

Structural Validity of the Posttraumatic Stress Disorder Checklist Among College Students With a Trauma History

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The authors conducted confirmatory factor analyses to test three-factor and four-factor models of posttraumatic stress disorder (PTSD) using the PTSD Checklist with college students reporting a traumatic event history. The authors found support for the three-factor *DSM-IV*-based PTSD diagnostic model including reexperiencing, avoidance/numbing, and hyperarousal symptom factors, with slightly better support for a four-factor model separating the avoidance and numbing factors. Results further attest to the PTSD Checklist's construct validity, and to research finding that PTSD avoidance and numbing constructs are distinct.

Keywords: *posttraumatic stress disorder; confirmatory factor analysis; college students; emotional trauma*

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Recently, Asmundson, Stapleton, and Taylor (2004) reviewed factor analytic studies of posttraumatic stress disorder (PTSD) symptom instruments. The authors found that most investigations supported either a four-factor model of PTSD, including reexperiencing the traumatic event (e.g., nightmares), avoidance (e.g., avoiding discussion of the trauma), emotional numbing (e.g., restricted affect range), and hyperarousal (e.g., exaggerated startle response) symptoms, or a similar *DSM-IV*-based three-factor model collapsing avoidance and numbing into a single factor. However, these studies either examined specific trauma samples (e.g., combat veterans) or included heterogeneous samples (e.g., medical patients) with no specific traumatic stressor reported.

Several factor-analytic PTSD studies used the PTSD Checklist (PCL), primarily with confirmatory factor analysis. The PCL is a popular PTSD symptom instrument, and is one of the most widely used by traumatic stress professionals (Elhai, Gray, Kashdan, & Franklin, 2005). In fact, its psychometric properties have been extensively examined (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996; Ruggiero, Del Ben, Scotti, & Rabalais, 2003).

Of the PCL factor-analytic articles, three tested the PCL's factor structure in cancer survivors (Cordova, Studts, Hann, Jacobsen, & Andrykowski, 2000; DuHamel et al., 2004; Smith, Redd, DuHamel, Vickberg, & Ricketts, 1999). Two studies examined its factorial validity structure in military personnel (Asmundson, Wright, McCreary, & Pedlar, 2003; Simms, Watson, & Doebbeling, 2002). Only Asmundson et al. (2000) explored the PCL's factor structure in a more general participant group, but these were medical patients without a specific traumatic stressor. Nonetheless, these studies primarily found a four-factor model of PTSD to best fit their data.

The aim of the present study was to assess the PCL's factorial validity with a sample of college students reporting a variety of traumatic events. Given the popularity of college student samples in PTSD research, the high prevalence of trauma exposure in this population, and the wide use of the PCL, this study is important in providing data on its structural validity with a sample of trauma victims reporting various traumatic stressors.

Method

Participants

A sample of 510 participants (174 men, 336 women) enrolled in psychology courses served as participants. These students were at least 18

years of age, attending college at one of two medium-sized state universities in the midwestern and western United States. Recruitment occurred in groups from psychology classes (for extra credit) or departmental research pools (for research credit). Participants ranged from 18 to 56 years of age ($M = 21.35$, $SD = 4.61$). Educational level ranged from 11 to 18 years, with an average of 13.5 ($SD = 1.38$). Personal annual income ranged from 0 to \$74,000.00 ($M = \$9,307.96$, $SD = \$11,454.43$). The majority was working part-time (53.73%) or not at all (30.39%). Most study participants were Caucasian (93.14%). Using ANOVAs for continuous and chi-square tests for categorical variables, universities differed ($p < .05$) only on age, education and employment status (midwestern school was older, more educated, and more likely employed), but only education reached at least the "medium" effect size threshold.

Procedure

Participants were assessed in groups typically ranging from 30 to 60 students, as part of a larger study investigating response styles on the Trauma Symptom Inventory. Informed consent was obtained from all participants, during which time participants were told that they could visit the university's counseling center if they had negative reactions to the study. Instruments pertaining to the present article are listed below.

Instruments

Demographics survey. This survey inquired about such demographic characteristics as age, gender, race, and annual income.

