+] Three-factor model reported by Rossi et al.[9]

Table 4. Optimal cut-off scores for GPS

	Cutoff	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)	AUC	Youden Index
GPS Symptoms (PCL-5)	10	.92(.83-.97)	.77(.71-.82)	.53(.45-.78)	.97(.93-.98)	.92	.69
GPS PTSD (PCL-5)	4	.90 (.81-.96)	.80 (.75-.85)	.57 (.48-.79)	.96 (.93-.97)	.90	.71
GPS CPTSD (ITQ-CPTSD)	6	.84(.63-.95)	.82(.77-.86)	.30(.24-.63)	.98(.95-.98)	.86	.66
GPS Anxiety (GAD)	2	.75 (.65-.84)	.71(.64-.77)	.53(.45-.65)	.87(.80-.90)	.76	.47
GPS Depression (PHQ)	2	.82(.71-.90)	.60(.53-.66)	.39(.33-.56)	.91(.85-.93)	.72	.42

Note. GPS Symptoms = Sum of items 1-16 + 18; GPS PTSD = Sum of items 1-5; GPS CPTSD = Sum of "GPS PTSD" and "GPS DSO"; GPS DSO = Sum of items 6-7; GPS Anxiety = Sum of items 8-9; GPS Depression = Sum of items 10-11; Scales showed in parenthesis were used as a criterion to establish the cutoff points. ITQ – CPTSD = International Trauma Questionnaire Complex PTSD diagnostic algorithm; PCL-5 = PTSD Checklist for DSM-5, cutoff point = 33. PHQ = Patient Health Questionnaire, cutoff point = 10; GAD = General Anxiety Disorder, cutoff point = 10.

Table 5. Correlations between GPS subscales and other symptoms measures

	ITQ – PTSD	ITQ – CPTSD	ITQ – DSO	PCL-5	PHQ	GAD
GPS Symptoms	.67**	.75**	.69**	.79**	.70**	.66**
GPS Anxiety	.55**	.61**	.55**	.61**	.57**	.56**
GPS Depression	.47**	.54**	.52**	.56**	.56**	.49**
GPS DSO	.46**	.59**	.62**	.59**	.52**	.50**
GPS CPTSD	.65**	.72**	.65**	.75**	.62**	.59**
GPS PTSD	.66**	.70**	.59**	.74**	.60**	.56**

Note. **$p < .001$. GPS Symptoms = Sum of items 1-16 + 18; GPS Anxiety = Sum of items 8-9; GPS Depression = Sum of items 10-11; GPS DSO = Sum of items 6-7; GPS CPTSD = Sum of "GPS PTSD" and "GPS DSO"; GPS PTSD = Sum of items 1-5; ITQ – PTSD = the International Trauma Questionnaire PTSD items; ITQ – CPTSD = ITQ Complex PTSD items; PCL-5 = PTSD Checklist for DSM-5. PHQ = Patient Health Questionnaire; GAD = General Anxiety Disorder.

Discussion

The present study was the first to assess the psychometric properties of the Brazilian version of the GPS. Furthermore, the accuracy of cut-off scores for detecting individuals with potential PTSD, CPTSD and significant symptoms of anxiety and depression was assessed. The overall results showed evidence of good internal consistency and concurrent validity.

Regarding the factor structure, all four tested models fitted the data well. The one-factor model theoretically is in line with the total GPS symptoms representing the transdiagnostic variety of responses, as reported by Frewen et al.[9] This finding is also supported by the significant correlations between the total GPS symptoms and the (C)PTSD, anxiety and depression scales. The three-factor model (core PTSD symptoms; DSO symptoms, anxiety, depression, sleep problems and other physical and psychological problems; and dissociative symptoms) proposed by Rossi et al.[19] showed the best fit. Rossi's model was also found to have the best fit in Salimi's et al.[12] study.

