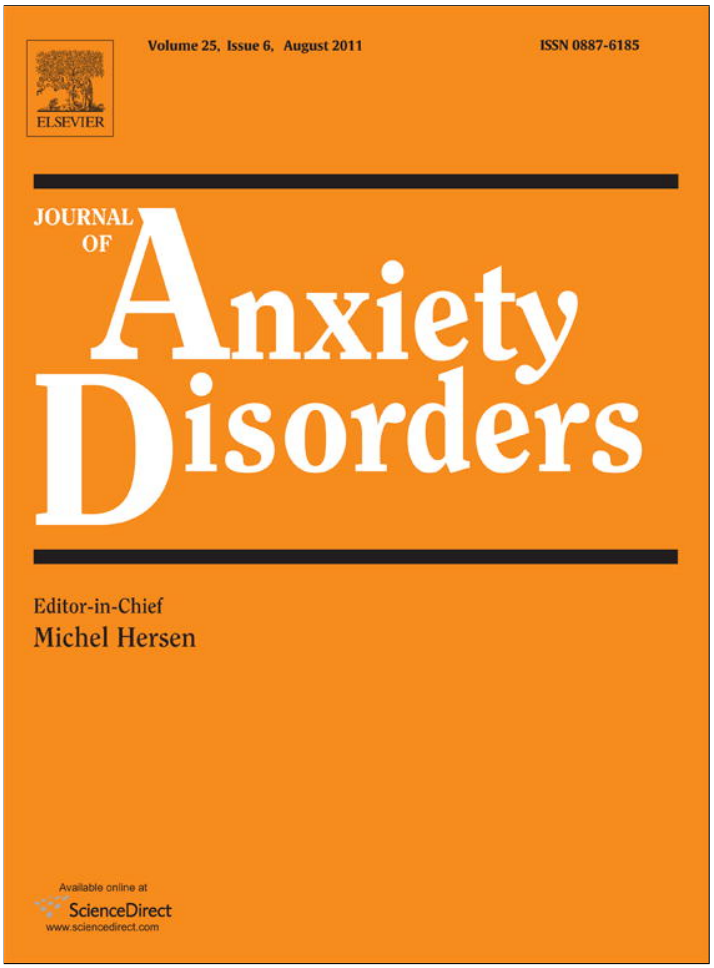

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Comparing alternative factor models of PTSD symptoms across earthquake victims and violent riot witnesses in China: Evidence for a five-factor model proposed by Elhai et al. (2011)

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ABSTRACT

The present study investigated the factor structure of posttraumatic stress disorder (PTSD) symptoms measured by the PTSD Checklist (PCL) in two large samples exposed to different traumatic events (an earthquake and a violent riot) from China. Despite the samples' difference in type of trauma, demographics, symptom severity, and elapsed time since trauma exposure, the results of a series of confirmatory factor analyses indicate that a five-factor intercorrelated model (intrusion, avoidance, numbing, dysphoric arousal, and anxious arousal) fit the data significantly better than the other alternative models including: the three-factor *DSM-IV* model, the four-factor numbing model (King et al., 1998), and the four-factor dysphoria model (Simms et al., 2002) in both samples. Implications and limitations regarding the results are discussed.

In the most recent revision of the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; *DSM-IV-TR*; American Psychiatric Association [APA], 2000), the criteria for posttraumatic stress disorder (PTSD) consist of 17 symptoms associated with reactions to a traumatic event. Based on expert consensus, these symptoms are grouped into three clusters: intrusion (Criterion B), effortful avoidance and emotional numbing (Criterion C), and hyperarousal (Criterion D). However, a growing body of findings from factor analytic studies suggests that the current tripartite diagnostic model does not adequately represent the latent structure of PTSD, and several alternative models have been proposed to account for PTSD symptoms appeared in various trauma-exposure populations (e.g., Elhai et al., 2011; King, Leskin, King, & Weathers, 1998; Lancaster, Melka, & Rodriguez, 2009; Rasmussen, Smith, & Keller, 2007; Simms, Watson, & Doebbeling, 2002; Smith, Redd, DuHamel, Vickberg, & Ricketts, 1999; Taylor, Kuch, Koch, Crockett, & Passey, 1998). We investigate a newly proposed, five-factor model in the present paper.

