

The Posttraumatic Stress Disorder Checklist for *DSM-5* (PCL-5): Development and Initial Psychometric Evaluation

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The Posttraumatic Stress Disorder Checklist (PCL) is a widely used *DSM*-correspondent self-report measure of PTSD symptoms. The PCL was recently revised to reflect *DSM-5* changes to the PTSD criteria. In this article, the authors describe the development and initial psychometric evaluation of the PCL for *DSM-5* (PCL-5). Psychometric properties of the PCL-5 were examined in 2 studies involving trauma-exposed college students. In Study 1 ($N = 278$), PCL-5 scores exhibited strong internal consistency ($\alpha = .94$), test-retest reliability ($r = .82$), and convergent ($r_s = .74$ to $.85$) and discriminant ($r_s = .31$ to $.60$) validity. In addition, confirmatory factor analyses indicated adequate fit with the *DSM-5* 4-factor model, $\chi^2(164) = 455.83$, $p < .001$, standardized root mean square residual (SRMR) = .07, root mean squared error of approximation (RMSEA) = .08, comparative fit index (CFI) = .86, and Tucker-Lewis index (TLI) = .84, and superior fit with recently proposed 6-factor, $\chi^2(164) = 318.37$, $p < .001$, SRMR = .05, RMSEA = .06, CFI = .92, and TLI = .90, and 7-factor, $\chi^2(164) = 291.32$, $p < .001$, SRMR = .05, RMSEA = .06, CFI = .93, and TLI = .91, models. In Study 2 ($N = 558$), PCL-5 scores demonstrated similarly strong reliability and validity. Overall, results indicate that the PCL-5 is a psychometrically sound measure of PTSD symptoms. Implications for use of the PCL-5 in a variety of assessment contexts are discussed.

The Posttraumatic Stress Disorder Checklist (PCL; Weathers, 2008; Weathers, Litz, Herman, Huska, & Keane, 1993) is one of the most widely used self-report measures of posttraumatic stress disorder (PTSD). Developed in 1990 at the National Center for PTSD, the PCL comprises 17 items corresponding to the PTSD symptom criteria in the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM-IV*; American Psychiatric Association [APA], 1994). Respondents indicate how much they have been bothered by each PTSD symptom over the past month, using a 5-point scale ranging from 1 = *not at all* to 5 = *extremely*. There are three versions of the PCL—Military (PCL-M), Civilian (PCL-C), and Specific (PCL-S), which differ only with respect to how the index trauma is referred to in the eight items that mention it specifically. Created to correspond to the military and civilian versions of the Mississippi Scale (Keane, Caddell, & Taylor, 1988), respectively, the PCL-M refers to “a stressful military experience” and the PCL-C refers to “a stressful experience from the past.”

The PCL-S prompts respondents to identify the index trauma, and then refers to it as “the stressful experience.”

PCL item scores are summed to yield a continuous measure of PTSD symptom severity. Various cut scores for PCL total severity have been used to predict PTSD diagnostic status, ranging from 30 to 60 depending on the population (e.g., combat vs. civilian trauma), setting (e.g., PTSD clinic vs. primary care), and assessment goal (e.g., screening vs. differential diagnosis; McDonald & Calhoun, 2010; Terhakopian, Sinaii, Engel, Schnurr, & Hoge, 2008). A provisional *DSM-IV* PTSD diagnosis also may be obtained by considering items rated 3 = *moderately* or higher as symptoms endorsed, and then following the *DSM-IV* diagnostic rule (at least one B, three C, and two D symptoms present). The PCL has been extensively validated and PCL scores have been found to have excellent psychometric properties, including test-retest reliability (ranging from .66 to .96), internal consistency (α ranging from .83 to .98), convergent validity (correlations with other PTSD measures ranging from .62 to .93), discriminant validity (correlations with measures of related constructs below .87), and diagnostic utility (diagnostic efficiencies ranging from .58 to .83; McDonald & Calhoun, 2010; Wilkins, Lang, & Norman, 2011). Further, the PCL is one of the most commonly used measures in the burgeoning PTSD confirmatory factor analysis (CFA) literature (e.g., Elhai & Palmieri, 2011).

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Revision of the PCL for *DSM-5* (PCL-5; Weathers, Litz, et al., 2013) began in early 2010, soon after the initial *DSM-5* draft criteria for PTSD were made available. The most notable changes for the PCL-5 included (a) adding three items to assess the three new PTSD symptoms (blame, negative emotions, and reckless or self-destructive behavior), (b) rewording existing items to reflect changes to existing PTSD symptoms, and (c) changing the rating scale from 1–5 to 0–4 so that the lowest possible score is a more intuitive 0 rather than 17 as on the PCL. Also, because of concerns about whether the PCL-M, PCL-C, and PCL-S could be used interchangeably, it was decided to have only a single version of symptom items for the PCL-5 and to follow the PCL-S in referring to the index event as the stressful event. Continuity between the PCL and the PCL-5 was maintained by retaining the verbal anchors for the rating scale, past-month time frame, and subjective distress-response dimension, and retaining most of the instructions with only slight revisions. Further, nine items were unchanged, and three more were only slightly reworded. An example of an unchanged item is Item 2: “Repeated, disturbing dreams of the stressful experience.” An example of a new item is Item 16: “Taking too many risks or doing things that could cause you harm.”

