

Psychometric Properties of the UCLA PTSD Reaction Index. Part II: Investigating Factor Structure Findings in a National Clinic-Referred Youth Sample

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We examined the underlying factor structure of the UCLA PTSD Reaction Index (PTSD-RI) using data from 6,591 children/adolescents exposed to trauma, presenting for treatment at any of 54 National Child Traumatic Stress Network (NCTSN) centers. Using confirmatory factor analysis, we tested the 3-factor *DSM-IV* PTSD model, 2 separate 4-factor models (Dysphoria vs. Emotional Numbing) and a recently conceptualized 5-factor Dysphoric Arousal model. We found a slight, but significant advantage for the Dysphoria model over the Emotional Numbing model on the PTSD-RI, with a difference in Bayesian information criterion (BIC) values of 81 points. As with several recent studies of adult trauma victims, we found a slight advantage for the Dysphoric Arousal model over the other models on the PTSD-RI, with BIC differences exceeding 300 points. Retaining the Dysphoric Arousal model, we tested the convergent validity of the PTSD-RI factors against subscales of the Trauma Symptom Checklist for Children. Supporting the convergent validity of the PTSD-RI, in the Dysphoric Arousal model, the dysphoric arousal factor related most strongly to anger, whereas the emotional numbing factor related most strongly to depression, and anxious arousal factor related most strongly to anxiety. Results support the use of the PTSD-RI for evaluating PTSD among youth.

Despite the proliferation of assessment instruments for post-traumatic stress disorder (PTSD) symptoms in adults, relatively few instruments are available for evaluating PTSD symptoms in children and adolescents (Balaban, 2009; Elhai, Gray, Kashdan, & Franklin, 2005). The UCLA PTSD Reaction Index (PTSD-RI; Steinberg, Brymer, Decker, & Pynoos, 2004; Steinberg &

Brymer, 2008) is one such child and adolescent instrument, and has been widely used across a variety of trauma-exposed child and adolescent samples (Hawkins & Radcliffe, 2006). A recent investigation of basic psychometric properties of the PTSD-RI using the Core Data Set (CDS) of the clinics affiliated with the National Child Traumatic Stress Network (NCTSN) revealed evidence of both internal consistency as measured by Cronbach's α , as well as of convergent validity (Steinberg et al., in press).

The purpose of the present study was to extend Steinberg et al.'s (in press) basic psychometric evaluation by examining the underlying factor structure of the PTSD-RI as a measure of PTSD symptoms, using the same data from the CDS. Previous studies tested the factor structure of a shortened version of the PTSD-RI (Armour, Elhai, et al., 2011; Armour, Layne, et al., 2011), but the present study uses the full, original version with a unique, large clinical sample of participants from clinics across the United States. Testing the factor structure of the PTSD-RI is important in documenting its psychometric properties because it represents a test of construct validity by evaluating the extent to which PTSD-RI items map onto empirically supported PTSD structural models. Because the UCLA PTSD-RI is a

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Table 1

Standardized Factor Loadings for the DSM-IV, Emotional Numbing, Dysphoria, and Dysphoric-Arousal Factor Models

DSM-IV PTSD Items	Item number	DSM-IV	Emotional Numbing	Dysphoria	Dysphoric Arousal
B1. Intrusive distressing recollections	3	.72	.72	.72	.72
B2. Recurrent distressing dreams	5	.67	.66	.66	.66
B3. Acting like the trauma is recurring	6	.67	.66	.66	.66
B4. Psychological reactivity to reminders	2	.68	.69	.69	.69
B5. Physical reactivity to reminders	18	.73	.74	.74	.74
C1. Avoiding thoughts, feelings, or conversations	9	.57	.63	.62	.62
C2. Avoiding activities, places, or people	17	.60	.69	.70	.69
C3. Inability to recall aspects of the trauma	15	.45	.44	.45	.44
C4. Diminished interest in activities	7	.58	.60	.59	.60
C5. Detachment or estrangement	8	.69	.72	.70	.72
C6. Restricted affect	10	.65	.68	.66	.68
C6. Restricted affect	11	.40	.41	.40	.40
C7. Foreshortened future	19	.57	.59	.59	.60
C7. Foreshortened future	21	.59	.62	.61	.62
D1. Sleep difficulty	13	.62	.62	.57	.62
D2. Irritable or anger	4	.55	.55	.54	.57
D2. Irritable/angry	20	.45	.45	.46	.48
D3. Difficulty concentrating	16	.57	.57	.56	.59
D4. Hypervigilance	1	.41	.41	.52	.51
D5. Exaggerated startle	12	.52	.52	.61	.62