Among alternative PTSD models, two four-factor models have received extensive attention (see King, King, Orazem, & Palmieri, 2006; King et al., 2009). The first four-factor model was developed by King et al. (1998), namely the four-factor numbing model. In this model, intrusion and hyperarousal factors of the *DSM-IV* model were retained, while symptoms of avoidance and numbing were differentiated to create two separate factors. Using data from a sample of treatment-seeking male military veterans, King et al. (1998) found support for the four-factor numbing model based on results from confirmatory factor analysis (CFA). A number of subsequent CFA studies yield strong evidence for the model in populations exposed to various traumatic events (e.g., Armour et al., 2011; Elhai et al., 2009; Hoyt & Yeater, 2010; Kassam-Adams, Marsac, & Cirilli, 2010; Mansfield, Williams, Hourani, & Babeu, 2010; Naifeh, Elhai, Kashdan, & Grubaugh, 2008; Saul, Grant, & Carter, 2008; Wang, Dai, & Wan, 2009). The model hinges on differentiating avoidance and numbing, a distinction which has substantial empirical support. In fact, these two constructs have different relations with treatment course and outcome (e.g., Malta, Wyka, Giosan, Jayasinghe, & Difede, 2009; Taylor et al., 2003), and display distinct correlations with external psychological and behavioral variables (e.g., Milanak & Berenbaum, 2009; Naifeh et al., 2008; Palmieri, Weathers, Difede, & King, 2007), which provide support for the external validity of the four-factor numbing model.

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By extending a theoretical approach originally designed to explain comorbidity of depression and anxiety (e.g., Mineka, Watson, & Clark, 1998), Simms et al. (2002) developed an alternative PTSD model, namely the four-factor dysphoria model. In this model, numbing and three hyperarousal symptoms (i.e., sleep difficulty, irritability, and concentration problems) were reconceptualized as indicators of a general distress or dysphoria factor—involving symptoms that are common to several mood and anxiety disorders. The other three factors contained the original intrusion and avoidance factor of the four-factor numbing model, and a smaller hyperarousal factor indicated only by hypervigilance and exaggerated startle response. By analyzing data from a large sample of deployed and nondeployed Gulf War veterans using CFA, Simms et al. (2002) found that the alternative four-factor model fit the data better than the other five competing models, including the four-factor numbing model proposed by King et al. (1998). The four-factor dysphoria model also has found support in numerous subsequent CFA studies with samples from a range of trauma populations (e.g., Armour & Shevlin, 2010; Boelen, van den Hout, & van den Bout, 2008; Carragher, Mills, Slade, Teesson, & Silove, 2010; Elklit, Armour, & Shevlin, 2010; Elklit & Shevlin, 2007; Hetzel-Riggin, 2009; Naifeh, Richardson, Del Ben, & Elhai, 2010; Olff, Sijbrandij, Opmeer, Carlier, & Gersons, 2009).

Taken together, both the four-factor numbing and four-factor dysphoria models have gained strong empirical support. However, consensus has not yet emerged regarding the relative merits of the two models across the current literature. Recently, several researchers have attempted to clarify conditions and circumstances under which either the numbing model or dysphoria model would best capture the latent structure of PTSD. Palmieri, Weathers et al. (2007) found that the numbing model fit better with data from a clinician-rated PTSD scale, while the dysphoria model fit better with data from a self-report questionnaire. However, in a recent meta-analytic study, Yufik and Simms (2010) found that the dysphoria model generally fit better than the numbing model across measures. Furthermore, Elhai et al. (2009) used experimental and quasi-experimental designs and found that the dysphoria model fit best when instructing participants to rate their PTSD symptoms from a specific traumatic event, while the numbing model fit best when using global instructions without reference to an index trauma. Moreover, Armour et al. (2011) compared the two competing PTSD models in war-exposed Bosnian secondary students, and found that the numbing model fit better in those endorsing PTSD's criterion A2 (intense fear, helplessness, or horror), while both the two models fit poor in those not endorsing A2.

