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The Posttraumatic Stress Disorder (PTSD) Checklist for DSM–5: A Systematic Review of Existing Psychometric Evidence

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Abstract

The PTSD Checklist for DSM-5 (PCL-5) is a widely used self-rated measure of DSM-5 PTSD symptoms. The goal of this systematic review was to synthesize research on the psychometric properties of the PCL-5 to guide clinical and research applications. We focused on reliability, validity, factor structure, optimal cutoff scores, and sensitivity to clinical change indices. A systematic review of the literature following PRISMA guidelines was conducted using PubMed, PsycINFO, CINAHL, and PTSDpubs with search terms capturing selected psychometric indices of the PCL-5. The inclusion criteria were: peer-reviewed publication in English; primary focus on the PCL-5 psychometrics; empirical study; and study with adult samples. The search yielded 265 studies; 56 papers (amounting to 64 studies) met inclusion criteria and were reviewed. Findings generally indicated evidence for: acceptable internal consistency and test-retest reliability; construct validity; a 7-factor Hybrid Model; recommended cutoff scores between 31–33; and ability to index sensitivity to clinical change. To further advance knowledge and applications of the PCL-5, we need more research on abbreviated versions of the PCL-5, bifactor modeling as applied to the PCL-5, as well as on PCL-5 item difficulty estimates, discrimination parameters, and clinical change score estimates.

Keywords

Posttraumatic stress disorder; PTSD Checklist for DSM-5; psychometric indices; systematic review

Introduction

Posttraumatic stress disorder (PTSD) is a serious and potentially disabling psychiatric disorder that can emerge following exposure to actual or threatened death, serious injury, and/or sexual violence (American Psychiatric Association [APA], 2013), with a lifetime prevalence of 8.3% in the United States population (Kilpatrick et al., 2013). PTSD is associated with negative physical health outcomes (e.g., cardiovascular diseases; Pacella

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et al., 2013; Ryder et al., 2018); mood disorders, substance use, and suicidal behaviors (Jacobson et al., 2001; Pietrzak et al., 2011; Rytwinski et al., 2013); and impairments in social and interpersonal functioning (Alonso et al., 2011; Birkley et al., 2016; Smith et al., 2005; Wald & Taylor, 2009). PTSD is also linked with greater healthcare service utilization (Kartha et al., 2008; Klassen et al., 2013), and lower levels of income, educational attainment, and occupational success (Sareen et al., 2011; Wald & Taylor, 2009; Vilaplana-Pérez et al., 2020). Indeed, PTSD imposes substantial medical and economic burden on individuals and society. Unsurprisingly, effective and timely treatment of PTSD is imperative; hence, an accurate assessment of PTSD symptoms is critical in this regard.

The PTSD Checklist (PCL; Weathers et al., 1993; Weathers et al., 2013) is a widely used self-rated measure of PTSD symptoms. The PCL has been used to estimate provisional PTSD, quantify symptom severity, and monitor symptom change across time and in response to interventions (Weathers et al., 1993; Weathers et al., 2013). The PCL for Diagnostic and Statistical Manual of Mental Disorders, 5th edition (*DSM-5*) – PCL-5 – was developed to reflect changes to the *DSM-5* PTSD criteria (APA, 2013). Revisions to the PCL-5 from the PCL for *DSM-IV* included: (1) adding three items to capture newly added PTSD symptoms (blame, negative emotions, reckless/self-destructive behaviors); (2) revising the language of certain items; and (3) changing the response scale from 1–5 to 0–4 (Blevins et al., 2015).

The PCL-5 is a 20-item self-rated scale that assesses symptoms across the four DSM-5 clusters: intrusions (Criterion B), avoidance of trauma reminders (Criterion C), negative alterations in cognitions and mood (NACM; Criterion D), and alterations in arousal and reactivity (AAR; Criterion E; APA, 2013). The PCL-5 can be used as a measure of symptom severity by summing the 20 items, or a measure of provisional PTSD by using an appropriate cutoff score or by following the DSM-5 diagnostic rules (i.e., endorsement of at least 1 B item, 1 C item, 2 D items, and 2 E items at a rating of 2 or above; Blevins et al., 2015; Wortmann et al., 2016). The PCL-5 has three formats for administration based on whether and how a Criterion A trauma is examined: without the Criterion A trauma component, with a brief Criterion A trauma assessment, and with the Life Events Checklist for DSM-5 (LEC-5) and extended Criterion A trauma assessment (Blevins et al., 2015).

The PCL-5 has undergone extensive psychometric investigations since its development and has been examined across several different languages and settings. In this systematic review, we aimed to synthesize findings from these psychometric investigations to inform strategic and appropriate uses of the PCL-5 tailored to different contexts and goals. Specifically, we synthesized data on the following psychometric properties across different PCL-5 formats (including abbreviated versions): (1) reliability (internal consistency, test-retest), (2) validity (convergent, discriminant, concurrent, predictive), (3) factor structure (i.e., structural models), (4) optimal cutoff score to determine probable PTSD diagnosis (i.e., diagnostic utility statistics), and (5) sensitivity to clinical change indices that reference clinically meaningful symptom improvement or exacerbation over time. Clinicians and researchers can use the synthesized information to gain an enhanced understanding of the strengths, weaknesses, and discriminative use of the PCL-5; to determine if and when the

PCL-5 provides reliable and valid information; and to guide clinical and research decisions involving the PCL-5 (Rust & Golombok, 2014).

Method

Comprehensive Search Strategy and Article Selection

We conducted a systematic review following Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021).