Although there is only one version of the PCL-5 symptom items, there are three versions of the PCL-5, which differ only in how Criterion A is assessed. The first version does not assess Criterion A. The second version defines Criterion A and provides examples of qualifying events, asks respondents to identify their worst event, and then assesses whether the worst event meets Criterion A. The third version includes the Life Events Checklist for *DSM-5* (LEC-5; Weathers, Blake, et al., 2013), as well as a more detailed assessment of Criterion A. The first version is designed to be used when Criterion A is measured by some other method. The second and third versions are designed to be used when a brief Criterion A assessment is needed.

All revisions, particularly those involving item content, were reviewed by numerous PTSD experts, including colleagues in and outside of the National Center for PTSD, and the chair of and advisors to the Trauma/Stress-Related and Dissociative Disorders Sub-Work Group (Friedman, 2013). Primary contributors to this review process were Charles Hoge, Patricia Resick, Matthew Friedman, and Michele Bovin. The revision process involved circulating drafts first among the authors, and then among the authors and expert reviewers, until consensus was reached regarding the final form of the instrument. This process targeted several aspects of content validity, defined as “the degree to which elements of an assessment instrument are relevant to and representative of the targeted construct for a particular assessment purpose,” where elements for questionnaire measures refers to “individual items, response formats, and instructions” (Haynes, Richard, & Kubany, 1995, p. 238). Because the PCL-5 is a measure of *DSM-5* (APA, 2013) PTSD symptoms, the primary task regarding content validity was to ensure that PCL-5 items faithfully reflect the *DSM-5* PTSD symptom criteria. Secondary tasks, which included revising the

rating scale and retaining only a single version of item content, required little discussion because of extensive feedback from PCL users over the years.

As on the PCL, PCL-5 item scores are summed to yield a continuous measure of PTSD symptom severity for symptom clusters and for the whole disorder. Cut scores for predicting PTSD diagnostic status have not yet been established for the PCL-5. Because of the change in the item response values and the addition of three new items, however, PCL-5 cut scores will differ substantially from those for the PCL. Also, as on the PCL, a provisional *DSM-5* PTSD diagnosis may be obtained from the PCL-5 by considering items rated 2 = *moderately* or higher as symptoms endorsed, and then following the *DSM-5* diagnostic rule (at least one B, one C, two D, and two E symptoms present).

The aim of the present research was to investigate the psychometric properties of the PCL-5. Two studies were conducted. The first study compared the PCL-5 to the PCL and two other self-report PTSD measures—the Posttraumatic Stress Diagnostic Scale (PDS; Foa, 1995) and the Detailed Assessment of Posttraumatic Stress (DAPS; Briere, 2001)—with respect to test-retest reliability, internal consistency, convergent and discriminant validity, and factor structure. The second study was a replication of the first study, except the PCL and PDS were not included and test-retest reliability was not evaluated. It was hypothesized that PCL-5 scores would demonstrate high test-retest reliability, internal consistency, and construct validity. With respect to structural validity, it was hypothesized that the 4-factor *DSM-5* model would provide adequate fit in CFA, but that recently proposed 6- and 7-factor models of PTSD would provide superior fit based on recent research supporting the latter models in multiple samples, including a trauma-exposed college student sample (Armour et al., 2015). Finally, it was hypothesized that the PCL-5 would be comparable to the PCL, PDS, and DAPS on all psychometric properties evaluated.

Study One

Method

Participants and procedure. Participants were undergraduates enrolled in psychology courses at a large public university in the southeastern United States. They self-identified as having experienced a “very stressful life event” and completed a questionnaire battery as part of a proctored data collection session. Questionnaires were presented in random order except for the demographics form and trauma exposure questionnaire, which were always presented first. Some participants completed a second battery of questionnaires online that included the Personality Assessment Inventory (PAI; Morey, 2007) and measures from the initial battery for test-retest reliability. Participants were compensated with course extra credit.

There were 278 students who participated in Study 1. Of these, 100 completed the PAI and 53 completed test-retest measures during the optional second part. The sample included

81 males (29.1%) and 197 females (70.9%) ages 18–54 years ($M = 19.96$, $SD = 2.65$). Participants predominantly identified as Caucasian ($n = 226$, 81.30%) or African American ($n = 32$, 11.5%). The most prevalent traumatic events were motor vehicle accident ($n = 71$, 25.5%), physical or sexual assault ($n = 63$, 22.8%), sudden violent or accidental death of a loved one ($n = 40$, 14.4%), life-threatening illness or injury ($n = 38$, 13.7%), and fire or natural disaster ($n = 28$, 10.1%).

Measures. Trauma exposure was assessed with the Life Events Checklist (LEC), a component of the Clinician-Administered PTSD Scale (CAPS; Blake et al., 1995). The LEC lists 17 categories of traumatic events. Participants indicated whether they had experienced, witnessed, learned about, or were never exposed to each type of event. They then identified their worst event, wrote a brief narrative description of it, and completed several additional questions regarding exposure level, life threat, and serious injury. The narratives and additional items were coded by two clinical psychology graduate students, supervised by the second author (F.W.), to determine whether the worst event met *DSM-5* PTSD Criterion A. Disagreements were resolved through discussion among the raters and the second author.

PTSD symptoms were assessed with the specific version of the PCL (PCL-S), PCL-5, PDS, and DAPS. On the PDS, respondents rated the frequency of their PTSD symptoms over the past 2 weeks on a 4-point scale ranging from 0 = *not at all or only one time* to 3 = *5 or more times a week/almost always*. PDS scores have demonstrated strong psychometric properties (Foa, Cashman, Jaycox, & Perry, 1997). The DAPS is a comprehensive 104-item instrument assessing PTSD and other trauma-related phenomena. In this study, only the 39 items of the posttraumatic stress scales were administered. On the DAPS, respondents rated the frequency of their PTSD symptoms in the past month on a 5-point scale of 1 = *never* to 5 = *4 or more times a week*. DAPS scores have demonstrated excellent reliability and validity (Briere, 2001).