Note. $N = 6,591$. DSM-IV = Diagnostic and Statistical Manual of Mental Disorders, 4th Edition; PTSD = posttraumatic stress disorder.

widely used measure of child and adolescent PTSD reactions, a rigorous evaluation of its psychometric properties carries the potential of advancing the child traumatic stress field by evaluating the factorial validity of the test's subscales in relation to well-studied models of PTSD symptoms found in the adult literature—including a newly developed 5-factor model. This effort will not only help to increase the methodological (especially psychometric) rigor of a widely used measure of PTSD symptoms, but also contribute to the sparse literature on the degree of similarity in PTSD symptom expression between youth and adults.

Currently, three primary symptom clusters, reexperiencing, avoidance/numbing, and hyperarousal, make up the PTSD diagnostic criteria according to the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; *DSM-IV-TR*; American Psychiatric Association [APA], 2000). Studies using confirmatory factor analysis (CFA), however, have provided little empirical support for the corresponding 3-factor PTSD model in accounting for the underlying dimensions of PTSD symptoms. Instead, two 4-factor PTSD models have, to date, received the most empirical support across adult and child/adolescent trauma-exposed samples. They have been termed the Emotional Numbing and Dysphoria models (reviewed in Elhai & Palmieri, 2011; Yufik & Simms, 2010).

The 4-factor emotional numbing model of PTSD symptom structure (King, Leskin, King, & Weathers, 1998) implemented a single, but important modification to the 3-factor *DSM-IV*

PTSD model, specifically by splitting the phenomena of effortful avoidance and emotional numbing into two separate factors. This revised model consists of reexperiencing (*DSM-IV* PTSD items B1-B5), avoidance (C1-C2), emotional numbing (C3-C7), and hyperarousal (D1-D5; see Table 1 for the B1-D5 symptom labels). Justification for this modification derives from both theoretical and empirical sources, including evidence that avoidance and numbing are differentially associated with both external indices of psychopathology, as well as treatment outcome (reviewed in Asmundson, Stapleton, & Taylor, 2004). A large body of empirical work has supported the emotional numbing PTSD model as an adequate representation of the factor structure of PTSD symptoms in adults (reviewed in Elhai & Palmieri, 2011; Yufik & Simms, 2010), including in child/adolescent samples (e.g., Nygaard, Jensen, & Dyb, 2012).

Alternatively, the 4-factor dysphoria model of PTSD (Simms, Watson, & Doebbeling, 2002) proposed removing PTSD items D1-D3 (reflecting difficulties with sleep, irritability, and concentration) from the hyperarousal factor and combining them with the emotional numbing items to form what the authors called the dysphoria factor. This proposal was based on both theory and empirical work demonstrating that PTSD is made up in part by a large constellation of items that reflect general emotional distress and dysphoria—features not unique to PTSD, but instead common to other anxiety and mood disorders (reviewed in Watson, 2005, 2009). As with the emotional numbing model, the dysphoria model has received substantial empirical support

in adults (reviewed in Elhai & Palmieri, 2011; Yufik & Simms, 2010), as well in adolescents (e.g., Elhai, Ford, Ruggiero, & Frueh, 2009).

Perhaps because the difference between the emotional numbing and dysphoria PTSD models is minor (the difference centering on the specific factor that items D1–D3 load onto), neither model has overwhelmingly outperformed the other across the many empirical studies that have compared them. Nevertheless, a meta-analysis by Yufik and Simms (2010) concluded that the dysphoria model appeared to have a slight statistical advantage across studies based on nominally improved fit indices.

More recently, a 5-factor PTSD model has been proposed and has recently garnered substantial empirical support across several research groups, discussed below. Elhai et al. (2011) initially proposed a modification to the emotional numbing and dysphoria models by assigning PTSD items D1–D3 to a separate and distinct dysphoric arousal factor, thereby producing five factors. The rationale behind this model modification derives from both theory and empirical evidence (Elhai et al., 2011). Specifically, based on examining factor loadings, PTSD items D1–D3 do not load well onto either the emotional numbing or hyperarousal factors, suggesting that these items are not clear indicators of either of those factors (Shevlin, McBride, Armour, & Adamson, 2009). In fact, the D1–D3 items are conceptually very different from the D4–D5 items. The D1–D3 items represent symptoms relevant to dysphoria, but that can be distinguished based on their more restless and agitated nature (Elhai et al., 2011); furthermore, the D4–D5 items have been conceptualized as involving conditioned fear that is more relevant to fear-based disorders such as panic disorder (Watson, 2005). Several studies thus far have discovered that this 5-factor dysphoric arousal PTSD model statistically outperformed both 4-factor models, with some evidence of discriminant validity for the D1–D3 dysphoric arousal factor (Armour et al., 2012; Armour, O'Connor, Elklit, & Elhai, in press; Elhai et al., 2011; Pietrzak, Tsai, Harpaz-Rotem, Whealin, & Southwick, 2012; L. Wang, Li, et al., 2011; L. Wang, Long, Li, & Armour, 2011; L. Wang, Zhang, et al., 2011; M. Wang, Elhai, Dai, & Yao, 2012); we know of no published studies at this time that fail to conclude that the 5-factor model provides statistically superior fit.