Eligibility information.—Inclusion criteria for studies were: (1) peer-reviewed publication in English, irrespective of the language and version of PCL-5; (2) empirical study vs. theoretical/conceptual/review paper; and (3) study with adult samples. For the current review, we synthesized literature on psychometric properties of reliability, validity, structural models, diagnostic utility statistics, and sensitivity to clinical change indices. Notably, there has been a recent review on invariance of the PTSD construct examined by different PTSD measures (Contractor et al., 2019) and on network analyses of the PTSD construct (Birkeland et al., 2020); hence we did not focus on these psychometric properties in the current review. Lastly, although we aimed to examine item difficulty and discrimination parameters of the PCL-5, we found only one study that matched pre-determined study inclusion criteria for this review; hence, we did not discuss this particular psychometric property in detail.

Information Sources and Search Strategy.—The following databases were searched: PubMed, PsycINFO, Cumulative Index of Nursing and Allied Health Literature (CINAHL), and PTSDpubs (formerly PILOTS). The following combination of terms was used to identify articles by searching the abstract, title, and key term fields: (“PTSD Checklist for DSM-5” or “PCL-5” or “PTSD Checklist 5” OR “PTSD Checklist-5” OR “Posttraumatic Stress Disorder Checklist for DSM-5” OR “PTSD Checklist for Diagnostic and Statistical Manual of Mental Disorders–Fifth Edition” OR “Posttraumatic Stress Disorder Checklist for Diagnostic and Statistical Manual of Mental Disorders–Fifth Edition” OR “DSM-5 Posttraumatic Stress Disorder Symptom*” OR “DSM-5 PTSD Symptom*” OR “DSM-5 PTSD”) AND (“psychometric*” OR “internal consistenc*” OR “reliabilit*” OR “test-retest” OR” temporal stabilit*” OR “validit*” OR “convergent validit*” OR “discriminant validit*” OR “construct validit*” OR “criterion validit*” OR “factor structure*” OR “factor analys*” OR “structural validit*” OR “confirmatory factor analys*” OR “exploratory factor analys*” OR “sensitivity to clinical change*” OR “clinical change*” OR “item response theor*” OR “diagnostic utilit*” OR “cut-off score*” OR “differential item analys*” OR “latent response theor*” OR “measurement validity” OR “structural model*”). The timeframe for the search was not constrained.

Selection Process.—See Figure 1 for a detailed description of the process. Abstracts produced by the initial search were screened independently by authors SRF and AMR. Then, for each abstract identified as potentially meeting inclusion criteria, the full-text articles were independently reviewed by SRF and HR, with author AAC cross-checking a random 20% of the articles to ascertain the reliability of the extracted information. Discussions

with senior authors AAC and NHW occurred in cases of discrepancies or if questions arose regarding inclusion criteria.

Data Collection Process.—Using standardized forms, the following descriptive information was extracted from each study: sample size, sample type, demographic information (age, gender, race/ethnicity), index trauma measure, and PCL-5 information (version, language, mode of administration, mean score with the standard deviation). Finally, information referencing the psychometric results from each study was extracted: reliability (internal consistency, test-retest), validity (convergent, discriminant, concurrent, predictive), structural models (information on the optimal model [fit indices, range of factor loadings, items with highest and lowest factor loadings, range of factor correlations]), diagnostic utility statistics (recommended cutoff scores, diagnostic utility estimates [sensitivity, specificity, utility, positive predictive power, negative predictive power]), and sensitivity to clinical change (kappa estimates, Pearson correlations, concordance correlations).

Data items

Reliability.—Relevant estimates of reliability for the current review included internal consistency and test-retest reliability of the PCL-5 scores (total and *DSM-5* subscales). Internal consistency refers to the homogeneity of the items within an instrument and the degree to which each item reliably reflects the measured construct (Cronbach, 1951). Internal consistency is frequently measured by Cronbach's alpha, with values ranging from 0 to 1. Recommended values indicate: ≥.90 is excellent, .80-.90 is good, .70-.80 is acceptance, .60-.70 is questionable, .50-.60 is poor, and <.50 is unacceptable (Nunally & Bernstein, 1994). Test-retest reliability evaluates the consistency of responses on a measure across multiple administrations. Test-retest reliability is often measured by the strength of the correlation between the two administrations, with recommended values ≥.60 (Cicchetti, 1994).

Validity.—Relevant estimates of validity for the current review included construct (i.e., convergent and discriminant) and criterion (i.e., concurrent and predictive) validity of the observed PCL-5 scores (total and *DSM-5* subscales). Construct validity refers to the extent that a measure is accurately capturing the construct it is purported to measure. Construct validity is typically established by examining the pattern of correlations between the score on the measure of interest and scores on a series of other measures that assess constructs that would theoretically be similar (convergent validity) or dissimilar (discriminant validity) to the measured construct (Cronbach & Meehl, 1955). Criterion validity captures the extent to which a score on the measure of interest relates to a specific and independent criterion that is identified as relevant to the measured construct (Cohen et al., 1996). Criterion validity can be evaluated by examining associations between scores on measures administered simultaneously (concurrent validity) or at different timepoints (predictive validity; Engellant et al., 2016).

Evidence for construct and criterion validity is indicated by correlation patterns (i.e., direction and magnitude of relationships) that are consistent with theoretical expectations. Correlation coefficients between .10 and .30 are considered weak effects, between .30

and .50 are considered moderate effects, and >.50 are considered strong effects (Cohen, 1988). Stronger correlations (>.50) are recommended as evidence of convergent, concurrent, and predictive validity. Evidence for discriminant validity would be indicated by lower correlations (weak to moderate) with measures of unrelated constructs and by negative correlations with measures of opposite constructs (Nunally & Bernstein, 1994; Terwee et al., 2007). Construct validity is also examined using effect size estimates ($r_{alerting\text{-}CV}$ and $r_{contrast\text{-}CV}$) that quantify the degree of convergence between theoretically-predicted and observed correlations across measured constructs; higher values represent a greater degree of match between observed and predicted correlation patterns (Westen & Rosenthal, 2003). Lastly, group difference statistics are also used to examine validity; investigators determine whether scores differ in expected ways across groups.