The two well-supported four-factor models only differ in placement of PTSD's D1–D3 symptoms (i.e., sleep difficulty, irritability, and concentration problems). Based on previous theoretical and empirical studies related to the factor structure of PTSD (e.g., Shevlin, McBride, Armour, & Adamson, 2009; Watson, 2005, 2009), Elhai et al. (2011) argued the D1–D3 symptoms differ conceptually from both hyperarousal and dysphoria symptoms, and specified a separate dysphoric arousal factor for these three symptoms. Therefore, the final model proposed by Elhai et al. (2011) comprised of five factors: intrusion, avoidance, numbing, dysphoric arousal, and anxious arousal. Using data from 252 women suffering from domestic violence, Elhai et al. (2011) found that the five-factor model provided a superior fit to both the four-factor numbing and four-factor dysphoria models. Given that most of the extant PTSD CFA studies either yielded evidence in favor of the four-factor numbing model or found support for the four-factor dysphoria model, the five-factor model has the important advantage of bringing mixed findings together, and improving the fit of PTSD's latent structure (Elhai et al., 2011).

Despite promising findings, the five-factor PTSD model was only recently developed, and validated in only a single, small sample exposed to domestic violence. Therefore, it needs to be subjected to further testing with larger samples from populations exposed to different traumatic events. In so doing, we compared competing PTSD models using CFA in two large Chinese samples exposed to different trauma events: the "Wenchuan Earthquake" and the "Urumqi Violent Riot" The PTSD symptoms were assessed with the 17-item PTSD Checklist (PCL; Weathers, Litz, Herman, Juska, & Keane, 1993), a widely used self-report measure in trauma-related research and practices.

1. Methods

1.1. Participants

1.1.1. Earthquake survivor sample (sample 1)

On May 12, 2008, southwest China experienced an earthquake measuring 8.0 on the Richter scale. During the earthquake, 69,227 people were killed, 374,643 injured, 17,923 listed as missing, and about 4.8 million left homeless. For the purpose of assessing disaster-related mental health needs, the sample was collected from a community whose inhabitants mainly came from Beichuan County Town. The Beichuan County Town was almost completely destroyed by the earthquake, and more than 6000 people (approximately 60% of the population) were killed there. The sample consisted of 1181 participants with a mean age of 47.3 years (SD = 15.5, range: 16–98). Of the participants, 602 (51%) were of the Han nationality, 530 (36.6%) were identified as Qiang, and 49 (4.1%) belonged to other sub-nationalities (including Tibetan, Hui, and Yi) in China. All participants personally experienced the earthquake. Other demographic characteristics are presented in Table 1.

1.1.2. Violent riot victim sample (Sample 2)

On July 5, 2009, a violent riot involving ethnic conflict occurred in Urumqi, the capital of Xinjiang Uygur Autonomous Regions in northwest China. During the riot, 197 people were killed, more than 1700 injured, and numerous automobiles and buildings were destroyed. For the purpose of assessing trauma-related mental health needs, the sample was collected from three communities affected seriously by the riot in Urumqi. The sample consisted of 1238 Han people with a mean age of 32.4 years (SD = 10.0, range: 18–89). Other demographic characteristics are presented in Table 1. All participants personally experienced the riot.

1.2. Measure

The PTSD Checklist-Specific Stressor Version (PCL-S; Weathers et al., 1993) is an easily administered self-report measure, and consists of 17 items which correspond directly to *DSM-IV* PTSD symptoms. Each item is rated on a five-point Likert scale using anchors ranging from one "*not at all*" to five "*extremely*," reflecting the extent to which the particular symptom bothers the respondent during the past month. The original version of the PCL has been demonstrated to have sound psychometric properties in various trauma populations (see McDonald & Calhoun, 2010; Norris & Hamblen, 2004; Orsillo, 2001). The Chinese version of the PCL was adapted by a stringent two-stage process of translation and back translation (Wu, Chan, & Yiu, 2008). Adequate levels of internal consistency (Cronbach's α above .77) have been previously reported for the total scale and three subscales (Wu et al., 2008; Yang, Yang, Liu, & Yang, 2007). The test–retest reliability (three weeks interval) was .84 for the total scale, and ranged from .76 to .82 for the three subscales (Wu et al., 2008). Convergent and discriminant validity have been demonstrated through associations with other PTSD measures including the Impact of Event Scale-Revised (IES-R;

Table 1
Demographic characteristics of the samples.