In the present study, we aimed to explore the factor structure of the PTSD-RI items by testing the 3-factor *DSM-IV* model, both 4-factor Emotional Numbing (King et al., 1998) and Dysphoria (Simms et al., 2002) models, and the 5-factor Dysphoric Arousal (Elhai et al., 2011) model using CFA. We used the full PTSD-RI, rather than short forms previously analyzed (Armour, Elhai, et al., 2011; Armour, Layne, et al., 2011). After identifying and retaining the best-fitting model, we then planned to examine the convergent validity of the PTSD-RI factors by assessing their respective relations with external measures of psychopathology included in the CDS using the Trauma Symptom Checklist for Children (TSCC; Briere, 1996). We hypothesized that the 5-factor PTSD model would fit best. Within the 5-factor model, we had two specific hypotheses. First, based

on research finding that numbing is more related to depression, anxious arousal is more related to anxiety, and dysphoric arousal is no more related to depression or anxiety (L. Wang, Li, et al., 2011; L. Wang, Long, et al., 2011), we expected similar findings. Second, we hypothesized that because of the irritability/anger symptom in the diagnostic criteria of PTSD, the factor containing that item (depending on the model analyzed) would be especially related to the TSCC anger scale.

Analyzing the factor structure of PTSD symptoms specifically in children and adolescents is important, as most studies examining this question were conducted with adults (discussed in Elhai & Palmieri, 2011). Additionally, this is the first study of which we are aware that tests the 5-factor dysphoric arousal PTSD model in American children or adolescents.

Method

Participants

We analyzed data using the CDS, which includes diverse samples of children and adolescents presenting for trauma-focused mental health treatment at the 54 participating NCTSN centers across the United States. The NCTSN is funded by the Substance Abuse and Mental Health Services Administration through U.S. federal legislation. The NCTSN centers are specialty treatment centers for child traumatic stress, in diverse treatment settings such as hospitals, outpatient clinics, social service agencies, etc. Patients are referred to the centers locally through local health care systems and providers. The NCTSN procedures for gathering data are described in detail (Briggs et al., in press; Pynoos et al., 2008; Steinberg et al., in press).

We started with the subsample of participants in the baseline CDS who endorsed at least one traumatic event as defined below, were aged 7 to 18 years, and who were administered the PTSD-RI, a total of 6,635. In contrast to Steinberg et al. (in press) who only included subjects who answered all PTSD-RI items, to preserve the item-level of analysis using CFA for the maximum number of participants, we included subjects with minor amounts of missing items on the PTSD-RI. Nevertheless, we chose a priori to exclude cases for which a substantial amount of PTSD-RI data (seven or more items, or 30%) were missing ($n = 44$), leaving $N = 6,591$.

In the current sample of 6,591 participants, the average age was 12.64 years ($SD = 3.08$). There were slightly more girls ($n = 3,657$; 55.5%) than boys ($n = 2,934$; 44.5%). Most participants were of Caucasian (Hispanic or non-Hispanic) ($n = 3,767$; 57.2%) or African American (Hispanic or non-Hispanic) ($n = 1,812$; 27.5%) racial backgrounds. Hispanic ethnicity was reported by 2,395 (38.3%) of respondents.

Measures

The UCLA Trauma History Profile (Pynoos & Steinberg, 2002) was adapted for use by NCTSN clinical providers to gather trauma history information based on a comprehensive list of traumatic events. Standardized definitions for the trauma types

were used, modeled after the National Child Abuse and Neglect Data System Glossary (U.S. Department of Health and Human Services Administration for Children and Family, 2000, March). Nineteen traumatic event types were queried, with an additional item that queried “other trauma.” Additional information about the timing of the events and other salient characteristics of each reported trauma were also assessed.