To our knowledge, this is the first study to test the cut-off points of the GPS for anxiety, depression and CPTSD symptoms. The findings of our study indicated that the GPS may serve as a reliable screening tool not only for PTSD and CPTSD but also for other disorders that frequently develop following exposure to traumatic events. Nonetheless, our findings also indicated that a clinical interview should follow the screening in order to validate the diagnoses, particularly for anxiety and depression, as these conditions exhibited lower sensitivity and specificity rates.

Some characteristics of our sample must be considered when interpreting the results. Emotional abuse was reported by 44% of the sample, a factor that may influence symptom presentation[20]. Yet, there was great variability in PTSD and CPTSD scores in our sample, and most participants didn't meet the criteria for either disorder, wich is expected in a non-clinical sample; however, this limits the generalizability of our results.

While online recruitment allowed us to reach a large number of participants, it also introduced some limitations: convenience samples in which most respondents were women, which may bias the results; the GPS-Brazil participants reported high education status, whereas this was not assessed with the GPS-CCC sample. Yet, the online recruitment led to an increase in the number of incomplete instruments, as many participants dropped out after completing only part of the survey.

As the sociodemographic characteristics of our sample do not fully reflect the Brazilian population diversity, attention should be paid to the generalization of the present results. Future studies should test this instrument in other contexts, such as public health services, and include clinical interviews. The strengths of our study include the identification of accurate cut-off scores for PTSD, CPTSD, anxiety and

depression, as well as using two samples to conduct both exploratory and confirmatory factor analyses.

In conclusion, our study shows that the Brazilian GPS version is a useful and valid screening tool both for research and for clinical purposes. The instrument fulfills the need for a reliable transdiagnostic screening tool in the Brazilian context, where high rates of trauma exposure exist[2], and may improve the identification of potential disorders, enabling appropriate treatment.

Author contributions: CRediT TaxonomyAlice BrunnetConceptualization-Equal, Data curation-Equal, Formal analysis-Equal, Methodology-Equal, Project administration-Equal, Writing - original draft-Lead, Writing - review & editing-LeadBruno CoimbraCRediT contribution not specifiedChris HoeberCRediT contribution not specifiedMarcus Vinicius MalachiasCRediT contribution not specifiedChristian KristensenCRediT contribution not specifiedMiranda OlffCRediT contribution not specified

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Disclosure

The authors report no conflicts of interest relating to this research.

References

[1] Benjet C, Bromet E, Karam EG, Kessler RC, McLaughlin KA, Ruscio AM, et al. The epidemiology of traumatic event exposure worldwide: results from the World Mental Health Survey Consortium. Psychol Med 2016;46:327–43. https://doi.org/10.1017/S0033291715001981.

[2] Ribeiro WS, Mari JDJ, Quintana MI, Dewey ME, Evans-Lacko S, Vilete LMP, et al. The Impact of Epidemic Violence on the Prevalence of Psychiatric Disorders in Sao Paulo and Rio de Janeiro, Brazil. PLoS One 2013;8.

https://doi.org/10.1371/journal.pone.0063545.

[3] Sambuco N, Bradley M, Herring D, Hillbrandt K, Lang PJ. Transdiagnostic trauma severity in anxiety and mood disorders: Functional brain activity during emotional scene processing. Psychophysiology 2020;57:1–13. https://doi.org/10.1111/psyp.13349.

[4] Olff M, Bakker A, Frewen P, Aakvaag H, Ajdukovic D, Brewer D, et al. Screening for consequences of trauma – an update on the global collaboration on traumatic stress. Eur J Psychotraumatol 2020;11:1752504. https://doi.org/10.1080/20008198.2020.1752504.

[5] Lewis SJ, Arseneault L, Caspi A, Fisher HL, Matthews T, Moffitt TE, et al. The epidemiology of trauma and post-traumatic stress disorder in a representative cohort of young people in England and Wales. The Lancet Psychiatry 2019;6:247–56. https://doi.org/10.1016/S2215-0366(19)30031-8.

[6] Hoppen TH, Priebe S, Vetter I, Morina N. Global burden of post-traumatic stress disorder and major depression in countries affected by war between 1989 and 2019: A systematic review and meta-analysis. BMJ Glob Heal 2021;6. https://doi.org/10.1136/bmjgh-2021-006303.