Variable	Sample 1 ($N = 1181$)		Sample 2 ($N = 1238$)		χ^2
	n	%	*n*	%	
Sex					1.88
Male	432	36.6	427	34.5	
Female	718	60.8	798	64.5	
Age group					439.31***
16–34	231	19.6	531	42.9	
35–54	576	48.8	631	51.0	
≥55	372	31.5	19	1.5	
Educational level					830.84***
Less than high school	518	43.9	124	10.0	
High school	618	52.3	443	35.8	
More than high school	24	2.0	629	50.8	
Marital status					35.48***
Married	795	67.3	654	52.8	
Single/divorced/separated/ widowed	351	29.7	486	39.3	

Note. Numbers within categories may not add up to the presented *N* for some variables due to missing values.
*** $p < 0.001$.

Weiss & Marmar, 1997) and the Clinician-administered Posttraumatic Stress Disorder Scale (CAPS; Blake et al., 1995), and the General Health Questionnaire-20 (GHQ-20; Goldberg, 1978) (Wu et al., 2008). In this study, Cronbach's α for the scale was .95 in sample 1, and .97 in sample 2. In the current study, participants of the two samples were instructed respectively to complete the PCL referring to the "Wenchuan Earthquake" or the "Urumqi Violent Riot."

1.3. Procedure

The two samples were recruited 14 months after the earthquake and three months after the violent riot, respectively. The investigators included trained clinical psychologists, psychiatrists, psychotherapists, and psychology graduate students. Before administering the self-report measure to the participants, investigators obtained verbal informed consent and introduced the aim and significance of the survey in detail.

1.4. Data analysis

Based on the most recent CFA studies on the factor structure of PTSD, we chose to test four competing models in the present study (see Table 2 for item mappings). These models included: the three-factor *DSM-IV* model (Model 1); the four-factor numbing model of King et al. (1998) (Model 2); the four-factor dysphoria model of Simms et al. (2002) (Model 3), and the five-factor model recently tested by Elhai et al. (2011) (Model 4). The CFA was conducted to test the competing models using Lisrel 8.72 (Jöreskog & Sörbom, 2005). In sample 1, there were 44 participants missing 1 PCL item data, 12 missing 2 data, 9 missing 3 data, 2 missing 4 data, and 1 missing 5 data. In sample 2, there were 109 participants missing 1 PCL item data, 15 missing 2 data, and 1 missing 3 data. For the missing data, we used all available PCL item responses to estimate missing values with maximum likelihood procedures.

Results of the preliminary normality test indicated that the data were not multivariate normally distributed, χ^2 (2, $N = 1181$) = 4954.18, $p < .001$ for sample 1, and χ^2 (2, $N = 1238$) = 10,936.10, $p < .001$ for sample 2. Therefore, the robust maximum likelihood method was used as an estimator, as it can yield the scaled Satorra-Bentler chi-square statistic (S-Bχ^2; Satorra & Bentler, 1988) and robust standard errors for more accurate parameter estimates that are robust to non-normality. In all of the CFA models estimated, error covariances were fixed to zero, and factors were permitted to correlate. Indices used to assess goodness-of-fit for the models included the root-mean square error of approximation (RMSEA; values ≤.08, acceptable fit, and ≤.06, excellent fit), the standardized root mean square residual (SRMR; values ≤.08, excellent fit), the comparative fit index (CFI; values ≥.90, acceptable fit, and ≥.95, excellent fit), the Tucker-Lewis index (TLI; values ≥.90, acceptable fit, and ≥.95, excellent fit) (Hu & Bentler, 1998; Hu & Bentler, 1999). As commented by Fan and Sivo (2009), examining differences in traditional goodness-of-fit indices is not an appropriate or accurate way for comparing nested models. Thus, we used the corrected scaled χ^2 difference test (Satorra & Bentler, 2001) to compared nested models (i.e., Model 1 vs. Model 2, Model 4; Model 4 vs. Model 2, Model 3). For comparing nonnested models (i.e., Model 1 vs. Model 3; Model 2 vs. Model 3), the Bayesian information criterion (BIC; Schwarz, 1978) was used. As suggested by Raftery (1995), a difference of 6–10 indicates strong support and a difference greater than 10 indicates very strong support for the model with the lower BIC value. The BIC is not included in LISREL 8.72 output, and was thus calculated separately using the following formula: BIC = S-B$\chi^2 + \ln(N) \times t$, where N = sample size and t = number of parameters estimated in the model.