To assess for anxiety and depression, the Beck Anxiety Inventory (BAI; Beck, Steer, & Brown, 1993) and Beck Depression Inventory-Second Edition (BDI-II; Beck, Steer, & Brown, 1996) were administered. Both consist of 21 items rated on a scale of 0 = *not at all* to 3 = *severely*. Participants endorsed how much they had been bothered by symptoms of anxiety in the past week and depression in the past 2 weeks (BDI-II). BAI (Beck, Epstein, Brown, & Steer 1988) and BDI-II scores (Wang & Gorenstein, 2013) have demonstrated strong psychometric properties. Specifically, BAI scores have demonstrated high internal consistency ($\alpha = .92$), test-retest reliability (.75), and convergent and discriminant validity (Beck et al., 1988). BDI-II scores also have demonstrated high internal consistency (average α of .90), test-retest reliability (ranging from .73 to .96), and convergent and discriminant validity (see Wang & Gorenstein, 2013, for a review).

The PAI is a 344-item multiscale inventory that assesses a broad range of psychopathology and personality traits. Items

are rated on a 4-point scale of 0 = *false*, 1 = *slightly true*, 2 = *mainly true*, and 3 = *very true*, with no specified time frame. The PAI has been extensively validated and has demonstrated excellent psychometric properties (Morey, 2007). Developed in a construct validation framework, with an emphasis on well-explicated constructs and discriminant validity, the PAI is a rich source of concurrent validity evidence for the PCL-5. First, it provides dimensional scores for clinical syndromes that are highly comorbid with PTSD as well syndromes less strongly related to PTSD. Second, it assesses common sources of response bias, including inconsistent, self-favorable, and self-unfavorable responding. The following PAI clinical scales were analyzed: Anxiety, Traumatic Stress, Depression, Mania, Paranoia, Schizophrenia, Borderline Personality Features, Antisocial Personality Features, Somatic Complaints, Alcohol Problems, and Drug Problems. The following PAI validity scales also were analyzed: Inconsistency (ICN), Infrequency (INF), and Negative Impression Management (NIM). No one had an invalid PAI profile, as indicated by an ICN score ≥ 73 T or an INF score ≥ 75 T.

Data analysis. Analyses were conducted using Mplus Version 7 (Muthén & Muthén, 1998–2012). Missing data were addressed using full information maximum likelihood (FIML), and acceptable covariance coverage was found (82.7% to 95.2% for trauma measures, 29.0% to 97.3% for other measures of psychopathology; Enders & Bandalos, 2001).

First, descriptive statistics, internal consistency, and reliability coefficients were examined. Enders' (2003) 2-step approach to estimate coefficient α was used. In Step 1, a covariance matrix was obtained using maximum likelihood (ML) estimation. In Step 2, the covariance matrix was used to calculate coefficient α . This approach allows for the use of ML estimation in reliability analyses with item-level missing data and has yielded the most accurate estimates in a simulation study (Enders, 2003).

Second, zero-order correlations were calculated to evaluate convergent and discriminant relationships among PTSD measures and the PAI. Following an approach to evaluating construct validity proposed by Westen and Rosenthal (2003), a pattern of correlations was predicted based on available convergent and discriminant validity evidence (McDevitt-Murphy, Weathers, Adkins, & Daniels, 2005; Morey, 2007; Wilkins et al., 2011). For convergent validity, PTSD measures were hypothesized to correlate most strongly with other PTSD measures. For discriminant validity, which was conceptualized on a continuum, PTSD measures were hypothesized to correlate most strongly with closely related constructs such as Depression, Anxiety, and Borderline Personality Disorder; moderately with related constructs such as Somatization and Alcohol and Drug Use; and weakly with constructs least theoretically related to PTSD such as Antisocial Personality Disorder and Mania. These correlations were evaluated with effect-size statistics that quantify construct validity by summarizing the fit between an observed and a predicted pattern

of correlations (Westen & Rosenthal, 2003). The first statistic, $r_{\text{alerting-CV}}$, indicates the degree to which the ordering of predicted versus observed correlations is consistent. The second statistic, $r_{\text{contrast-CV}}$, is a more stringent test of fit that accounts for sample size, median intercorrelations among criterion measures, and the magnitudes of correlations between target and criterion measures.

Third, CFA was applied to PCL-5 items. Three PTSD models were evaluated. The first was the 4-factor *DSM-5* model, with reexperiencing, avoidance, negative alterations in cognitions and mood (NACM), and hyperarousal factors. The other two, which have demonstrated superior fit to the *DSM-5* model, were the Liu et al. (2014) 6-factor anhedonia model, with reexperiencing, avoidance, NACM, anhedonia, anxious arousal, and dysphoric arousal factors; and the Armour et al. (2015) 7-factor hybrid model, with reexperiencing, avoidance, negative affect, anhedonia, externalizing behavior, anxious arousal, and dysphoric arousal factors. These recent models are based on theoretical and empirical evidence that propose that PTSD symptoms are better characterized by separating hyperarousal into anxious and dysphoric arousal and separating reduced positive and increased negative affect into distinct factors. Additionally, the hybrid model distinguishes externalizing behavior including emotion dysregulation and lack of impulse control from more internalizing behavior including difficulty concentrating and sleep problems.

