BRIEF REPORT

Support for the 7-Factor Hybrid Model of PTSD in a Community Sample

Antonia V. Seligowski and Holly K. Orcutt
Northern Illinois University

Objective: Research suggests that 4-factor models of posttraumatic stress disorder (PTSD) may be improved upon by the addition of novel factors, such as Dysphoric Arousal, Externalizing Behaviors, and Anhedonia. However, a novel 7-factor hybrid model has demonstrated superior fit in veteran and undergraduate samples. The current study sought to replicate this finding in a trauma-exposed community sample and examined relations with positive (PA) and negative affect (NA). Method: Participants included 403 adults (M age = 37.75) recruited through Amazon’s MTurk. PTSD was measured using the PTSD Checklist-5 (PCL-5). Confirmatory factor analyses were conducted in Mplus. Results: The 7-factor hybrid model demonstrated good fit: CFI = .96, TLI = .95, RMSEA = .06 (90% CI [.05, .07]), SRMR = .03. This model was superior to the 5- and 6-factor models. All factors demonstrated significant relations with PA and NA, the largest of which were the Externalizing Behaviors (with NA) and Anhedonia (with PA) factors. Conclusion: Results provide support for the 7-factor hybrid model of PTSD using the PCL-5 in a community sample. Findings replicate previous research suggesting that PTSD is highly related to NA, which has been purported as an underlying dimension of PTSD. It is recommended that future research use clinical measures to further examine the hybrid model.

Keywords: PTSD, factor analysis, hybrid model

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Theoretical models have historically considered PTSD to be comprised of related but distinct factors, rather than one higher-order construct. Two four-factor models have gained the most support in previous research: the emotional numbing model (King, Leskin, King, & Weathers, 1998) and the dysphoria model (Simms, Watson, & Doebbelling, 2002). In a meta-analysis conducted by Yufik and Simms (2010), the dysphoria model emerged as superior to the emotional numbing model by demonstrating somewhat improved fit. However, given the preponderance of research supporting both of these models, it is not entirely clear that one is truly superior to the other (Asmundson et al., 2000; Krause, Kaltman, Goodman, & Dutton, 2007; McWilliams, Cox, & Asmundson, 2005). A five-factor dysphoric arousal model was subsequently proposed whereby three hyperarousal items were placed on a new dysphoric arousal cluster (Elhai et al., 2011). This model has demonstrated improved fit over both four-factor models among various populations and trauma types (Armour, Carragher, & Elhai, 2013; Pietrzak, Tsai, Harpaz-Rotem, Whealin, & Southwick, 2012).

Along with the emergence of DSM–5, two six-factor models of PTSD have been proposed: anhedonia (Liu et al., 2014) and externalizing behaviors (Tsai et al., 2015). While both of these models have demonstrated superior fit in comparison to four- and five-factor models, a new factor structure incorporating elements of both six-factor models has been proposed (Armour et al., 2015). In this hybrid model, seven factors are suggested to account for anxious and dysphoric arousal, NA and anhedonia, as well as externalizing behaviors, in addition to the reexperiencing and avoidance factors that have remained unchanged. The seven-factor hybrid model was compared to four-, five-, and six-factor models of PTSD among U.S. veteran and trauma-exposed undergraduate samples. Chi-square analyses indicated that the seven-factor hybrid model demonstrated superior fit among both samples (Armour et al., 2015).

Previous factor analytic studies of PTSD have informed changes in diagnostic criteria. For example, the three-factor model of PTSD that was used in the DSM prior to 2013 was found to be inferior to four-factor structures (King et al., 1998; Simms et al., 2002). Subsequently, the DSM–5 was released with changed diagnostic criteria that included the addition of a fourth symptom cluster of PTSD (American Psychiatric Association, 2013). This change highlights the importance of continued factor analytic studies to shed light on the latent structure of PTSD. Although the newer aforementioned models have increasing factors, this is consistent with other clinical research demonstrating that PTSD is a highly heterogeneous disorder (Pietrzak et al., 2014; Zoladz & Diamond, 2013). Research into factor structure may assist in further refining diagnostic criteria, which has implications for the diagnosis and
treatment of PTSD. As such, the current study sought to examine the hybrid model among a trauma-exposed community sample.