Life Events Checklist (LEC). The LEC (Blake et al., 1995) is a self-report survey assessing previous exposure to 16 potentially traumatic events. Participants are asked to indicate whether a given event happened to them, if they witnessed it occurring to others, or learned about it occurring to someone close. Test-retest reliability has been demonstrated with a mean kappa coefficient of .61 (indicating high correspondence) for direct exposure items, and a lower (but acceptable) mean kappa of .41 for indirect exposure items (Gray, Litz, Wang, & Lombardo, 2004). The LEC also converged with the Traumatic Life Events Questionnaire (mean kappa coefficient was .51), and predicted PTSD symptomatology in college students and combat veterans with the PCL, Clinician-Administered PTSD Scale and Modified PTSD Symptom Scale (Gray et al., 2004).

We supplemented the LEC administration by subsequently querying characteristics of respondents' first, most recent, and worst reported traumatic events (e.g., age at onset, whether respondents feared death or serious injury), similar to that used in other trauma exposure instruments (Resnick, Best, Kilpatrick, Freedy, & Falsetti, 1993). Participants were given instructions to complete the PCL based on these events.

PCL. The PCL is a 17-item, Likert-type-scaled *DSM-IV*-based PTSD symptom measure. Internal consistency is adequate (.94; Blanchard et al., 1996; Ruggiero et al., 2003), with test-retest reliability of .88 (Ruggiero et al., 2003). The PCL correlates highly with the Mississippi PTSD Scale (.82), Impact of Event Scale (.77) and Keane PTSD scale (.77; Ruggiero et al., 2003), and optimal cutoff scores of 44 and 50 have been found in diagnosing PTSD among treatment-seeking trauma survivors (Blanchard et al., 1996; Ruggiero et al., 2003). The PCL-Specific Stressor version (PCL-S) was used.

Results

Of the 510 participants, we selected only those who endorsed at least one LEC event that happened to them, and endorsed at least one event that involved perceived death or serious injury ($N = 215$, including 74 men and 141 women) to ensure a sample that was truly exposed to a traumatic event(s). The most commonly reported traumatic events included directly experiencing transportation accidents ($n = 186$, 78.6%), physical assaults ($n = 98$, 45.6%), and natural disasters ($n = 86$, 40.0%), witnessing life-threatening illnesses/injuries ($n = 91$, 42.3%), and being confronted with news of a close associate being attacked with a weapon ($n = 77$, 35.8%) or being suddenly killed ($n = 107$, 49.8%). Average age during the earliest reported trauma was 9.97 years ($SD = 4.90$), and 20.02 years ($SD = 5.15$) for the most recent event. It should be acknowledged that twice as many women constituted the sample than men. However, this is consistent with the university's demographic contour, and is common at many universities in current times. No difference was found between genders on the PCL's total score, $F(1, 213) = 2.52, p > .05$.

We assessed whether the resulting sample represented unique characteristics, by comparing excluded ($n = 295$) and nonexcluded ($n = 215$) participants on all demographic variables. Using t tests (for continuous variables) and Pearson chi-square tests (categorical variables), no significant differences were found for age, gender, or education level. Differences were

found for income and race, with excluded participants reporting a lower mean income ($M = \$8,109.76$, $SD = 9,873.99$) than those included ($M = \$10,946.67$, $SD = 13,165.87$), $F(1, 481) = 7.32$, $p < .001$ (partial eta-squared = .02). Caucasian participants were more likely to be excluded than non-Caucasians, $\chi^2(1) = 4.11$, $p < .05$ ($phi = .09$). However, income and race differences were associated with “small” effect sizes.

Confirmatory Factor Analyses

Confirmatory factor analyses were performed with SPSS AMOS 5.0 on the 17 items of the PCL using maximum likelihood procedures. Standardized parameters are presented to facilitate interpretation. Chi-square tests of model fit were examined in conjunction with goodness-of-fit indices. These indices include the Tucker-Lewis index (TLI), comparative fit index (CFI) and root mean square error of approximation (RMSEA), with robust empirical support for their sensitivity to recognizing well-fitting models (Hu & Bentler, 1998).