The PTSD-RI (Steinberg et al., 2004) is a 22-item self-report instrument for assessing PTSD symptoms in school-aged children and adolescents. Questions are rated on a 5-point Likert-type scale—from 0 = *none of the time* to 4 = *most of the time* based on the past month. Symptoms were queried globally, but without specific reference to an index traumatic event. The PTSD-RI includes the 17 *DSM-IV* PTSD items, and also included an alternate version for each of the *DSM-IV* PTSD items C6, C7, and D2. Two additional items reflect associated features of PTSD, which we excluded from analyses. In their analysis of the PTSD-RI using the CDS, Steinberg et al. (in press) reported an overall internal consistency of .90 for the PTSD-RI. Steinberg et al. also found convergent validity in that the PTSD-RI’s total score correlated more with the TSCC’s Posttraumatic Stress scale than scales measuring anger, anxiety, depression, and dissociation. The PTSD-RI has also been validated outside of the U.S. (e.g., Murray et al., 2011). Other CFA studies using a 17-item version of the PTSD-RI (excluding the three alternative item versions) in adolescents assessed 2 years after the 1992–1995 Bosnian war reported good fit for both the Emotional Numbing and Dysphoria models (Armour, Elhai, et al., 2011; Armour, Layne, et al., 2011).

The TSCC-Alternate Version (TSCC-A, Briere, 1996) is a 44-item, multiscale self-report measure of posttraumatic psychopathology for children and adolescents. It uses Likert-type response options ranging from 0 = *never* to 3 = *almost all of the time*. The TSCC-A is an alternative version of the original TSCC (Briere, 1996), but excludes the original instrument’s 10 items referencing sexual concerns. The TSCC has demonstrated adequate internal consistency for its primary scales of Anxiety (Cronbach’s $\alpha = .87$), Depression (.90), Anger (.91), Dissociation (.89), and Posttraumatic Stress (.88; Sadowski & Friedrich, 2000); coefficient alphas for the TSCC have been reported in the CDS by Steinberg et al. (in press). The TSCC has demonstrated convergent validity with the Child Behavior Checklist (Briere, 1996; Sadowski & Friedrich, 2000).

Data Analysis

Among the subsample of 6,591 respondents, 764 participants missed between one to six PTSD-RI items (mostly one to two items each). We estimated missing data with maximum likelihood procedures using all available PTSD-RI data (Graham, 2009). Screening of PTSD-RI and TSCC items revealed that the assumption of normality was not violated (no item skewness or kurtosis values > 1.5).

We conducted our primary analyses using Mplus 6.12 software. We treated variables as continuously scaled, resulting in

the use of a Pearson covariance matrix and linear regression paths to estimate factor loadings. Because normality was not violated, we used maximum likelihood estimation for CFAs. All tests were two-tailed. Goodness of fit indices are reported below, including the comparative fit index (CFI), Tucker Lewis Index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). Models fitting very well (or adequately) are indicated by CFI and TLI $\geq .95$ (range = .90–.94), RMSEA $\leq .06$ (range = .07–.08), and SRMR $\leq .08$ (range = .09–.10; Hu & Bentler, 1999). Nested models were compared by a difference test between chi-square values. Nonnested models were compared using Bayesian information criterion (BIC) values, where a difference in BIC of at least 10 points indicates that the model with the smaller BIC value is statistically superior with 150:1 odds (Kass & Raftery, 1995).

We first tested the factor structure of the PTSD-RI’s 20 items by comparing four separate models. In the first, we specified the 3-factor *DSM-IV* PTSD model by specifying PTSD items B1–B5 to load onto a reexperiencing factor, items C1–C7 on an avoidance/numbing factor, and items D1–D5 on a hyperarousal factor. In the second we specified the emotional numbing model by splitting the 3-factor *DSM-IV* model’s items C1–C2 into a distinct factor from items C3–C7. For the third we specified the dysphoria model by moving the emotional numbing model’s items D1–D3 and combining them with items C3–C7 to form the dysphoria factor. Last, we specified the dysphoric arousal model by removing items D1–D3 from the dysphoria model’s dysphoria factor and using them to form a single dysphoric arousal factor. These models were intercorrelated models rather than higher order models; higher-order models of PTSD have statistical disadvantages and do not fit as well as the intercorrelated models (Yufik & Simms, 2010). Finally, we conducted CFA analyses that included a given PTSD model and the TSCC scales to examine which PTSD factors are differentially related to TSCC scales; we conducted four such analyses—one for each PTSD model.