Structural Models.—The factor structure is assessed to determine whether the underlying structure of the measure is consistent with the conceptual understanding of the measured construct. The factor structure is examined through the use of confirmatory factor analysis (CFA) or exploratory factor analysis (EFA). The adequacy of the model can be evaluated by examining several fit indices, such as Tucker Lewis index (TLI; Tucker & Lewis, 1973), root mean square error of approximation (RMSEA; Steiger, 1990), standardized root mean square residual (SRMR; Hu & Bentler, 1999), and comparative fit index (CFI; Bentler, 1990). A well-fitting (adequate) model has CFI and TLI values ≥.95 (.90-.94), a SRMR value of ≤.05 (.06-.08), and an RMSEA value ≤.06 (.07-.08; Hu & Bentler, 1999). Chi-square difference tests are conducted to compare the nested models (Kline, 2011). Non-nested models are compared using the Bayesian Information Criterion (BIC) and Akaike Information Criterion (AIC) values, with lower values indicating better fit (Kass & Raftery, 1995; Kline, 2011).

Diagnostic Utility Estimates.—Diagnostic utility estimates are used to evaluate the appropriateness of a measure in accurately determining the presence or absence of a specific condition (Cicchetti, 1994). This is examined by comparing the level of diagnostic agreement between a measure (e.g., PCL-5) and a reference test (e.g., gold standard assessment). Several indicators, such as sensitivity (proportion of individuals correctly identified as having the condition; true positives), specificity (proportion of individuals correctly identified as not having the condition, true negatives), positive predictive power (probability that individuals screening positive truly have the condition), and negative predictive power (probability that individuals screening negative truly do not have the condition) are examined. These metrics can be used to identify the optimal cutoff score for identifying the presence of a condition (i.e., probable PTSD).

Sensitivity to Clinical Change Index.—Sensitivity to clinical change refers to the ability of a measure to detect meaningful change in symptom severity over time (Husted et al., 2000). The PCL-5's sensitivity to change is critical for demonstrating its practical use in capturing symptom change (e.g., improvement) following an intervention.

Results

Study Selection

The initial search resulted in 541 articles. After removing duplicates, the initial database search resulted in 265 articles. Authors SRF and AMR reviewed abstracts and excluded 182 articles based on abstract review. Next, 83 full-text articles were reviewed independently by Authors SFR and HR and 56 articles (amounting to 64 unique samples) were identified as meeting inclusion criteria. For the rest of the review, we will reference the 64 unique studies (i.e., samples) hereon for all reported estimates (e.g., frequencies) to capture more nuanced data. Samples that were studied longitudinally were counted as one sample and only baseline data are reported in results. Similarly, studies that divided one sample into multiple subsamples were counted as one sample, and only data for the full sample are reported in results. Similarly, studies that divided one sample into multiple subsamples were counted as one sample, and only data for the full sample is reported in text.

Study Characteristics

Supplemental Table 1 outlines sample characteristics and methodological information. Sample sizes ranged from 56 to 11,728. Primarily, the samples included military personnel (current duty or veteran; $n = 17$; 26.6%), university students ($n = 16$; 25.0%), treatment-seeking individuals (mental health outpatient or inpatient; $n = 9$; 14.1%), and community participants (recruited online and in-person; $n = 8$; 12.5%). The mean age ranged from 18 to 60. More than half of the studies ($n = 35$; 54.7%) reported information on race and ethnicity; most of these studies ($n = 30$; 85.7%) reported having a primarily white sample (>50%). The index trauma was primarily assessed using the Life Events Checklist for DSM-5 (LEC-5, $n = 24$; 37.5%; Gray et al., 2004) and the Stressful Life Events Screening Questionnaire (SLESQ, $n = 8$; 12.5%; Goodman et al., 1998). The PCL-5 version most commonly administered was the PCL-5 without Criterion A ($n = 55$; 85.9%). The PCL-5 in English was administered across most studies ($n = 39$; 60.9%). The PCL-5 was most frequently administered through the computer and as a self-rated measure ($n = 31$; 48.4%). Mean PCL-5 scores ranged from 5.5 to 55.4 across studies.

Psychometric Properties

Reliability.—A total of 51 studies (79.7%) assessed internal consistency (Cronbach's alpha coefficients) for the PCL-5 total scale score and 18 studies (28.1%) assessed internal consistency for the PCL-5 subscale scores. Internal consistency coefficients ranged from .83 to .97 for the PCL-5 total scale score, and .57-.93, .69-.91, .74-.94, and .71-.90 across the intrusions, avoidance, NACM, and AAR subscale scores, respectively. For studies using the abbreviated versions ($n = 4$; 6.3%), the internal consistency coefficients ranged from .82 to .87 for the 4-item and .90 to .93 for the 8-item total scale scores. Internal consistency was also assessed using Omega coefficients in two of these studies (Hurlocker et al., 2018; Moring et al., 2019); the coefficient for the PCL-total score was .94, and the PCL-5 subscale scores had the following ranges: intrusions (.54-.94), avoidance (.38-.83), NACM (.58-.83), and AAR (.67-.77). Test-retest reliability was examined in 9 studies (17.6%) for the PCL-5 total scale score and in 4 studies (7.8%) for the PCL-5 subscale scores; time intervals ranged from one to six weeks. Several different time intervals were used: 1 week (Blevins et al.,

2015), 10 days (Hall et al., 2019), 15 days (Boysan et al., 2017), an interval with a mean of 20.95 days (Ashbaugh et al., 2016), an interval with a median of 16 days (Pereira-Lima et al., 2019), 3 weeks (Carvalho et al., 2020; Krüger-Gottschalk et al., 2017), 1 month (Bovin et al., 2016), and 6 weeks (Sveen et al., 2016). Coefficients ranged from .58 to .91 for the PCL-5 total scale score and .58-.91, .49-.88, .63-.92, and .76-.89 across the intrusions, avoidance, NACM, and AAR subscale scores, respectively. For the abbreviated versions, one study found a test-retest reliability of .84 for both the 4- and 8-item scale scores. See Supplemental Table 1 for a detailed summary of reliability estimates.