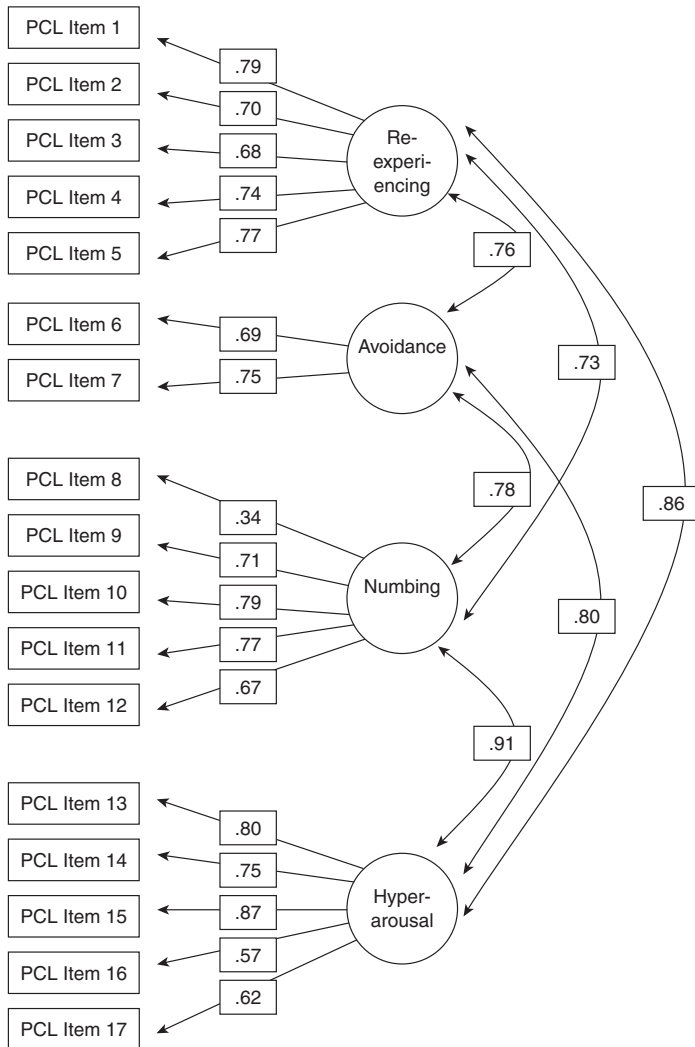
The hypothesized model is presented in Figure 1, consisting of reexperiencing, numbing, avoidance, and hyperarousal, set to covary. We set the error covariances for Items 16 and 17 to covary, based on observed modification indices and the theoretical similarity between these two items' constructs. The four-factor model fit the data well, $\chi^2(112, N = 215) = 185.32$, $p < .001$, TLI = .95, CFI = .96, RMSEA = .06 (e.g., for good-fitting models, RMSEA \leq .06, CFI $>$.95; Hu & Bentler, 1998).

Next, the hypothesized model was compared to the three-factor model. The three-factor model fit the data well, $\chi^2(115, N = 215) = 210.25$, $p < .001$, TLI = .94, CFI = .95, RMSEA = .06. However, the four-factor model represented a slight but significantly better fit, $\chi^2_{diff}(1, N = 215) = 6.30$, $p < .01$. Regression coefficients for the four-factor model are displayed in Figure 1.

Discussion

We found support for four-factor and three-factor PTSD models using the PCL. The four-factor model, separating effortful avoidance and emotional numbing factors, appeared to represent a slightly better fit to the data. The distinction between these two factors is supported from previous studies investigating factor structure, psychopathology and treatment outcome predictors (Asmundson et al., 2004). Given the popularity of the PCL among traumatic stress professionals (Elhai et al., 2005), these findings are important and further attest to the factorial and construct validity of the

Figure 1
Hypothesized Four-Factor Model of PTSD, With Regression
Coefficients for the PTSD Checklist (PCL)



Note: Rectangles represent observed variables, and circles represent latent variables. Each PCL item has residual error variance associated with it. The error variances of Items 16 and 17 are correlated.

PCL, and provide further justification for separating the avoidance and numbing constructs in future versions of the *DSM* PTSD criteria.

Several limitations are inherent in the present study. First, although we aimed to study a heterogeneous sample of trauma survivors, our reliance on college students limits the generalizability of findings regarding community trauma samples. Second, we used the LEC to assess trauma exposure, which despite its demonstrated psychometric properties (Gray et al., 2004), does not replace the more comprehensive interview-based trauma exposure assessment. Nonetheless, the article contributes to our understanding of the PCL's validity in heterogeneous college trauma samples, and the empirical distinction between avoidance and numbing in PTSD.

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