In all analyses, the PTSD-RI’s alternative versions of *DSM-IV* PTSD symptoms C6, C7, and D2 were specified to load onto their appropriate factors. We decided a priori to estimate a residual error covariance between a given symptom’s two versions of items (e.g., between the 2-item versions of symptom C6), however, because the two versions are worded similarly and are based on the same symptom. Failure to estimate covariances between residuals in such instances leads to artificially reduced fit (Cole, Ciesla, & Steiger, 2007). All other error covariances were fixed to zero. Factor covariances were estimated. We fixed factor variances to the value 1.0 to scale the factors within a model.

Results

The most prevalent (nonmutually exclusive) traumatic events reported were traumatic loss/separation/bereavement of a loved one ($n = 3,288$; 51.9%) and domestic violence ($n = 3,081$;

49.3%). Also prevalent were emotional or psychological maltreatment ($n = 2,249$; 37.2%), and physical abuse ($n = 1,899$; 30.4%). The majority of participants ($n = 5,178$; or 78.6%) endorsed more than one type of traumatic event.

The 3-factor *DSM-IV* model fit well, $\chi^2(164, N = 6591) = 3,376.37, p < .001, CFI = .92, TLI = .91, RMSEA = .06, 90\% CI = [.053, .056], SRMR = .04, BIC = 420,483.77$. The 4-factor Emotional Numbing model (King et al., 1998) also fit well, $\chi^2(161, N = 6591) = 2,549.86, p < .001, CFI = .94, TLI = .93, RMSEA = .05, 90\% CI = [.046, .049], SRMR = .03, BIC = 419,683.64$. Given that the models were nested, a chi-square difference test revealed that the emotional numbing model yielded significantly better fit, $\chi^2_{diff}(3, N = 6591) = 826.52, p < .001$ (Table 1 presents standardized factor loadings for all models tested).

The 4-factor dysphoria model (Simms et al., 2002) also fit the data well, $\chi^2(161, N = 6591) = 2,469.11, p < .001, CFI = .94, TLI = .93, RMSEA = .05, 90\% CI = [.045, .048], SRMR = .03, BIC = 419,602.89$. Because the 3-factor *DSM-IV* and 4-factor emotional numbing models are not nested within the dysphoria model, chi-square difference tests comparing the models are not appropriate. Comparisons of BIC values, however, revealed a smaller BIC value and thus significantly better fit for the dysphoria model.

Next we tested the 5-factor dysphoric arousal model, which fit well, $\chi^2(157, N = 6591) = 2,128.54, p < .001, CFI = .95, TLI = .94, RMSEA = .04, 90\% CI range = [.042, .045], SRMR = .03, BIC = 419,297.49$. This model fit significantly better than the *DSM-IV* model, $\chi^2_{diff}(7, N = 6591) = 1247.84, p < .001$. The 5-factor model also fit better than the emotional numbing, $\chi^2_{diff}(4, N = 6591) = 421.32, p < .001$, and dysphoria models, $\chi^2_{diff}(4, N = 6591) = 340.57, p < .001$. Figure 1 depicts the 5-factor model pictorially, including with standardized factor loadings. Because the 5-factor model fit best, we used it in subsequent analyses. We also report internal consistency estimates for the five subscales that map onto the five factors: reexperiencing (.82), avoidance (.60), numbing (.79), dysphoric arousal (.68), and anxious arousal (.48).

Finally, we examined the convergent validity of the PTSD-RI factors in relation to the TSCC Anxiety, Depression, Anger, Dissociation, and Posttraumatic Stress scales. We excluded PTSD-RI data from 1,410 participants who were not administered the TSCC (typically due to age restrictions for the instrument), leaving 5,181 subjects. We conducted a CFA with the 5-factor model (and separately for the other models), and we included the TSCC subscale scores as observed variables specified to correlate with the five PTSD factors using standardized correlation coefficients; specifying the model in this manner allowed us to examine bivariate relationships between the PTSD factors and TSCC scales (see Table 2). For the 5-factor model, differences between bivariate correlations were tested using a Wald chi-square test. Hypothesis 1 was supported, in that (a) the TSCC anxiety scale was more related to anxious arousal ($r = .59$) than to dysphoric arousal ($r = .07$), $\chi^2(1) = 79.72, p < .001$; and (b) the TSCC Depression scale was more related to numbing

($r = .56$) than to dysphoric arousal ($r = .06$), $\chi^2(1) = 56.64, p < .001$. Hypothesis 2 was also supported in that within each PTSD model, the TSCC Anger scale correlated significantly higher with the PTSD factor containing the irritability/anger item (all $ps < .001$). Table 2 also presents similar analyses by additionally specifying the remaining three PTSD models.