Validity.—A total of 21 studies assessed validity (32.8%). Of these, 20 studies examined construct validity (i.e., construct validity broadly, convergent, and/or discriminant validity) and 4 studies examined criterion validity (i.e., criterion validity broadly, concurrent and/or predictive validity). Findings are grouped by validity type as indicated in the study, with the exception of studies that did not specify validity type; these studies were grouped under the broader construct of convergent validity. See Supplemental Table 2 for a detailed summary of validity estimates. Notably, no studies assessed predictive validity.

Construct validity.—A total of 20 studies examined construct validity (convergent/discriminant validity) of the PCL-5 scores. Of those, 17 studies (85.0%) examined convergent validity. For the complete measure, the PCL-5 total score showed moderate to strong correlations with other measures of PTSD (*n*=16; .44-.89). In reference to the PCL-5 subscale scores, there were also moderate to strong correlations with other measures of PTSD (intrusions [*n*=2; .48-.67], avoidance [*n*=2; .57-.57], NACM [.73], AAR [*n*=2; .50-.69]). The PCL-5 total score also correlated with measures of trauma/stressors (*n*=10; .12-.46), depression (*n*=12; .54-.81), anxiety (*n*=9; .56-.74), general mental (*n*=6; .32-.75) and physical (*n*=2; .09-.29) health, functional impairment (*n*=3; .59-.68), stress (*n*=2; .56-.62), suicidal ideation (*n*=3; .54-.57), substance use (*n*=3; .12-.26), somatic symptoms (*n*=3; .50-.61), sleep (*n*=2; .51-.62), negative cognitions (*n*=4; .47-.61), and dissociation (*n*=4; .53-.72). Although examined less frequently, the PCL-5 total score also correlated with constructs of panic (.50), sexual problems (.33), borderline personality symptoms (.68), rumination (.68), anger (.55), mania (.47), psychosis (.46), memory problems (.51), repetitive thoughts and behaviors (.70), and personality functioning (.66).

The PCL-5 intrusion subscale score correlated with other measures of the total PTSD score (.55), PTSD symptom clusters (intrusions [*n*=4; .53-.76], avoidance [.52], AAR [.44]), depression (*n*=2; .47-.62), anxiety (.60), general mental health (*n*=2; .61 −.66), trauma (*n*=4; .14-.22), dissociation (.58), stress (.47), sexual problems (.28), and sleep (.57). The PCL-5 avoidance subscale score correlated with other measures of the total PTSD score (.46), PTSD symptom clusters (intrusions [.37], avoidance [*n*=4, .55-.68], AAR [.34]), depression (*n*=2; .47-.53), anxiety (.54), general mental health (*n*=2; .51-.57), trauma (*n*=4; .01-.17), dissociation (.50), stress (.41), sexual problems (.19), and sleep (.46). The PCL-5 NACM subscale score correlated with other measures of the total PTSD score (.54), PTSD symptom clusters (intrusions [.48], avoidance [.51], NACM [.68], AAR [.41]), depression (*n*=2; .60-.64), anxiety (.62), general mental health (*n*=2; .60-.69), trauma (*n*=4; .10-.27), dissociation (.61), stress (.51), sexual problems (.29), and sleep (.62). The PCL-5 AAR

subscale score correlated with other measures of the total PTSD score (.53), PTSD symptom clusters [intrusions [.39], avoidance [.47], AAR [*n*=4; .62-.81]), depression (*n*=2; .52 - .65), anxiety (.58), general mental health (*n*=2; .60 −.68), trauma (*n*=4; .09-.16), dissociation (.61), stress (.61), sexual problems (.33), and sleep (.51).

Construct validity was further assessed using group difference tests. Individuals with PTSD (vs. without PTSD) had a significantly higher PCL-5 total score (Fung et al., 2019). Individuals with probable PTSD (determined using recommended cutoff scores on the 4-item abbreviated PCL-5, and 8-item abbreviated PCL-5, separately) had significantly greater physical and mental functional impairment compared to those without probable PTSD. Individuals with probable PTSD (determined using recommended cutoff scores for the 20-item PCL-5) had significantly greater mental functional impairment compared to those without probable PTSD (Geier et al., 2020). As expected, demographics (higher levels of education and being married) and psychological symptoms (dissociation and depression) predicted probable PTSD on the PCL-5 among individuals who were incarcerated (Öğülmüş et al., 2020). Construct validity of a 4-item abbreviated version of the PCL-5 (B3, C2, D6, and E1) was assessed by comparing odds ratios between the abbreviated and full versions of the PCL-5 with measures of depression, generalized anxiety disorder, panic disorder, and intermittent explosive disorder; there was a high degree of similarity between the odds ratios for the abbreviated and full versions of the PCL-5.