CFA was conducted using the robust maximum likelihood estimation procedure. The factor variance for each latent variable was fixed to 1 to manage scale dependency. The following model fit indices were examined: Yuan-Bentler χ^2 , standardized root mean square residual (SRMR), comparative fit index (CFI), Tucker-Lewis index (TLI), and root mean squared error of approximation (RMSEA). Following recommended cutoff criteria, adequate fit was defined as CFI and TLI values $> .90$ (Bentler, 1990) and SRMR and RMSEA values $< .08$ (Hu & Bentler, 1999). To compare models, Bayesian information criterion (BIC), Akaike information criterion (AIC), and χ^2 difference tests using a correction factor (Muthén & Muthén, 2010) were calculated.

Last, signal detection analyses (Kraemer, 1992) were used to identify the PCL-5 scores that best corresponded with three of the most widely used cut scores on the PCL. Specifically, in three separate analyses, PCL cut scores of 40, 44, and 50 were used to dichotomize the sample into presumed PTSD-negative (those below a given cut score) and presumed PTSD-positive groups (those at or above a given cut score). Using PCL-based provisional diagnostic status as the criterion and PCL-5 score as the test, the optimally efficient PCL-5 cut score for each of the three PCL cut scores was identified. This was defined as the PCL-5 cut score with both (a) the highest quality of efficiency (proportion of true positives plus true negatives, corrected for chance agreement), and (b) the estimated prevalence of presumed PTSD that was closest to, without exceeding, the estimated prevalence of presumed PTSD based on the criterion (i.e., PCL cut score).

Table 1
Study 1 Scale-Level Descriptive Statistics

Variable	<i>M</i>	<i>SD</i>	Possible range	Obs. range	α
PCL-5	15.42	14.72	0–80	0–65	.94
PCL	29.89	12.51	17–85	17–66	.93
PDS	9.12	8.93	0–51	0–38	.91
DAPS	64.81	24.75	39–195	39–171	.96
BDI-II	10.72	9.50	0–63	0–50	.93
BAI	10.60	10.00	0–63	0–56	.92
PAI Scales					
NIM	51.13	10.30	44–110	44–110	.75
ANX	54.22	10.43	34–103	38–88	.90
ARD-T	53.46	10.25	41–99	37–80	.87
DEP	53.73	12.51	35–111	37–87	.92
MAN	52.49	10.93	25–103	33–81	.84
PAR	53.10	9.50	29–112	36–75	.82
SCZ	48.64	10.46	32–124	32–81	.87
BOR	56.10	11.90	32–104	37–92	.90
ANT	54.90	11.90	36–115	37–92	.88
SOM	52.24	8.93	39–110	39–85	.87
ALC	52.33	9.85	41–105	41–88	.83
DRG	52.23	10.42	42–110	42–88	.81

Note. $n = 266$ – 292 for PCL-5, PCL, PDS, DAPS, BDI-II, and BAI. $n = 92$ – 100 for PAI scales. PCL-5 = PTSD Checklist-5; PCL = PTSD Checklist-Specific Version; PDS = Posttraumatic Distress Scale; DAPS = Detailed Assessment of Posttraumatic Symptoms-Posttraumatic Stress Scale; BDI-II = Beck Depression Inventory-II; BAI = Beck Anxiety Inventory; PAI = Personality Assessment Inventory; NIM = Negative Impression Management; ANX = Anxiety; ARD-T = Traumatic Stress; DEP = Depression; MAN = Mania; PAR = Paranoia; SCZ = Schizophrenia; BOR = Borderline Personality Features; ANT = Antisocial Personality Features; SOM = Somatic Complaints; ALC = Alcohol Problems; DRG = Drug Problems. T scores derived from census-matched standardization sample reported for PAI Validity and Clinical Scales. Raw scores reported for PCL-5, PCL, PDS, DAPS, BDI-II, and BAI.

Results

Scale-level descriptive statistics for Study 1 measures are presented in Table 1 (item-level descriptive statistics for the PCL-5 are available in Supplemental Table 1). Mean depression and anxiety scores were in the mild range ($M = 10.7$, $SD = 9.5$ for the BDI-II; $M = 10.6$, $SD = 10.0$ for the BAI) and the observed range of scores approached the possible range of scores. A similar pattern was found for other measures of psychopathology in this sample. The PCL-5 exhibited high internal consistency ($\alpha = .94$) and was comparable to the other PTSD measures. Interitem correlations generally fell in the recommended range of .15 to .50 (Clark & Watson, 1995), with a range of .17 to .77 ($M = .42$) for the PCL-5.