One of the problems with the large relationship between the TSCC Anger scale and the PTSD factor containing the irritability item (which depends on which model is being examined) is that we had two indicators/versions of the irritability item. We recomputed the models, but leaving out one indicator of irritability at a time. Results reduced the correlations between the TSCC anger scale and the PTSD factor containing the irritability item as low as follows: 5-factor model (r reduced from .75 to .58), dysphoria model (from .29 to .22), and numbing model and 3-factor model (from .59 to .40). Thus removing one of the versions of irritability somewhat reduced the relation between the TSCC Anger scale and the PTSD factor in question.

Discussion

The current study examined the underlying factor structure of the PTSD-RI using data from 6,591 trauma-exposed children and adolescent presenting for treatment at NCTSN centers. Using CFA, we tested the 3-factor *DSM-IV* PTSD model, as well as two 4-factor models (Dysphoria vs. Emotional Numbing) and a recently conceptualized 5-factor Dysphoric Arousal model. Findings suggest that all four PTSD symptom models fit reasonably well in accounting for the underlying symptom dimensions of PTSD, supporting previous research on these models with adults, children and adolescents using other PTSD symptom instruments (reviewed in Elhai & Palmieri, 2011). In comparing only the two models that have garnered the most empirical support across the PTSD literature—the emotional numbing (King et al., 1998) and dysphoria (Simms et al., 2002) models—the Dysphoria model appeared to fit best. Although the Dysphoria model fit better than the Numbing model based on objective statistical criteria (BIC values), differences in goodness of fit values as compared to the Emotional Numbing model were not apparent. Thus the difference between these 4-factor models appeared negligible, perhaps because of the fact that they only differ in the placement of the D1–D3 symptoms. Furthermore, in comparing all four models, the emerging 5-factor Dysphoric Arousal model fit slightly better than the remaining three models, with differential associations found against external measures of psychopathology. In particular, Table 2 demonstrates that the results for the 5-factor model are quite similar to those of the 4-factor models, but the 5-factor model appears to be slightly different in discriminant validity. For example, by distinguishing dysphoric arousal from numbing and anxious arousal, the 5-factor model demonstrates nonsignificant associations for numbing with the TSCC Anxiety scale and dysphoric arousal with the