A total of 5 studies (7.8%) explicitly examined discriminant validity. The PCL-5 total score correlated with measures of trauma (*n*=3; .12-.30), traumatic stress symptoms (.74), depression (*n*=4; .60-.64), anxiety (*n*=2; .40-.61), somatic symptoms (*n*=2; .49-.51), substance use (alcohol [*n*=3; .10-.40], drug [.39]), personality disorders (antisocial [.39], borderline [.58], psychopathy [.08]), schizophrenia (.49), paranoia (.43), mania (.31), social support (−.11), pain (.33), guilt (*n*=3; .03-.32), anger (.33), sleep (.48), and resilience (−.22). Discriminant validity was further tested by examining the statistical difference between correlations: Ashbaugh et al. (2016) found that the correlation between the PCL-5 total score and a measure of depression was lower than the correlation between the PCL-5 total score and another measure of PTSD.

Construct validity of the PCL-5 was further supported by effect size statistics that found strong matches between the observed and predicted patterns of correlations ($r_{alerting\text{-}CV}$ ranged from .86 to .94 and $r_{contrast\text{-}CV}$ ranged from .86 to .92). This suggests a strong degree of convergence between the predicted and observed correlations between the PCL-5 total score and (1) Personality Assessment Inventory subscales (i.e., traumatic stress, depression, anxiety, borderline personality features, schizophrenia, paranoia, somatic complaints, alcohol, drug, antisocial features, and mania; Blevins et al., 2015); (2) measures of PTSD, depression, anxiety, suicidal ideation, substance use, and distress/functioning (Ito et al., 2017); and (3) measures of PTSD, trauma, anxiety, depression, guilt, anger, sleep disturbances, alcohol use, somatic symptoms, and resilience (Wortmann et al., 2016).

Criterion validity.—A total of 4 studies (19.0%) examined concurrent validity, which was tested by examining both correlations and group difference tests. Individuals with PTSD (vs. depression and healthy controls) scored higher on the PCL-5 total score

and measures of dissociation, depression, and anxiety (Boysan et al., 2017a); and on measures of psychological symptoms and trauma cognitions, with two exceptions: the PCL-5 avoidance subscale and depression measure scores were not statistically different between individuals with PTSD vs. depression (Boysan et al., 2017b). Additional support for concurrent validity was found by examining associations between the PCL-5 and other measures of PTSD, including the Clinician Administered PTSD Scale for DSM-5 (CAPS-5) total severity score (.90), the Posttraumatic Symptoms Scale-10 total score (.82), and the Posttraumatic Symptoms Scale-14 total score (.85; Rosendahl et al., 2019). Similarly, the PCL-5 demonstrated strong correlations with measures of depression (.72) and anxiety (.71; Van praag et al., 2020).

Structural Models.—Extensive factor-analytical research has been conducted with the PCL versions (Armour et al., 2016). The four-factor *DSM-5* Model comprising of intrusions, avoidance, NACM, AAR closely resembles the *DSM-IV* Emotional Numbing (EN) Model (Friedman et al., 2011); the EN Model (King et al., 1998) split PTSD's avoidance and numbing into separate factors (Asmundson et al., 2004). Additionally, a *DSM-5* Dysphoria Model (Miller et al., 2013) and a *DSM-5* Dysphoric Arousal (DA) Model similar to their *DSM-IV* counterparts were proposed. The Dysphoria Model (Simms et al., 2002) retains the EN Model's intrusion and avoidance factors, and combines some AAR and numbing symptoms to create PTSD's dysphoria factor, which potentially accounts for PTSD's comorbidity with distress-based disorders (Contractor et al., 2014; Watson, 2009). The DA Model (Elhai et al., 2011) retains the three EN Model factors, while separating the AAR cluster into dysphoric arousal and anxious arousal symptoms. Further, the six-factor Anhedonia (AN) Model (Liu et al., 2014) differentiates Criterion D symptoms of negative from positive affect (Watson, 2005, 2009), while the six-factor Externalizing Behavior (EB) Model (Tsai et al., 2015) proposes an additional externalizing behaviors factor (E1-E2) representing emotion regulation difficulties. Lastly, the Hybrid Model integrates the components of other *DSM-5* models resulting in seven factors (Armour et al., 2015). See Supplemental Table 3 for PCL-5 structural models.

Among the studies examined, 47 studies (73.4%) assessed PCL-5 structural models. Of those, the Hybrid Model was tested across 34 studies (72.3%) and was found to be optimal across 28 studies (82.3%) compared to the examined alternate models. The Anhedonia Model was found to perform equally well as the Hybrid Model across 6 of these studies. Using a different approach, support was also found for a two- and four-factor bifactor model (Schmitt et al., 2018). The following are the ranges for the most commonly reported fit indices for the CFA models: RMSEA (0.0-.12), CFI (.89–1.00), TLI (.86–1.00), and SRMR (.03-.05). The factor loadings were reported by 30 studies (63.8%); 22 studies (46.8%) reported factor correlations. Item factor loadings ranged from .01 to .97 across studies; item 8 (memory impairment) had the lowest factor loading across most studies (n = 16; 53.3%) and item 7 (avoidance of trauma reminders) had the highest factor loading across most studies (n = 7; 23.3%). Factor correlations ranged from .21 to .996. See Supplemental Table 4 for detailed information on PCL-5 structural models.

Diagnostic Utility Statistics.—Notably, we report conclusive results on optimal cutoff scores as provided by authors of included studies; in the event that the authors have concluded that there is no diagnostic cutoff score, we report that as such to keep the scope of this review feasible and meaningful. Overall, 21 studies (32.3%) examined the optimal cutoff score to determine a probable PTSD diagnosis using the PCL-5; they produced a total of 30 potential cutoff scores for the full PCL-5, 3 for the 4-item abbreviated PCL-5, and 4 for the 8-item abbreviated PCL-5. These cutoff scores were most commonly examined among military personnel, university students, and treatment-seeking samples.