Table 2
Item mapping for confirmatory factor analysis.

PCL Items	Model 1	Model 2	Model 3	Model 4
B1. Intrusive thoughts	I	I	I	I
B2. Nightmares	I	I	I	I
B3. Flashbacks	I	I	I	I
B4. Emotional reactivity	I	I	I	I
B5. Physical reactivity	I	I	I	I
C1. Avoidance of thoughts	A/N	A	A	A
C2. Avoidance of reminders	A/N	A	A	A
C3. Amnesia for aspects	A/N	N	D	N
C4. Loss of interest	A/N	N	D	N
C5. Feeling distant	A/N	N	D	N
C6. Feeling numb	A/N	N	D	N
C7. Foreshortened future	A/N	N	D	N
D1. Sleep disturbance	H	H	D	DA
D2. Irritability	H	H	D	DA
D3. Difficulty concentrating	H	H	D	DA
D4. Hypervigilance	H	H	H	AA
D5. Exaggerated startle	H	H	H	AA

Note. I = Intrusion; A/N = Avoidance/Numbing H = Hyperarousal; A = Avoidance; N = Numbing; D = Dysphoria; DA = Dysphoric Arousal; AA = Anxious Arousal. Model 1 = the three-factor *DSM-IV* model; Model 2 = the four-factor numbing model of King et al. (1998); Model 3 = the four-factor dysphoria model of Simms et al. (2002); Model 4 = the five-factor model of Elhai et al. (2011).

Table 3
Model goodness of fit indices.

Models	χ^2	S-Bχ^2	*df*	CFI	TLI	SRMR	RMSEA	RMSEA 90% CI	BIC
Sample 1 (N = 1181)									
Model 1	1373.76	867.55	116	.984	.982	.039	.074	.070–.079	1129.29
Model 2	870.18	553.32	113	.991	.989	.035	.058	.053–.062	836.28
Model 3	1233.84	794.52	113	.986	.983	.039	.072	.067–.076	1077.48
Model 4	713.16	454.12	109	.993	.991	.034	.052	.047–.057	765.38
Sample 2 (N = 1238)									
Model 1	2408.87	1253.12	116	.979	.976	.050	.089	.085–.094	1516.61
Model 2	1782.14	941.38	113	.985	.982	.044	.077	.073–.081	1226.23
Model 3	1200.14	639.30	113	.990	.989	.040	.061	.057–.066	924.15
Model 4	1070.03	573.47	109	.992	.990	.032	.059	.054–.064	886.81

Note. S-Bχ^2 = scaled Satorra-Bentler χ^2; CFI = Comparative fit index; TLI = Tucker-Lewis index; SRMR = Standardized root mean square residual; RMSEA = Root mean square error of approximation; CI = Confidence interval; BIC = Bayesian information criterion.

2. Results

2.1. Descriptive statistics

Detailed demographic data of the samples are presented in Table 1. There were significant differences between the samples in terms of age group, educational level, and marital status (all $ps < .001$). Regarding symptom severity of PTSD, the mean PCL score in sample 1 was 36.9 (SD = 13.7, range: 17–85) and in sample 2 was 29.1 (SD = 12.2, range: 17–85). There was a significant difference between the two samples regarding PCL scores, F (1, 2417) = 217.740, $p < .001$. On the basis of previous studies using civilian trauma victim samples in the United States (see McDonald & Calhoun, 2010) and using earthquake survivor samples in China (Li et al., 2010; Zhao et al., 2009), we used a clinical cutoff score of 44. Based on this criterion, 291 (24.6%) participants in sample 1 and 150 (12.1%) participants in sample 2 were identified as probable PTSD cases.

2.2. Confirmatory factor analyses

Goodness-of-fit indices for all competing PTSD models in sample 1 and sample 2 are summarized in Table 3. In sample 1, according to the above mentioned criteria, all models achieved acceptable fit. However, only Model 2 and Model 4 achieved excellent fit. In terms of nested models comparison (corrected scaled χ^2 difference test), Model 2 (the four-factor numbing model) and Model 4 (the five-factor model) each significantly improved on Model 1 (the three-factor *DSM-IV* model), and Model 4 significantly improved on both Model 2 and Model 3 (the four-factor dysphoria model) (see Table 4). Regarding nonnested models comparison, Model 3 fit better than Model 1 (ΔBIC = −51.81), and Model 2 fit better than Model 3 (ΔBIC = −241.20).