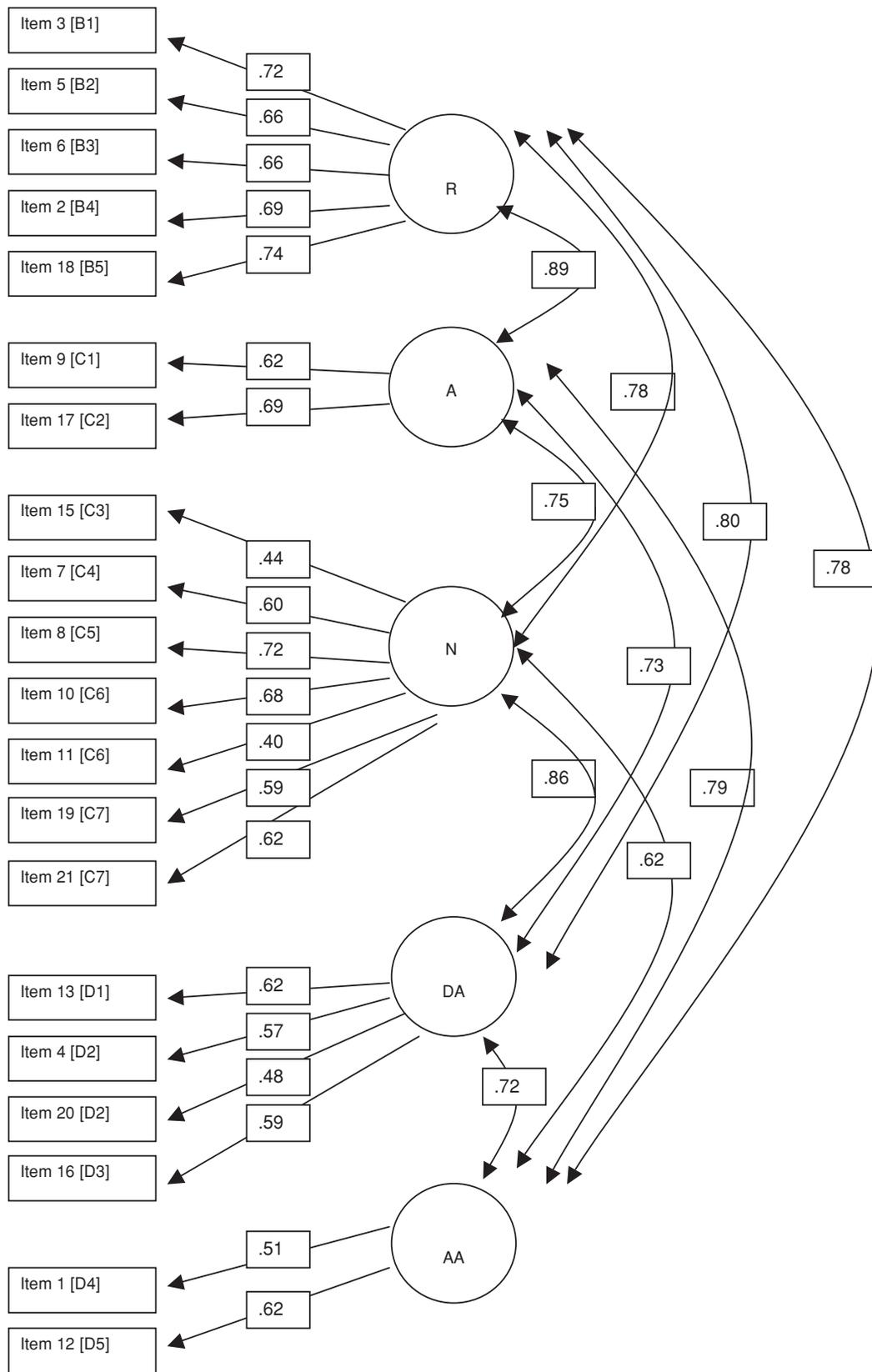


Figure 1. Standardized factor loadings on 20 PTSD-RI items for the 5-factor Dysphoric Arousal model of PTSD in children and adolescents, $N = 6,591$. Observed variables are denoted by rectangles, and latent factors are denoted by circles. Each observed variable has residual error variance associated with it. R = Reexperiencing; A = Avoidance, N = Numbing; D = Dysphoric Arousal; AA=Anxious Arousal.

Table 2
Standardized Correlation Coefficients Between the TSCC-A Scales and PTSD Factor Models

Model	TSCC Scale				
	Anger	Anxiety	Depression	Dissociation	Posttraumatic Stress
Model 3-Factor					
R	.01	.12***	.07**	.05*	.72***
A/N	.07***	.04	.47***	.22***	.35***
H	.59***	.27***	.02	.18***	.25***
Emotional Numbing					
R	.01	.12***	.07**	.05*	.72***
A	.05*	.04	.01	.06*	.65***
N	.07***	.04	.56***	.23***	.19***
H	.59***	.26***	.02	.18***	.25***
Dysphoria					
R	.01	.12***	.07**	.05*	.72***
A	.05*	.04	.01	.06*	.65***
D	.29***	.06*	.45***	.25***	.23***
AA	-.05*	.59***	-.11***	.14***	.24***
Dysphoric Arousal					
R	.01	.12***	.07**	.05*	.72***
A	.05*	.04	.01	.06*	.65***
N	.07***	.04	.56***	.23***	.19***
DA	.75**	.07**	.06*	.12***	.18***
AA	-.05*	.59***	-.11***	.14***	.24***

Note. $N = 6,591$. TSCC = Trauma Symptom Checklist for Children; R = Reexperiencing; A = Avoidance; N = Numbing; H = Hyperarousal; D = Dysphoria; DA = Dysphoric Arousal; AA = Anxious Arousal.

* $p < .05$. ** $p < .01$. *** $p < .001$.

TSCC Depression scale that would not otherwise be evident. We must, however, provide the caveat that despite significantly better fit for the 5-factor model, improvement in objective fit indices appeared minor. This could be due to the fact that we had such a large sample and thus were overpowered; though other studies supporting the 5-factor model over other models had little more than 300 subjects each (Armour et al., 2012; Armour et al., in press), so there is some support for the 5-factor model even in smaller samples. An additional concern about the 5-factor model findings is that some factor intercorrelations were quite high (e.g., .89 for reexperiencing–avoidance, and .86 for numbing–dysphoria), suggesting challenges to this model’s discriminant validity.