To analyze test-retest reliability, a subset of participants ($n = 53$) was readministered the initial battery during the optional second part of the study. The retest interval was approximately 1 week ($M = 6.14$ days). This interval was selected because it was considered long enough to minimize carryover

Table 2

Study 1 Correlations Between PTSD Checklist and Corresponding PTSD Checklist –5 Items

Item stem	PCL Item #	PCL – 5 Item #	Rewording	Test-retest coefficient		
				r_{xx}	95% CI	r_{xy}
Memories	1	1	Minor	.66	[.47, .79]	.70
Dreams	2	2	None	.75	[.60, .85]	.80
Flashbacks	3	3	Minor	.61	[.40, .76]	.57
Cued distress	4	4	None	.69	[.51, .81]	.70
Cued physical reactions	5	5	Minor	.69	[.51, .81]	.70
Avoiding internal reminders	6	6	Substantial	.68	[.50, .80]	.56
Avoiding external reminders	7	7	Substantial	.68	[.50, .80]	.63
Amnesia	8	8	None	.75	[.60, .85]	.81
Loss of interest	9	12	None	.71	[.54, .82]	.80
Detachment or estrangement	10	13	None	.60	[.39, .75]	.81
Numbing	11	14	Substantial	.66	[.47, .79]	.80
Foreshortened future	12	—	—	.62	[.42, .76]	—
Sleep	13	20	None	.77	[.63, .86]	.84
Irritability	14	15	Substantial	.56	[.34, .72]	.80
Concentration	15	19	None	.75	[.60, .85]	.80
Hypervigilance	16	17	None	.60	[.39, .75]	.80
Startle	17	18	None	.77	[.63, .86]	.82

Note. PCL = PTSD Checklist–Specific Version; PCL-5 = PTSD Checklist–5. r_{xx} = test-retest correlations for PCL items (ns ranged from .51 to .53); r_{xy} = correlations between corresponding PCL and PCL-5 items (ns ranged from .275 to .277). All reported correlations significant at $p < .001$.

effects, but short enough so that reliability coefficients would not be affected by changes in respondents' true scores, as might occur in the natural course of PTSD or as a function of treatment (see Crocker & Algina, 1986). Test-retest reliability results are presented in Supplemental Table 2. PCL-5 total score demonstrated good test-retest reliability, $r = .82$, 95% CI [.71, .89], as did total scores for the other PTSD measures, $rs = .85$, 95% CI [.75, .91], .80, 95% CI [.68, .88], and .91, 95% CI [.85, .95], for PCL, PDS, and DAPS, respectively, the BDI-II, $r = .88$, 95% CI [.80, .93], and the BAI, $r = .82$, 95% CI [.71, .89]. Despite these high test-retest correlations, Time 2 means were lower than Time 1 means for all measures. Paired t tests conducted on Time 1 and Time 2 means, however, were significant ($p < .01$) only for the PCL-5, PCL, and PDS, and were nonsignificant for the DAPS, BDI-II, and BAI.

At the item level, test-retest reliability for PCL-5 items ranged from .39 to .83, with a median of .68, indicating good consistency across testing occasions (see Supplemental Table 2). Time 2 score was lower for all PCL-5 items, but paired t tests were significant only for Items 3, 5, 7, and 10. Similarly, test-retest reliability for PCL items ranged from .56 to .77, with a median of .69. Time 2 score was lower for all PCL items, but paired t tests were significant only for Items 2, 4, 5, and 6.

Another issue addressed involved correlations between corresponding PCL and PCL-5 items. This analysis involved both test-retest reliability (for PCL items unchanged on the PCL-5) and parallel forms reliability (for PCL items reworded

for the PCL-5). Table 2 lists the corresponding PCL and PCL-5 items and characterizes the extent of rewording for the PCL-5. As shown in Table 2, correlations between corresponding PCL and PCL-5 items ranged from .56 to .84, with a median .80, indicating strong association between individual PCL symptoms retained and/or revised for the PCL-5. These correlations were comparable to—and often higher than—the test-retest correlation for corresponding PCL items, although this is likely influenced by the fact that data for these correlations were obtained in the same testing session.

Convergent and discriminant validity correlations are displayed in Table 3. Consistent with hypotheses, the strongest correlations were found between the PCL-5 and other PTSD measures ($rs = .85$, .85, and .84, all $p < .01$, with PCL, PDS, and DAPS). Results generally supported the discriminant validity of PCL-5 scores, which correlated moderately with related constructs, such as Depression ($r = .60$), and least strongly with measures of unrelated constructs, such as Antisocial Personality Features ($r = .39$) and Mania ($r = .31$). A similar pattern was observed between the other PTSD measures and PAI scales. A few discriminant correlations were stronger than expected (e.g., $r = .49$ between PCL-5 and Schizophrenia; see Table 3 for all discriminant correlation coefficients). To examine the influence of negative response bias, partial correlations were calculated, adjusting for NIM. After adjusting for NIM, the magnitude of discriminant correlation coefficients decreased, but the pattern remained the same.

Table 3

Study 1 Predicted and Observed Correlations Between PTSD and Criteria, Raw λ s, and Integer Values of Raw λ s

Variable	Observed correlations								Predicted correlations and λ s		
	PCL-5		PCL		PDS		DAPS		Predicted r	Raw λ s	Raw λ s as Integers
	r	pr	r	pr	r	pr	r	pr			
PCL-5	-	-	-	-	-	-	-	-	.80	.35	4
PCL	.85**	.83**	-	-	-	-	-	-	.80	.35	4
PDS	.85**	.83**	.78**	.74**	-	-	-	-	.80	.35	4
DAPS	.84**	.81**	.86**	.82**	.85**	.82**	-	-	.80	.25	3
PAI-ARD-T	.74**	.68**	.75**	.68**	.68**	.62**	.77**	.70**	.70	.15	2
PAI-DEP	.60**	.50**	.54**	.35**	.59**	.50**	.58**	.41**	.60	.05	0
PAI-ANX	.40**	.28**	.42**	.26**	.40**	.29**	.46**	.31**	.50	.05	0
PAI-BOR	.58**	.47**	.56**	.39**	.47**	.34**	.49**	.29**	.50	-.05	-1
PAI-SCZ	.49**	.34**	.51**	.29**	.44**	.29**	.51**	.30**	.40	-.05	-1
PAI-PAR	.43**	.30**	.42**	.22**	.40**	.27**	.41**	.22**	.40	-.15	-2
PAI-SOM	.51**	.40**	.51**	.36**	.52**	.42**	.51**	.36**	.30	-.25	-3
PAI-ALC	.40**	.31**	.27**	.14**	.40**	.32**	.22**	.08	.20	-.35	-4
PAI-DRG	.39**	.33**	.33**	.24**	.38**	.32**	.25**	.14*	.10	-.35	-4
PAI-ANT	.39**	.28**	.29**	.12**	.39**	.28**	.27**	.09	.10	-.35	-4
PAI-MAN	.31**	.20**	.30**	.16**	.25**	.14*	.27**	.13*	.10	.35	4