For the 20-item PCL-5, recommended cutoff scores ranged from 22 to 49. Recommended cutoff scores most frequently ranged between 31 and 33 (n = 11; 36.7%). Across these studies, the diagnostic utility estimates for the identified optimal scores had the following ranges: sensitivity (.50–1.00), specificity (.35-.97), diagnostic utility (.52-.95), positive predictive power (.38-.97), and negative predictive power (.63–1.00). For the 4-item abbreviated PCL-5, cutoff scores ranged from 4 to 10 (sensitivity [.76–1.00], specificity [.52-.83], diagnostic utility [.77-.87], positive predictive power [.42-.63], and negative predictive power [.83–1.0]). For the 4-item abbreviated PCL-5, Zuromski et al. (2019) did not conclusively provide an optimal cutoff score; looking at provided data, cutoff scores in the range of 6–7 seem to have an optimal combination of specificity and sensitivity broadly across the different full PCL-5 threshold values. For the 8-item abbreviated PCL-5, cutoff scores ranged from 13 to 21 (sensitivity [.79-.96], specificity [.39-.90], diagnostic utility [.77-.92], positive predictive power [.38-.71], and negative predictive power [.84-.99]). See Supplemental Table 5 for a summary of cutoff scores and diagnostic utility statistics.

Sensitivity to clinical change.—One study examined sensitivity to clinical change for the PCL-5. Wortmann et al. (2016) found that the PCL-5 showed agreement with a clinical interview for current *DSM-IV* PTSD symptoms (PTSD Symptom Scale–Interview [PSS-I]; Foa et al., 1993) in terms of pre- to post-treatment changes (i.e., highly correlated and of nearly equal magnitude). Specifically, kappa estimates ranged from .28 to .55, the Pearson correlation coefficient was .72, and the concordance correlation coefficient was .68.

Discussion

In this systematic review, we summarized findings on the following psychometric properties of the PCL-5: reliability, validity, structural models, diagnostic utility, and sensitivity to clinical change indices. To begin with, we note certain sample and methodological characteristics across reviewed studies. There was significant variation in the size of the samples used, with most sample sizes between 200 and 500. Indicative of less diversity across examined studies, most studies utilized data from military or university samples, and used samples that identified as predominantly white and female. Also, most studies used the LEC-5 as the index measure, the English version of the PCL-5, the PCL-5 version without Criterion A trauma assessment, and a computer-administered self-rated measure of the PCL-5.

Broadly, the PCL-5 scores (total and subscale) demonstrated acceptable internal consistency and test-retest reliability, including scores from abbreviated versions. Notably, the studies

demonstrated good to excellent internal consistency for the PCL-5 total score (coefficient > .80). Internal consistency estimates of the subscale scores ranged between acceptable and excellent. Differently, the study by Sveen et al., 2016 found that the intrusion subscale score had poor internal consistency (.57); this may be due to the overall low levels of PTSD symptom severity in the sample or translation differences related to the Swedish version of the PCL-5. Scores derived from the 4-item abbreviated PCL-5 had good internal consistency and scores derived from the 8-item abbreviated PCL-5 had excellent internal consistency. Lower internal consistency coefficients for the subscale scores and for the scores of the 4-item abbreviated PCL-5 is consistent with evidence suggesting that Cronbach's alpha estimates are influenced by the number of items in a scale (range of 2–5 items per subscale; Streiner, 2003). In these cases, omega coefficients may be a better alternative to assessing internal consistency as it appears to overcome these limitations of Cronbach's alpha (Trizano-Hermosilla & Alvardao, 2016). Further, for the most part, the PCL-5 total and subscale scores had acceptable temporal stability across multiple administrations of the full scale and abbreviated versions (coefficients >.60), with two exceptions: poor reliability was found for the PCL-5 total score using the Filipino (Tagalog) version of the PCL-5 in a sample of migrant workers (.58; Hall et al., 2019) and for two subscale scores (intrusions [.58] and avoidance [.49]) derived from the Swedish version of the PCL-5 in a sample of parents with children with burn injuries (Sveen et al., 2016). Findings may speak to important characteristics of the sample or the version of the PCL-5. Overall, the PCL-5 appears to be a reliable measure across various populations, settings, and translations.

In support of convergent validity, and as expected, the strongest correlations were found between the PCL-5 and other measures of PTSD (with the exception of one study by Fung et al., 2019 that found a moderate correlation between the total score of the Chinese version of the PCL-5 and another measure of PTSD). Further, PCL-5 scores had moderate to strong correlations with related constructs, such as measures of functional impairment, mental health, and other disorders/symptoms (e.g., depression, anxiety, borderline personality disorder symptoms, panic, dissociation, rumination, negative cognitions, sleep disturbances, somatic complaints, repetitive thoughts/behaviors, traumatic stress symptoms, stress, memory problems, suicidal ideation). Additionally, findings supported the discriminant validity of the PCL-5 through weak to moderate (at times negative) correlations between the PCL-5 and less strongly related constructs, such as substance use, guilt, health, pain, resilience, sexual problems, social support, psychosis, schizophrenia, paranoia, mania, and personality disorders (except borderline personality disorder symptoms). Further support for construct validity of the PCL-5 was found through a strong match between observed correlations and correlations predicted by past research across measures of PTSD, psychopathology, functioning, and distress (Blevins et al., 2015; Ito et al., 2017; Wortmann et al., 2016). Relatedly, concurrent validity was demonstrated via associations between the PCL-5 scores and measures of PTSD, anxiety, and depression, as well as via results that individuals with vs. without PTSD scored higher on the PCL-5 and related measures of mental health and functioning (Boysan et al., 2017a; Boysan et al., 2017b; Rosendahl et al., 2019; Van praag et al., 2020).