The current findings parallel those demonstrated with other PTSD symptom instruments, providing evidence of construct validity for the PTSD-RI. Specifically, support for the Dysphoria model over the Emotional Numbing model was found in the Yufik and Simms meta-analysis of the factor structure of PTSD, although the authors provided the caveat that the Dysphoria model held only a mild advantage (Yufik & Simms, 2010). The current study’s mild support for the 5-factor Dysphoric Arousal model is also consistent with the conclusions of numerous recent studies of adults and adolescents that have utilized such instruments as the PTSD Checklist, PTSD Symptom Scale, and

Harvard Trauma Questionnaire (Armour et al., 2012; Armour et al., in press; Elhai et al., 2011; Pietrzak et al., 2012; L. Wang, Li, et al., 2011; L. Wang, Long, et al., 2011; L. Wang, Zhang, et al., 2011; M. Wang et al., 2012). Notably, the conclusion by Yufik and Simms (2010) that first-order factor models provide superior fit compared to second-order models challenges the long-held practice of creating a summative total-scale score to measure global PTSD symptom severity. Instead, these findings suggest that it is more appropriate to score and interpret PTSD symptoms at the level of individual subscale scores, and to treat the diagnostic construct of PTSD as a constellation of correlated but empirically and conceptually distinct symptom dimensions.

Our findings of convergent validity for the PTSD-RI also parallel those previously revealed with other PTSD assessment instruments. We examined the relationship between PTSD factors in the 5-factor Dysphoric Arousal model and TSCC scales. We found that emotional numbing was especially related to depression, and anxious arousal was especially related to anxiety. Recent work with other PTSD assessment measures in trauma-exposed adults has also found that the emotional numbing factor is more strongly related to external measures of depression compared to anxiety, while the opposite is true for the anxious arousal factor (L. Wang, Li, et al., 2011; L. Wang,

Long, et al., 2011). Thus, the PTSD-RI's convergent validity is consistent with previous findings. Additionally, we found that the TSCC posttraumatic stress scale was especially related to PTSD's reexperiencing and avoidance.

Unique to the present study is the assessment of PTSD factors in relation to anger. The dysphoric arousal factor of the PTSD-RI was most related to the TSCC anger subscale. One symptom of PTSD that loads onto the dysphoric arousal factor, however, is irritability/anger, suggesting the possibility of content contamination between predictor (anger) and criterion (dysphoric arousal) and artificial inflation of covariation as a result. The real problem is that irritability/anger was represented by two indicator variables on the dysphoric arousal factor, and thus half of dysphoric arousal's items comprised a construct conceptually similar to that of the TSCC anger scale. We found, however, that removing one of the dysphoric arousal's irritability items, while reducing the relationship with anger on the TSCC somewhat, did not substantially reduce this relationship. Furthermore, the contents of the two remaining symptoms of dysphoric arousal are not necessarily related to anger or aggression, instead tapping into sleep and concentration difficulties. Perhaps dysphoric arousal is distinct from both emotional numbing and anxious arousal in part because of its particularly strong relationship with anger and aggression, both of which have demonstrated substantial relations with PTSD (reviewed in McHugh, Forbes, Bates, Hopwood, & Creamer, 2012). Future research should continue to explore possible differential relations between aggression and anger as external criteria in relation to PTSD's underlying dimensions as a means of both further understanding the convergent validity of the PTSD-RI and in examining whether the various proposed dimensions of PTSD are meaningfully distinct from one another. Further work should also examine the factorial invariance of PTSD across age, gender, and racial groups.

The present study supplements that of Steinberg et al. (in press) in comprehensively establishing the psychometric properties of the PTSD-RI, specifically in validating the underlying symptom dimensions of PTSD with a treatment-seeking sample. Study limitations involve the exclusion of many subjects who were not administered the PTSD-RI, which may have resulted in a skewed subsample of subjects who responded to this measure, and thus nongeneralizable results (perhaps a more symptomatic or less symptomatic sample). Additionally, the data were used in aggregate, and findings across age groups were not examined. An additional limitation is our reliance on a multiscale measure (the TSCC) to create external indicators of psychopathology for convergent validation purposes, rather than using formal diagnoses and diagnostic constructs from a structured diagnostic interview, which could have produced a somewhat different pattern of intercorrelations. Additionally, participants were globally queried on PTSD symptoms, rather than queried specifically in response to an index trauma, a methodology that has been criticized (Elhai, Engdahl, et al., 2009); results may have been different (perhaps with less PTSD severity) had the more rigorous PTSD assess-

ment methodology been used. Finally, two of the PTSD factors included only two PTSD items each; new measures should be developed that include additional items in order to allow for an adequate number of item indicators per PTSD factor. Despite these limitations, the present study's ability to explore the structure of the PTSD-RI with a national clinic-referred sample of children and adolescents—especially such a large sample—provides important psychometric evidence supporting the use of this instrument.

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