[7] Aprigio I, dos Santos PPP, Gauer G. International Trauma Questionnaire and Posttraumatic Cognitions Inventory-9: validity evidence and measurement invariance of their Brazilian versions. Psicol Reflexão e Crítica 2024;37:18. https://doi.org/10.1186/s41155-024-00297-z.

[8] Pereira-Lima K, Loureiro SR, Bolsoni LM, Apolinario da Silva TD, Osório FL. Psychometric properties and diagnostic utility of a Brazilian version of the PCL-5 (complete and abbreviated versions). Eur J Psychotraumatol 2019;10. https://doi.org/10.1080/20008198.2019.1581020.

[9] Frewen P, McPhail I, Schnyder U, Oe M, Olff M. Global Psychotrauma Screen (GPS): psychometric properties in two Internet-based studies. Eur J Psychotraumatol 2021;12. https://doi.org/10.1080/20008198.2021.1881725.

[10] Oe M, Kobayashi Y, Ishida T, Chiba H, Matsuoka M, Kakuma T, et al. Screening for psychotrauma related symptoms: Japanese translation and pilot testing of the Global Psychotrauma Screen. Eur J Psychotraumatol 2020;11. https://doi.org/10.1080/20008198.2020.1810893.

[11] Rossi R, Socci V, Talevi D, Niolu C, Pacitti F, Di Marco A, et al. Trauma-spectrum symptoms among the Italian general population in the time of the

COVID-19 outbreak. 2020. https://doi.org/10.1101/2020.06.01.20118935.

[12] Salimi Y, Hoeboer C, Motevalli Haghi SA, Williamson RE, Rahimi MD, Rajabi-Gilan N, et al. Trauma and its consequences in Iran: cross-cultural adaption and validation of the Global Psychotrauma Screen in a representative sample. BMC Psychiatry 2023;23:1–11. https://doi.org/10.1186/s12888-023-04564-8.

[13] Cloitre M, Shevlin M, Brewin CR, Bisson JI, Roberts NP, Maercker A, et al. The International Trauma Questionnaire: development of a self-report measure of ICD-11 PTSD and complex PTSD. Acta Psychiatr Scand 2018;138:536–46. https://doi.org/10.1111/acps.12956.

[14] Donat JC, Lobo N dos S, Jacobsen G dos S, Guimarães ER, Kristensen CH, Berger W, et al. Translation and cross-cultural adaptation of the international trauma questionnaire for use in Brazilian Portuguese. Sao Paulo Med J 2019;137:270–7. https://doi.org/10.1590/1516-3180.2019.0066070519.

[15] Weathers FW, Litz BT, Keane TM, Palmieri PA, Marx BP, Schnurr PP. The PTSD Checklist for DSM-5 (PCL-5). 2013. Scale available from the National Center for PTSD at www.ptsd.va.gov.

[16] Kroenke K, Wu J, Yu Z, Bair MJ, Kean J, Stump T, et al. Patient Health Questionnaire Anxiety and Depression Scale. Psychosom Med 2016;78:716–27. https://doi.org/10.1097/PSY.0000000000000322.

[17] Spitzer RL, Kroenke K, Williams JBW, Lowe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. Arch Intern Med 2006;166:1092–7. https://doi.org/10.1001/archinte.166.10.1092.

[18] Rosseel Y. Lavaan: An R package for structural equation modeling and more. Version 0.5–12 (BETA). J Stat Softw 2012;48:1–36.

[19] Rossi R, Socci V, Talevi D, Niolu C, Pacitti F, Di Marco A, et al. Trauma-spectrum symptoms among the Italian general population in the time of the COVID-19 outbreak. Eur J Psychotraumatol 2021;12. https://doi.org/10.1080/20008198.2020.1855888.

[20] Smith HL, Summers BJ, Dillon KH, Cougle JR. Is worst-event trauma type related to PTSD symptom presentation and associated features? J Anxiety Disord 2016;38:55–61. https://doi.org/10.1016/j.janxdis.2016.01.007.