Given that PTSD symptoms may present differently among various populations, and where the Armour et al. (2015) study utilized veteran and undergraduate samples, our aim was to assess the hybrid model among a general sample of trauma-exposed adults (i.e., broader age range than undergraduates, trauma not specific to military service). Based on the Armour et al. (2015) study and previous research suggesting the separation of anxious and dysphoric arousal (Elhai et al., 2011), as well as NA and anhedonia (Liu et al., 2014), it was hypothesized that the seven-factor hybrid model would demonstrate superior fit to the dysphoric arousal, anhedonia, and externalizing behaviors models. In addition, previous research has noted that the novelty of the NA factor of PTSD in DSM–5 warrants examination of other NA measures along with PTSD factors (Liu, Wang, Cao, Qing, & Armour, 2015). Studies have demonstrated that PTSD factors are significantly related to both NA and PA, and it has been suggested that future research continue to examine the external validity of PTSD models by looking at relations among PTSD factors and affect (Amdur, Larsen, & Liberezon, 2000; Kraal, Waldron-Perrine, Pangilinan, & Bieliauskas, 2015). Given that the hybrid model is still nascent, a secondary goal of our study was therefore to explore the differential relations between each PTSD factor and both NA and PA. As an exploratory endeavor, we did not specify particular hypotheses regarding these relations. Rather, we sought to examine which of the hybrid model factors strongly correlate with NA and PA.

Method

Procedure and Participants

Participants were recruited from an online survey system, Amazon’s Mechanical Turk, and were compensated 50¢ for 1 hr of work (mturk.com). Participants were required to be at least 18 years old, live in the United States, be fluent in English, have an MTurk response accuracy rating of at least 95%, and endorse exposure to a traumatic event on the PCL-5 (Weathers et al., 2013). A total of 403 individuals met inclusion criteria (n = 279 female [69%]; Mage = 37.75, SD = 13.38).

In terms of race, 345 (86.5%) participants identified as White, 22 (5.5%) as Black, 17 (4.3%) as “Other,” 13 (3.3%) as Asian, and two (.5%) as American Indian or Alaskan Native; four (1%) declined to respond. The majority of participants identified as non-Latino/Hispanic (94%).

Self-report measures included the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) and the PCL-5 (Weathers et al., 2013). Cronbach’s alphas in the current sample were .93 for NA and .91 for PA. For the PCL-5, Cronbach’s alphas were: .89 (Intrusion), .83 (Avoidance), .90 (Negative Alterations in Cognition and Mood), and .84 (Alterations in Arousal and Reactivity).

In regard to traumatic events, 25.06% of participants reported sexual assault (n = 101), 22.08% physical assault (n = 89), 18.86% knowing someone who was murdered or committed suicide (n = 76), 14.89% experiencing a motor vehicle/other serious accident (n = 60), 9.43% exposure to a life-threatening illness/injury (n = 38), 3.72% natural disaster (n = 15), 2.48% combat (n = 10), 1.49% captivity (n = 6), and 1.49% exposure to fire/toxic substance (n = 6). Twenty-eight participants (6.95%) endorsed exposure to traumatic events not otherwise categorized (e.g., witnessing death, being burglarized). Although the PCL-5 asks participants to describe the single worst event, 23 participants (5.71%) described two traumatic events, and three (.74%) described three traumatic events. Because these participants did not indicate their worst event, all events were included in the percentages reported above.

Statistical Analysis

Following data screening, confirmatory factor analyses with weighted least squares estimation were performed in Mplus. Chi-square difference tests were then conducted to compare the models to one another. One loading on each latent factor was fixed to 1, with remaining loadings freely estimated.

Results

Using the recommended cutoff score of 38 (Weathers et al., 2013), 33% of participants met criteria for probable PTSD. However, using the more stringent DSM–5 criteria (as used in Armour et al., 2015), current probable PTSD was observed in 8.7% of participants (as compared to 5.2% of the veteran sample and 4.0% of the undergraduate sample in Armour et al., 2015). See Table 1 for a summary of fit indices (available online as supplemental material). The 6-factor anhedonia and externalizing behaviors models demonstrated superior fit to the 5-factor dysphoric arousal model: $\Delta \chi^2(9) = 229.61, p < .001$ and $\Delta \chi^2(9) = 127.61, p < .001$, respectively. The 7-factor hybrid model demonstrated superior fit to the dysphoric arousal model ($\Delta \chi^2(15) = 256.66, p < .001$) as well as both $6$-factor models: $\Delta \chi^2(6) = 27.05, p < .001$ for anhedonia, $\Delta \chi^2(6) = 129.05, p < .001$ for externalizing behaviors. See Figure 1 for individual factor loadings (available online as supplemental material).