In sample 2, Model 2 and Model 3 achieved acceptable fit, while Model 4 achieved excellent fit. Regarding nested models comparison, Model 2 and Model 4 each significantly improved on Model 1, and Model 4 significantly improved on both Model 2 and Model 3 (see Table 4). With respect to nonnested models comparison, Model 3 fit better than both Model 1 (ΔBIC = −592.46) and Model 2 (ΔBIC = −302.46).

Table 4
Corrected scaled χ^2 difference test for comparing nested models.

Models	Δ corrected scaled χ^2 (*df*)	
	Sample 1	Sample 2
Model 1 vs. Model 2	252.82(3)	207.42(3)
Model 1 vs. Model 4	369.66(7)	478.04(7)
Model 2 vs. Model 4	96.13(4)	270.24(4)
Model 3 vs. Model 4	483.69(4)	59.48(4)

Note. All corrected scaled χ^2 differences are statistically significant ($p < .001$).

Taken together, Model 4 emerged as the best fitting model in both samples in this study. The standardized factor loadings and factor correlations of the five-factor PTSD model are presented in Table 5.

3. Discussion

In the present study, we compared four competing factor models of PTSD symptoms with CFA in two large Chinese samples suffering from different traumas. The results indicated that a five-factor intercorrelated model (intrusion, avoidance, numbing, dysphoric arousal, and anxious arousal) provided a superior fit to the data compared to the other alternative models (including the three-factor *DSM-IV* model and two well-supported four-factor models proposed by King et al., 1998 and Simms et al., 2002, respectively) in both samples. Our findings suggest that posttraumatic stress symptoms can be best represented by intrusion, avoidance, numbing, dysphoric arousal, and anxious arousal factors, and provide further empirical support for the recent reconceptualization of PTSD symptoms proposed by Elhai et al. (2011).

As mentioned earlier, most of recent studies on the factor structure of PTSD either found support for the four-factor numbing model (King et al., 1998), or yielded evidence in favor of the four-factor dysphoria model (Simms et al., 2002). In the present study, we also obtained mixed results that the numbing model fit better than the dysphoria model in the earthquake survivor sample, while the latter fit better than the former in the violent riot victim sample. According to several researchers (e.g., Naifeh et al., 2008; Palmieri, Marshall, & Schell (2007), mixed results may be due to differences in trauma type, demographics, symptom severity, and elapsed time since trauma exposure. The principal disagreement between the models is that PTSD's D1–D3 symptoms should be placed in hyperarousal cluster or dysphoria cluster. When a five-factor model in which these three symptoms were treated as a separate factor was included in comparison, we found that this model fit significantly better than both the numbing model and the dysphoria model across samples. The findings suggest that the five-factor solution can best capture the latent structure of PTSD symptoms appeared in the present samples, and support the idea that PTSD's D1–D3 symptoms may represent a unique latent construct which differs from both hyperarousal and dysphoria symptoms. Considering our utilization of two large samples varying in type of trauma exposed, demographics (including age group, educational level, and marital status), symptom severity, and elapsed time since trauma exposure, the systematic replication yields additional strong evidence in favor of the five dimensional conceptualization of PTSD proposed by Elhai et al. (2011). Moreover, from a cross-cultural perspective, our findings are also welcoming as they are consistent with previous United States data (Elhai et al., 2011). The culturally robust findings provide additional support for the five-factor PTSD model.

Table 5
Standardized factor loadings and factor correlations for the five-factor PTSD model.