This being said, we note that there were some unexpected findings such as lower-than-expected correlations between the PCL-5 scores and some measures of trauma, substance

use, health (Fung et al., 2019; Hall et al., 2019; Ibrahim et al., 2018; Moodliar et al., 2020; Rosendahl et al., 2019); higher-than-expected correlations between the PCL-5 scores and unrelated constructs such as psychosis-based symptoms/disorders (Blevins et al., 2015; Ito et al., 2019); and mixed findings for the magnitude of associations between the PCL-5 scores and constructs such as anger and mania. These unexpected findings may be due to sample specific characteristics and/or selected measures. Further, moderate correlations between the PCL-5 and unrelated constructs may speak to overlapping symptomology and high rates of comorbidities between PTSD and other mental health symptoms more broadly (Brady et al., 2000). In summary, review findings generally support the convergent, discriminant, and concurrent validity of the PCL-5 scores (total and subscale), indicated by a theoretically-consistent pattern of correlations between the PCL-5 scores and examined constructs. Predictive validity was not examined among the reviewed studies; more research is needed to examine the utility of the PCL-5 in predicting theoretically-determined distal outcomes such as substance use (Jacobsen et al., 2001) and functional impairment (Byers et al., 2014).

The factor structure of PTSD informs diagnostic algorithms used in research and clinical settings, which can translate to treatment referrals and approaches (e.g., symptoms targeted in treatment); this highlights the need to examine the structural validity/models of the PCL-5. In this regard, our review primarily indicated that the Hybrid Model is optimal compared to alternate factor-analytical models (including the *DSM-5* Model). Despite such strong empirical support from the factor-analytical literature, the Hybrid Model has been the topic of ongoing debate. Researchers caution against reconfiguring PTSD symptom clusters based on fit indices alone, as fit indices may be distorted by the complexity of the model (i.e., more complex models may account for more variance resulting in better fit statistics) and under-identified factors (i.e., factors defined by only two indicators; Rasmussen et al., 2019). Additionally, the clinical utility of these complex models may be compromised (Silverstein et al., 2018). In this regard, while the current review indicates that the current *DSM-5* Model may not optimally represent PTSD's latent structure, we need to acknowledge the feasibility/utility of its clinical applications and its parsimony when making decisions about what diagnostic structure to use. Complicating this issue, our review findings identified the Anhedonia Model as an equally well-performing model across multiple studies (Blevins et al., 2015; Bovin et al., 2016; Morderno et al., 2020; Shevlin et al., 2017; Van Praag et al., 2020); this model may be optimal due to parsimony and having fewer latent factors identified by a small number of items. Beyond the need for future research on PCL-5's optimal latent structure, studies may also benefit from considering bifactor modeling to examine the factor structure of the PCL-5; bifactor modeling is a multilevel approach that includes a general factor to represent the shared variance and separate unique factors to represent the variance unexplained by the general factor.

Recommended cutoff scores for the PCL-5 varied significantly across each study, ranging from 23–49 for the full PCL-5. Broadly, across the reviewed studies, recommended cutoff scores that maximized diagnostic utility most frequently ranged between 31 and 33. For the abbreviated PCL-5 versions, the optimal cutoff scores ranged between 4 and 10 for the 4-item scale and 13 and 21 for the 8-item scale. Consistent with findings for the PCL for DSM-IV (McDonald & Calhoun, 2010), our review results suggest that a universal

cutoff score applicable across diverse samples and settings does not exist for the PCL-5. Variations in the cutoff scores may be due to methodological and contextual factors, such as sample/demographic characteristics, severity and prevalence estimates for PTSD and disorders, comorbidities, and the type of reference standards (McDonald & Calhoun, 2010; Whiting et al., 2004). Importantly, identifying an appropriate cutoff score will vary based on the user's priority and goals. Specifically, there is an important trade-off between sensitivity and specificity (i.e., higher sensitivity results in lower specificity and vice versa); thus, a cutoff score with greater sensitivity may be chosen if there is a more critical need to confirm tentative diagnoses (i.e., minimize false negatives), whereas greater specificity may be more beneficial in cases where it would be of greater value to rule out potential diagnoses (i.e., minimize false positives). Also, cut-off score considerations are contextually dependent; for instance, false positives could lead to costly and unnecessary treatments and false negatives could lead to failures in treatment (Trevethan, 2017). Our review provides a summary of cutoff scores (with associated diagnostic estimates) that can be used as a guide to identify the most appropriate cutoff score based on goals and priorities. Notably, and an important area for future research, only one study examined PCL-5's sensitivity to clinical change (Wortmann et al., 2016). Findings indicated that the PCL-5 was able to detect meaningful symptom changes across a treatment-seeking military sample.

We need to consider some caveats and limitations when interpreting findings from this review. First, psychometric investigations of the PCL-5 are limited by the data reported by each study and specific to the particular population and setting of that study. Second, studies differed on their conceptualization of what serves as evidence of the different types of validity. For instance, similar constructs were used as evidence for both convergent and discriminant validity (e.g., mania and anger). Third, there are limited investigations on predictive validity, sensitivity to clinical change, and item difficulty/discrimination parameters. Fourth, the primary mode of administering the PCL-5 in the reviewed studies was via an online format. Research is needed to examine any potential differences in the psychometric properties of the PCL-5 by mode of administration, considering that research and clinical settings may vary in their method of administering the PCL-5 and that the mode of administration can influence data quality, as responses may vary due to specific factors related to the method of administration (Bowling, 2005).