In terms of relations with the PANAS, all seven PTSD factors were significantly related to the PANAS-NA (ps < .001). Of these, the largest association was observed for the Externalizing Behaviors factor ($r = .63$). In addition, all of these factors were also significantly related to the PANAS-PA ($ps < .01$). Of these, the largest association was observed for the Anhedonia factor ($r = -.39$). Lastly, all seven factors were significantly related to one another. Removal of the trauma-related amnesia item (the lowest factor loading) did not change these results. See Table 2 for a summary of these associations (available online as supplemental material).

Discussion

The current study examined a new seven-factor hybrid model of PTSD symptoms (Armour et al., 2015) using the PCL-5 with a trauma-exposed community sample. This model was compared to the dysphoric arousal, anhedonia, and externalizing behaviors models. In addition, relations between each factor and both NA and PA were explored.

While the hybrid model demonstrated superior fit compared to the five- and six-factor models, it is noteworthy that the individual fit indices were nearly identical, suggesting that other models
should still be examined. Using the PCL-5 versus other measures of PTSD likely increased the chances of our finding support for the hybrid model, given that it was initially tested using the PCL-5 (though our use of a community sample may have added demographic variability; Armour et al., 2015). Indeed, research suggests that model fit may be affected by differences in measure type, as well as trauma and population types (Elhai & Palmieri, 2011). Continued research examining the hybrid model across different measures of PTSD and trauma types is necessary to determine whether this factor structure may be further replicated.

In line with Armour et al.’s (2015) findings, the smallest factor loading was for the trauma-related amnesia item. This item may represent dissociative-like experiences, which are considered to represent a distinct subtype of PTSD (Wolf et al., 2012). Given that few participants are likely to highly endorse this symptom, it may have limited utility when examining overall factor structure.

All seven factors demonstrated significant relations with NA, the largest of which was the the Anhedonia factor. We removed the trauma-related amnesia item to explore whether it was influencing these associations, but doing so did not alter PANAS correlations. In addition, PA was significantly related to all seven PTSD factors, the strongest of which was the Anhedonia factor. These results support the notion that significant alterations in both positive and negative emotions may be observed among individuals suffering from PTSD symptoms. The strong relations observed between the Externalizing Behaviors factor and NA, and between the Anhedonia factor and PA suggest that separating out items related to anhedonia and externalizing behaviors may be important to the superior fit of the hybrid model.

There may be important theoretical and diagnostic implications of the hybrid model. The increasing number of factors emphasizes the heterogeneity of PTSD and calls for continued research into potential subtypes of the disorder (e.g., perhaps treatment outcomes differ for those with different subgroups of symptoms), as well as examinations of the usefulness of these factor structures in practice. If diagnostic criteria were to change such that symptoms were required on seven, rather than four clusters, there may be implications for prevalence/diagnostic rates and subsequent treatment. This ultimately questions the clinical utility of the hybrid model, which has yet to be tested. Further examination of the hybrid model in clinical practice may also have implications for understanding the etiology of PTSD as well as how symptoms are maintained (e.g., if symptom clusters develop concurrently or if some appear secondary to others).

The current study has important limitations to acknowledge. First, a self-report measure of PTSD symptoms was used. Future research examining the hybrid model would benefit from utilizing multiple measures of PTSD symptoms in order to more accurately determine factor structure. Second, the current data are cross-sectional and limit any conclusions about causal relations between symptoms. Third, most participants were White and non-Hispanic, thus limiting the generalizability of our findings to other racial and ethnic populations. As a result of this demographic bias, higher PTSD symptom levels may not accurately represent those in lower socioeconomic communities.

In conclusion, results of the current study provide further support for the hybrid model of PTSD using the PCL-5 among a community sample. Given the likely presence of measurement and sample bias (i.e., using the PCL-5 as used in the Armour et al., (2015) study and the limited demographics of our sample), future research is recommended to evaluate whether this model demonstrates varying fit across different measures of PTSD, as well as across different trauma types and racial/ethnic populations. In addition, further examination of the externalizing behaviors factor and both positive and negative affect is warranted, given their strong relations observed in the current study.

References


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