	Sample 1 (N = 1181)					Sample 2 (N = 1238)				
	I	A	N	DA	AA	I	A	N	DA	AA
B1. Intrusive thoughts	.74					.77				
B2. Nightmares	.78					.79				
B3. Flashbacks	.81					.81				
B4. Emotional reactivity	.83					.79				
B5. Physical reactivity	.80					.80				
C1. Avoidance of thoughts		.85					.83			
C2. Avoidance of reminders		.89					.91			
C3. Amnesia for aspects			.72					.68		
C4. Loss of interest			.76					.81		
C5. Feeling distant			.81					.79		
C6. Feeling numb			.80					.77		
C7. Foreshortened future			.80					.79		
D1. Sleep disturbance				.76					.84	
D2. Irritability				.83					.88	
D3.Difficulty concentrating				.86					.87	
D4. Hypervigilance					.90					.89
D5. Exaggerated startle					.89					.93
Factor correlations										
A	.73					.78				
N	.77	.76				.84	.75			
DA	.77	.72	.85			.84	.72	.93		
AA	.77	.68	.78	.91		.82	.62	.79	.82	

Note. I = Intrusion; A = Avoidance; N = Numbing; DA = Dysphoric Arousal; AA = Anxious Arousal. All factor loadings and correlations are statistically significant (p < .01).

The new validated five-factor PTSD model has considerable clinical implications. As highlighted by Elhai et al. (2011), the model has a potential advantage in bringing together mixed findings typically transpiring in modern PTSD CFA studies, and covering the gap between the well-supported four-factor numbing and dysphoria models. Considering the upcoming *DSM-5*, the empirically supported five-factor model may help to organize clinically useful diagnostic criteria that can guide the development of accurate and valid assessment and diagnostic procedures. Furthermore, the five-factor PTSD model may also have implications in specifying the functional relationship among differentiable symptom clusters. For example, as reported in previous longitudinal studies (e.g., Marshall, Schell, Glynn, & Shetty, 2006; Schell, Marshall, & Jaycox, 2004), it was the hyperarousal factor defined in the *DSM-IV* model or the four-factor numbing model, but not any other PTSD factors, shaping subsequent manifestation of posttraumatic psychological distress. Given the empirically-based distinction between dysphoric arousal and anxious arousal, by identifying the roles of specific arousal constructs in the natural course of PTSD symptoms, further research might be fruitful. Findings from these studies can contribute to a better understanding of the pathogenesis and nature of PTSD, and guide structuring and monitoring treatment interventions more effectively.

This study has several limitations. First, considering that the types of trauma and culture may have important effects on traumatic responses in victims (Hinton & Lewis-Fernández, in press; Kelley, Weathers, McDevitt-Murphy, Eakin, & Flood, 2009; Marsella & Christopher, 2004), the generalizability of our findings may be somewhat limited. Further studies should test the findings with samples from a range of trauma populations in different cultural contexts. Second, the findings are also limited by using a self-report instrument to assess PTSD symptoms. As reported by Palmieri, Weathers et al. (2007) the specific response modality (self-report or clinician-rated) may moderate PTSD's factor structure findings. Thus, our findings also need to be tested using data from clinician-rated PTSD measures (e.g., CAPS) in future studies. Third, a common criticism of PTSD CFA studies yielding support for the emotional numbing or dysphoria model is that only two indicators are used to tap the avoidance and hyperarousal factors (e.g., Palmieri, Marshall et al., 2007; Palmieri, Weathers et al., 2007). This criticism also applies to the newly proposed five-factor model, since two indicators are employed to tap avoidance and anxious arousal factors. It is an inherent problem faced by all PTSD CFA studies with measures whose items correspond directly to the *DSM-IV* symptoms. To improve the stability of factor solutions, future studies should include additional avoidance and anxious arousal items. Finally, the present study relied exclusively on the internal fit of alternative models. As commented by several researchers (e.g., Miller et al., 2010), a diagnostic model cannot be validated using internal fit statistics alone. Therefore, further studies on the factor structure of PTSD should give a greater emphasis on the external psychological, biological, and behavioral correlates of competing models.

Despite the limitations, by analyzing data from two large Chinese samples varying in type of trauma exposed, demographics, symptom severity, and elapsed time since trauma exposure, the present study found that compared with the well-supported four-factor numbing and dysphoria models, an alternative five-factor PTSD model (intrusion, avoidance, numbing, dysphoric arousal, and anxious arousal) recently proposed by Elhai et al. (2011) can better capture the latent structure of PTSD symptoms. The findings extend knowledge of the structure of PTSD symptoms, and may help to clarify mixed results from PTSD CFA studies. Moreover, considering that most of extant studies on the structure of PTSD symptoms were all conducted in the western world, the present study also contributes to limited literature regarding the cross-cultural validity of existing structural models of PTSD.

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