Note. $n = 278$; pr = partial correlations, controlling for PAI Negative Impression Management; PCL-5 = PTSD Checklist-5; PCL = PTSD Checklist-Specific Version; PDS = Posttraumatic Distress Scale; DAPS = Detailed Assessment of Posttraumatic Symptoms-Posttraumatic Stress Scale; PAI = Personality Assessment Inventory; ARD-T = Traumatic Stress; DEP = Depression; ANX = Anxiety; BOR = Borderline Personality Features; SCZ = Schizophrenia; PAR = Paranoia; SOM = Somatic Complaints; ALC = Alcohol Problems; DRG = Drug Problems; ANT = Antisocial Features; MAN = Mania.

* $p < .05$. ** $p < .01$.

Predicted correlations and λ values used to compute construct validity effect sizes $r_{\text{alerting-CV}}$ and $r_{\text{contrast-CV}}$ are shown on the right side of Table 3. Large effect sizes were found for the PCL-5 ($r_{\text{alerting-CV}} = .90$, $r_{\text{contrast-CV}} = .92$), indicating strong correspondence between predicted and observed correlations. Large effect sizes also were found for PCL, PDS, and DAPS (see Table 4). The 95% CI around the DAPS $r_{\text{contrast-CV}}$ effect size did not overlap the PCL-5 or PDS CIs. This suggested a stronger fit between predicted and observed correlations for

Table 4

Study 1 Effect Size Statistics $r_{\text{alerting-CV}}$ and $r_{\text{contrast-CV}}$ for PTSD Measures

Quantity	PCL-5	PCL	PDS	DAPS
$r_{\text{alerting-CV}}$.90	.91	.88	.94
$r_{\text{contrast-CV}}$.92	.93	.92	.96
95% CI	[.90, .93]	[.92, .95]	[.90, .94]	[.95, .97]
Z_{contrast}	22.49	23.68	22.95	26.55
t_{contrast}	38.14	42.86	39.90	57.35
p_{contrast}	< .001	< .001	< .001	< .001

Note. $n = 278$. PCL-5 = PTSD Checklist-5; PCL = PTSD Checklist-Specific Version; PDS = Posttraumatic Distress Scale; DAPS = Detailed Assessment of Posttraumatic Symptoms-Posttraumatic Stress Scale.

the DAPS than for the PCL-5 and PDS. None of the other comparisons of $r_{\text{contrast-CV}}$ effect size were nonoverlapping.

Item mapping for the CFA models is shown in Table 5. Limited support was found for the DSM-5 model: SRMR (.07) and RMSEA (.08), 90% CI [.07, .09], met the recommended cutoff for adequate fit, but chi-square, $\chi^2(164) = 455.83$, $p < .001$, CFI (.86), and TLI (.84) did not meet cutoff values (see Supplemental Table 3 for parameter estimates). Support was found for the anhedonia and hybrid models. For the anhedonia model, $\chi^2(164) = 318.37$, $p < .001$, all fit indices met cutoff criterion including SRMR (.05), RMSEA (.06), 90% CI [.05, .07], CFI (.92), and TLI (.90). Similarly, for the hybrid model, $\chi^2(164) = 291.32$, $p < .001$, all fit indices met cutoff criterion including SRMR (.05), RMSEA (.06), 90% CI [.05, .07], CFI (.93), and TLI (.91). The anhedonia and hybrid models provided a significantly better fit than the DSM-5 model, as evidenced by a 168.47-point BIC difference, 201.09-point AIC difference, and significant χ^2 difference test, $\Delta\chi^2(9) = 117.66$, $p < .001$, between the anhedonia and DSM-5 models, and a 179.49-point BIC difference, 233.85-point AIC difference, and significant χ^2 difference test, $\Delta\chi^2(15) = 143.24$, $p < .001$, between the hybrid and DSM-5 models. The χ^2 difference test comparing the anhedonia and hybrid models was not significant, $\Delta\chi^2(6) = 0.69$, supporting the more parsimonious anhedonia model.