In summary, the current systematic review indicated that the PCL-5 is a psychometrically strong measure of PTSD symptoms across contextually-distinct and demographically-varied samples. As a comprehensive guide, this review can be used to inform both clinical and research applications of the PCL-5, as well as future research on PCL-5 psychometrics. Specifically, based on data from most studies, our review findings suggest (1) good to excellent internal consistency for the PCL-5 total score, (2) acceptable to excellent internal consistency for the PCL-5 subscale scores, (3) strong support for construct validity, (4) strongest evidence for a 7 factor structure of PTSD symptoms (Hybrid Model), (5) recommended cutoff scores between 31 and 33 for the 20-item PCL-5 total score, and (6) promising evidence of sensitivity to clinical change. Further, promising evidence for strong psychometrics for the PCL-5 abbreviated versions supports their meaningful use in intensive longitudinal study designs to minimize participant burden and maximize the richness of collected data. Findings also highlight important avenues of future work on the psychometric

properties of the PCL-5, including examining how the mode of administration may impact psychometric properties, utilizing bifactor models, estimating item difficulty and discrimination parameters, and capturing clinical change scores across different contexts. Such an enhanced understanding of the psychometric properties of the PCL-5 can facilitate appropriate and valid applications of this measure across different clinical and research contexts, and help to outline relative strengths and weaknesses of the PCL-5.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Public Health Statement

This study reviewed the literature on the PTSD Checklist for DSM-5 (PCL-5) and found that it is an accurate and reliable measure for assessing PTSD symptom severity and diagnosis across a wide range of populations. This study can be used to inform appropriate and strategic use of the PCL-5. Accurate and reliable measurements of PTSD are necessary for detecting, intervening, and monitoring PTSD.

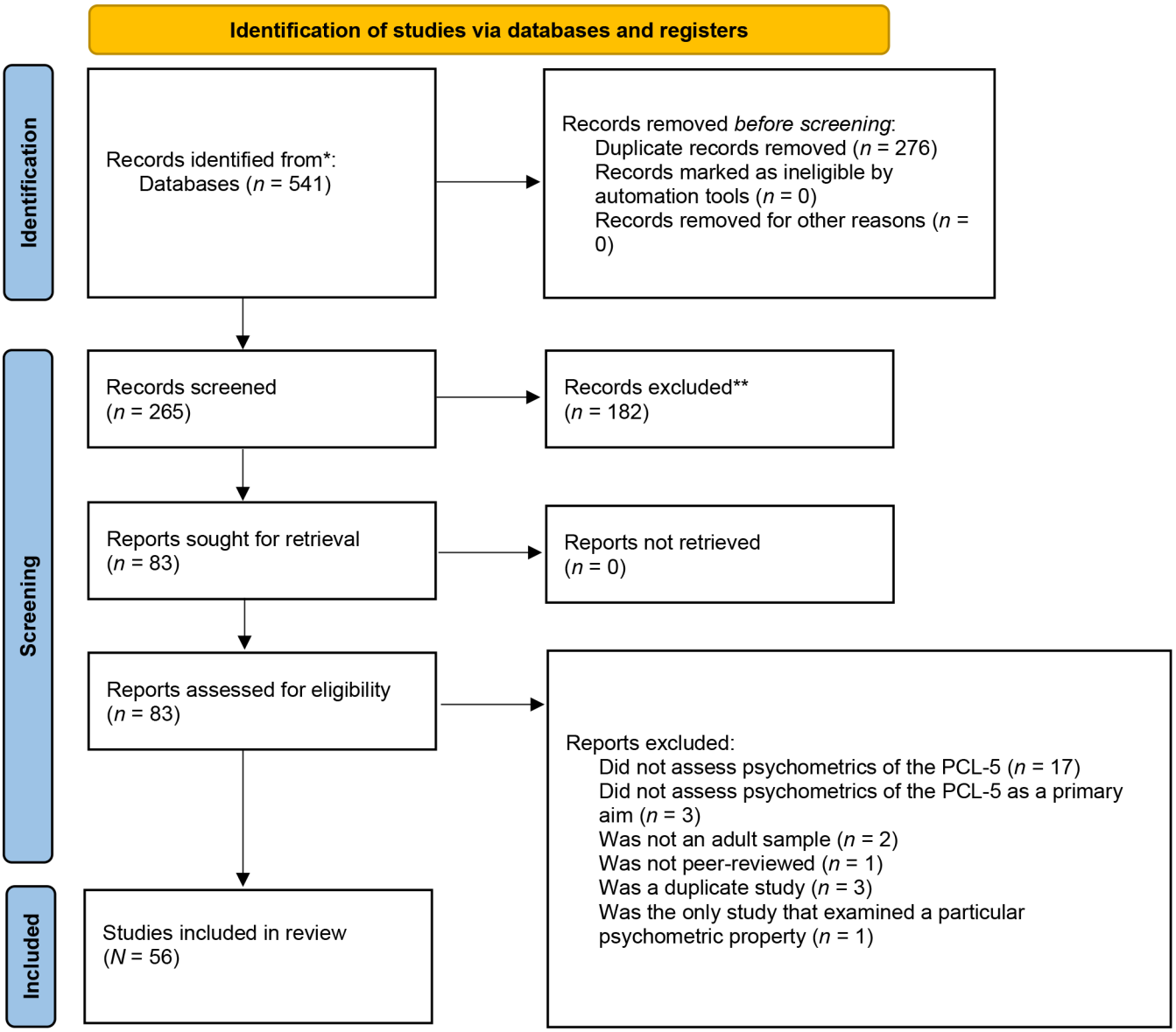

Figure 1.
Flow diagram of review process