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Abstract

The Clinician-Administered PTSD Scale (CAPS) is a widely used diagnostic interview for posttraumatic stress disorder (PTSD). Following fundamental modifications in the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (*DSM-5*), the CAPS had to be revised. This study examined the psychometric properties (internal consistency, interrater reliability, convergent and discriminant validity, and structural validity) of the German version of the CAPS-5 in a trauma-exposed sample (n = 223 with PTSD; n =51 without PTSD). The results demonstrated high internal consistency (αs = .65-.93) and high interrater reliability (ICCs = .81-.89). With regard to convergent and discriminant validity, we found high correlations between the CAPS severity score and both the Posttraumatic Diagnostic Scale sum score (r = .87) and the Beck Depression Inventory total score (r = .72). Regarding the underlying factor structure, the hybrid model demonstrated the best fit, followed by the anhedonia model. However, we encountered some nonpositive estimates for the correlations of the latent variables (factors) for both models. The model with the best fit without methodological problems was the externalizing behaviors model, but the results also supported the *DSM-5* model. Overall, the results demonstrate that the German version of the CAPS-5 is a psychometrically sound measure.

Keywords

Clinician-Administered PTSD Scale, posttraumatic stress disorder, assessment, *DSM-5*, structured interview, psychometric properties

With the introduction of the new edition of the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (*DSM-5*; American Psychiatric Association [APA], 2013) in 2013, the diagnostic criteria for posttraumatic stress disorder (PTSD) underwent some important changes that required an adaption of the existing diagnostic measures, including the Clinician-Administered PTSD Scale (CAPS).

The CAPS was developed to improve the reliability and validity of the assessment of PTSD diagnosis and severity (Blake et al., 1995). Today, it is the gold standard in PTSD research for diagnosing the disorder and measuring its severity (Weathers, Keane, & Davidson, 2001). The CAPS has several strengths. First, it can be used to determine whether a diagnosis is present and to measure symptom severity. Second, it considers the frequency and intensity of all *DSM* PTSD symptoms and permits the severity of the different PTSD symptom clusters to be determined separately. Finally, it provides a high level of standardization through carefully phrased prompt questions and clear anchors for the rating scales (Weathers et al., 2001). The CAPS for the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (*DSM-IV*; APA, 1994) demonstrated excellent psychometric properties, with an internal consistency of α = .94 for the total score (Blake et al., 1995), test–retest reliability ranging from .90 to .98 (Blake et al., 1995), strong convergent and discriminant validity, good diagnostic utility, and sensitivity

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to clinical changes (Weathers et al., 2001), which is particularly important for treatment studies. The CAPS for *DSM-IV* was validated in different non-English versions (e.g., Charney & Keane, 2007; Hinton et al., 2006; Paunović & Öst, 2005). The German version showed strong convergent validity and an internal consistency comparable to that of the English version (Schnyder & Moergeli, 2002).

In the *DSM-IV*, PTSD comprises three symptom clusters ("reexperiencing," "avoidance and numbing," and "hyperarousal") based on a total of 17 symptoms (APA, 1994). As this structure, independent of measures and samples, received little empirical support and because a meta-analysis demonstrated that it could not reasonably represent the underlying dimensions of PTSD (Elhai & Palmieri, 2011; Yufik & Simms, 2010), it was replaced in the *DSM-5*. The new *DSM-5* criteria comprise the following clusters: "reexperiencing" (Criterion B), "avoidance" (Criterion C), "negative alterations in cognitions and mood" (Criterion D), and "alterations in arousal and reactivity" (Criterion E), which are composed of a total of 20 symptoms. The new cluster "negative alterations in cognitions and mood" includes new symptoms of blame of self or others for the trauma or its consequences, and persistent negative emotions such as guilt, shame, and anger. Furthermore, the "hyperarousal" cluster was renamed "alterations in arousal and reactivity" and now includes symptoms of reckless and self-destructive behavior such as risk-taking and suicidal behavior (Friedman, 2013).