Lastly, signal detection analyses were conducted. A PCL score of 50 yielded a presumed prevalence of 11.0%. The

Table 5
Item Mapping for Three Confirmatory Factor Analytic Models

Item		DSM-5	Anhedonia	Hybrid
PCL-5 1	Memories	R	R	R
PCL-5 2	Dreams	R	R	R
PCL-5 3	Flashbacks	R	R	R
PCL-5 4	Cued distress	R	R	R
PCL-5 5	Cued physical reactions	R	R	R
PCL-5 6	Avoiding internal reminders	A	A	A
PCL-5 7	Avoiding external reminders	A	A	A
PCL-5 8	Amnesia	NACM	NACM	NA
PCL-5 9	Negative beliefs	NACM	NACM	NA
PCL-5 10	Blame	NACM	NACM	NA
PCL-5 11	Negative feelings	NACM	NACM	NA
PCL-5 12	Loss of interest	NACM	AN	AN
PCL-5 13	Detachment or estrangement	NACM	AN	AN
PCL-5 14	Numbing	NACM	AN	AN
PCL-5 15	Irritability or aggressive behavior	H	DA	EB
PCL-5 16	Reckless behavior	H	DA	EB
PCL-5 17	Hypervigilance	H	AA	AA
PCL-5 18	Startle	H	AA	AA
PCL-5 19	Concentration	H	DA	DA
PCL-5 20	Sleep	H	DA	DA

Note. $n = 277$. DSM-5 = Diagnostic and Statistical Manual of Mental Disorders (5th ed.; American Psychiatric Association, 2013); PCL-5 = PTSD Checklist-5; R = Reexperiencing; A = Avoidance; NACM = Negative Alterations in Cognitions and Mood; H = Hyperarousal; AN = Anhedonia; DA = Dysphoric Arousal; AA = Anxious Arousal; NA = Negative Affect; EB = Externalizing Behaviors.

optimal PCL-5 score for predicting this criterion was 37, which yielded a presumed prevalence of 10.3%, sensitivity of .66, specificity of .97, efficiency of .93, and quality of efficiency of .64. A PCL score of 44 yielded a presumed prevalence of 16.3%. The optimal PCL-5 score for this criterion was 31, which yielded a presumed prevalence of 16.0%, sensitivity of .77, specificity of .96, efficiency of .93, and quality of efficiency of .73. A PCL score of 40 yielded a presumed prevalence of 21.0%. The optimal PCL-5 score for this criterion was 28, which yielded a presumed prevalence of 20.0%, sensitivity of .78, specificity of .95, efficiency of .92, and quality of efficiency of .74. In sum, for each PCL score used as a criterion, the corresponding optimally efficient PCL-5 score yielded a similar presumed prevalence and a high level of diagnostic agreement. PCL scores of 50, 44, and 40 corresponded to PCL-5 scores of 37, 31, and 28, respectively.

Study Two

Method

Participants and procedure. Following the same procedure as Study 1, 558 individuals participated in Study 2. Participants were undergraduates at the same university, enrolled in different psychology courses. The sample included 138 males (24.8%) and 419 females (75.2%; one participant did not report

gender) ages 18–62 ($M = 20.20$, $SD = 2.72$). Participants predominantly identified as Caucasian ($n = 477$, 85.5%) or African American ($n = 43$, 7.7%). The most prevalent traumatic events were motor vehicle accidents ($n = 110$, 19.7%), physical or sexual assault ($n = 96$, 17.0%), sudden violent or accidental death of a loved one ($n = 103$, 18.5%), fire or natural disaster ($n = 44$, 7.9%), and life-threatening illness or injury ($n = 14$, 2.5%).

Measures. Participants completed an online battery that included the PCL-5, DAPS, BAI, and BDI-II. The PCL and PDS were not included in Study 2. A subset ($n = 236$) also completed the PAI as part of an optional second battery.

Data analysis. To replicate results from Study 1, a similar analytic strategy was used in Study 2. All analyses were conducted using Mplus Version 7. Missing data were addressed using FIML, and acceptable covariance coverage was found (89.2% to 96.0% for trauma measures, 35.0% to 93.5% for measures of other forms of psychopathology). Descriptive statistics and internal consistency were examined. Next, zero-order correlations were calculated to evaluate convergent and discriminant validity. Effect size statistics developed by Westen and Rosenthal (2003) were used to examine construct validity. Finally, CFAs were conducted using the PCL-5. The three PTSD models described in Study 1 were evaluated.

Results

Scale-level descriptive statistics for all measures administered in Study 2 and item-level descriptive statistics for PCL-5 are presented in Supplemental Tables 4 and 5. Consistent with results from Study 1, the PCL-5 exhibited high internal consistency ($\alpha = .95$). Overall, interitem correlations fell in the recommended range for the PCL-5, with a range of .25 to .77 ($M = .51$).

Convergent and discriminant validity correlations are displayed in Supplemental Table 6. The pattern of correlations among the PCL-5, DAPS, and PAI clinical scales was consistent with hypothesized convergent and discriminant relationships and with the pattern of correlations found in Study 1. Large effect sizes were found for the PCL-5 ($r_{\text{alerting-CV}} = .94$, $r_{\text{contrast-CV}} = .81$) and DAPS ($r_{\text{alerting-CV}} = .92$, $r_{\text{contrast-CV}} = .83$), indicating a high degree of correspondence between theoretically and empirically derived predictions and observed correlations.

In the CFA analyses, similar to Study 1, the *DSM-5* model provided adequate fit to the data, with $\chi^2(164) = 558.18$, $p < .001$, SRMR = .05, RMSEA = .07, 90% CI [.06, .07], CFI = .91, and TLI = .89 (see Supplemental Table 7 for parameter estimates). The anhedonia model, $\chi^2(155) = 389.02$, $p < .001$, SRMR = .04, RMSEA = .05, 90% CI [.05, .06], CFI = .94, and TLI = .93, and hybrid model, $\chi^2(149) = 352.26$, $p < .001$, SRMR = .04, RMSEA = .05, 90% CI [.04, .06], CFI = .95, and TLI = .94 demonstrated superior fit compared to the *DSM-5* model but were not significantly different compared to each other, $\Delta\chi^2(6) = 0.91$, not significant.

Discussion

In this article we described the development of the PCL-5 and presented the results of two studies examining its psychometric properties in trauma-exposed college students. Overall, the PCL-5 demonstrated excellent reliability and validity. Further, PCL-5 scores performed quite similarly to PCL scores, suggesting a high degree of comparability between the PCL and PCL-5, and thus strong continuity in self-reported PTSD symptoms moving from *DSM-IV* to *DSM-5* criteria.

Specifically, Study 1 provided evidence of strong test-retest reliability for PCL-5 total score and test-retest and parallel forms reliability for individual PCL-5 items compared to PCL items. Although the test-retest reliability coefficient for PCL-5 total score was high, the mean PCL-5 total score was significantly lower at retest. Lower scores on retest, though, may be characteristic of repeated administrations in nonclinical samples. For example, Hoge, Riviere, Wilk, Herrell, and Weathers (2014) administered both the PCL-S and PCL-5 in counter-balanced order within the same 45-minute survey. Regardless of the order of administration, for the second PCL they found lower PTSD prevalence and lower endorsement of the nine items that are identical on the PCL-S and PCL-5, with many of the differences being statistically significant. Of note in this regard, Keane et al. (2014) provided evidence of temporal sta-

bility of the PCL-5 factor structure in a treatment study with veterans, demonstrating that even though PCL-5 scores dropped over time, the PCL-5 continued to measure the same underlying construct. Last, in the present study, test-retest reliability coefficients for individual PCL-5 items were consistently high and most item scores did not significantly differ at retest, indicating substantial stability across testing occasions.

Study 1 also provided evidence of the PCL-5's internal consistency, convergent and discriminant validity, and structural validity based on CFA. Study 2 closely replicated Study 1 results. Although limited support was found for the *DSM-5* model, strong support was found for the anhedonia and hybrid models, consistent with other recent CFA studies (Armour et al., 2015; Liu et al., 2014). Chi-square difference testing suggested that the hybrid model did not provide better model fit compared to the anhedonia model, which thus supports the more parsimonious anhedonia model. This suggests that PTSD symptoms in the current sample were best characterized by distinguishing anxious and dysphoric arousal as well as positive and negative affect. More research is needed to clarify the strengths and limitations of these newly proposed models in representing the latent structure of the PCL-5.

Last, signal detection analyses revealed that PCL-5 scores of 28, 31, and 37 best predicted PCL scores of 40, 44, and 50, respectively. It should be emphasized that these analyses served only as an empirical calibration of PCL-5 scores with established PCL cut scores. The PCL-5 was not compared against a structured diagnostic interview, so these cut scores should be considered tentative. Further, the optimal cut score for a test varies as a function of the base rate (prevalence of the disorder) and other characteristics of a target population, and by the intended use of a test, for example, screening or differential diagnosis (Kraemer, 1992). Thus, these scores require replication, should not be reified, and even if replicated should be considered appropriate only for the populations and purposes for which they have been shown to be valid.

This research had several limitations. First, participants were a convenience sample of college students, and thus the generalizability of the results to clinical samples is unknown. Nonetheless, all participants were trauma-exposed, based on a rigorous assessment of Criterion A; mean PCL and PCL-5 scores were comparable to those of warzone deployed soldiers (Hoge et al., 2014); and prevalence of a presumed PTSD diagnosis based on a PCL score of 40 was 21.0%, indicating that a substantial proportion of respondents reported high levels of PTSD symptoms (cf., Hoge et al., 2014; McDonald & Calhoun, 2010; Terhakopian et al., 2008). Generalizability of the current results is also limited with respect to demographic variables such as age, race, ethnicity, and socioeconomic status, and future research using samples with greater diversity is warranted. In addition, given differences between men and women with respect to type of trauma exposure, probability of developing PTSD, and patterns of comorbidity, future research is needed to examine the impact of gender on the psychometric properties of the PCL-5, including its convergent and discriminant validity.

Second, this research did not include a structured diagnostic interview, and thus was not able to evaluate comparability of the PCL-5 scores with those based on clinicians' ratings, or evaluate diagnostic utility of the PCL-5 against a clinical PTSD diagnosis. Third, the reliance on a monomethod strategy to assess convergent and discriminant validity may have contributed to an overestimation of correlation coefficients due to response bias and semantic overlap among items. Fourth, given the cross-sectional design, this research did not examine sensitivity of the PCL-5 to clinical change. Future research utilizing a multimethod approach, including a structured diagnostic interview, and treatment outcome research with the PCL-5 is warranted to address these limitations and build on these initial findings.

To our knowledge, this is the first comprehensive psychometric evaluation of the PCL-5 in a mixed civilian trauma sample. Taken together, the two studies conducted indicate the PCL-5 is a psychometrically sound self-report measure of the *DSM-5* PTSD symptom criteria, and is closely comparable to the PCL. Like the PCL, the PCL-5 is intended for a variety of clinical and research assessment tasks, including quantifying PTSD symptom severity, measuring the underlying construct of PTSD, establishing a provisional PTSD diagnosis, and estimating presumed prevalence of PTSD. Although the present research only addresses the first two tasks, the strong comparability of the PCL-5 with the PCL suggests that the PCL-5 will prove to be useful for the other tasks as well, thus continuing the tradition established by nearly 25 years of research and clinical application of the PCL.

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