These modifications required an adaptation of the CAPS. The CAPS for *DSM-5* (CAPS-5; Weathers et al., 2013) was adapted to the newly included symptoms and assesses the severity of the 20 *DSM-5* PTSD symptoms over the past month. In addition to including the new *DSM-5* symptoms, some further changes in comparison with the CAPS for *DSM-IV* (CAPS-IV; Blake et al., 1995) were made (Weathers et al., 2017). One of the changes is that the CAPS-5 requires the identification of a single index trauma as the basis of symptom inquiry, whereas the CAPS-IV allowed the assessment of symptoms in relation to up to three traumatic events. Furthermore, the frequency and intensity of the symptoms are no longer measured separately, as the scale includes only one severity rating for each symptom. Nevertheless, symptom frequency *and* intensity are still assessed and considered when determining the severity score (Weathers et al., 2017). Additionally, questions to assess the new dissociative subtype of PTSD (depersonalization and derealization) are included. In the first validation study with a veteran sample, the CAPS-5 total severity score demonstrated high internal consistency ($\alpha = .88$), high interrater reliability (intraclass correlation coefficient [ICC] = .91) and good test–retest reliability (ICC = .78; Weathers et al., 2017). Furthermore, a strong correspondence with the PTSD diagnoses based on the CAPS-IV as well as good convergent and discriminant validity were also found (Weathers et al., 2017).

As the *DSM-IV* model did not confirm structural validity, several competing models related to the underlying factor structure of PTSD were proposed during the time period of the *DMS-IV*. Since these models are still relevant, they will be described in the following. The model that most closely resembles the *DSM-5* model (Friedman, Resick, Bryant, & Brewin, 2011) is the four-factor emotional numbing model, which has demonstrated better fit than the three-factor *DSM-IV* model (Benuto, Olmo-Terrasa, & Reyes-Rabanillo, 2011). The four-factor emotional numbing model includes the *DSM-IV* "reexperiencing" and "hyperarousal" criteria and splits the *DSM-IV* avoidance criterion into "effortful avoidance" and "emotional numbing" (King, Leskin, King, & Weathers, 1998). Another prominent four-factor model, which was developed based on factor analytic investigations of the *DSM-IV* PTSD symptoms, is the dysphoria model, which comprises the factors "reexperiencing," "avoidance," "dysphoria," and "hyperarousal" (Simms, Watson, & Doebbelling, 2002). In this model, all symptoms representing general distress are integrated into one large dysphoria factor (Simms et al., 2002). In addition, a five-factor dysphoric arousal model was proposed. This model combines the characteristics of the emotional numbing and the dysphoria models by splitting the *DSM-IV* hyperarousal symptom cluster into dysphoric and anxious arousal (Elhai et al., 2011).

Since the introduction of the *DSM-5*, several alternative models reflecting the *DSM-5* PTSD criteria have also been proposed, including the *DSM-5* version of the four-factor dysphoria model and a *DSM-5* version of the five-factor dysphoric arousal model (Armour, Műllerová, & Elhai, 2016). Furthermore, three new models have been proposed: the six-factor anhedonia model (Liu et al., 2014), the six-factor externalizing behaviors model (Tsai et al., 2015), and the seven-factor hybrid model (Armour et al., 2015). Table 1 gives an overview of the competing *DSM-5* models. The six-factor anhedonia model extends the dysphoric arousal model by further dividing the cluster "negative alterations in cognition and mood" into symptoms that involve enhanced negative affect and those that involve reduced positive affect (Liu et al., 2014). The six-factor externalizing behaviors model is also based on the dysphoric arousal model; it keeps the separation of anxious and dysphoric arousal but further distinguishes an "externalization behaviors" cluster that consists of the new *DSM-5* symptoms "irritability or anger" and "reckless behavior" (Tsai et al., 2015). The seven-factor hybrid model combines the features of the six-factor anhedonia model and the six-factor externalizing Behaviors model (Armour et al., 2015). Recently, a number of studies have provided evidence that the seven-factor hybrid model has a better fit than the other models (e.g., Armour, Contractor, Shea, Elhai, & Pietrzak, 2016; Mordeno, Nalipay, Sy, & Luzano, 2016; Wang et al., 2015; Weathers et al., 2017). However, with the exception of the CAPS-5 validation study by Weathers et al. (2017),

Table 1. Overview of the *DSM-5* Model and Competing Models.

PTSD symptoms (*DSM-5*)	*DSM-5* model	Dysphoria model	Dysphoric arousal model	Anhedonia model	Externalizing behaviors model	Hybrid model
1. Intrusive memories	R	R	R	R	R	R
2. Nightmares	R	R	R	R	R	R
3. Flashbacks	R	R	R	R	R	R
4. Emotional cue reactivity	R	R	R	R	R	R
5. Psychical cue reactivity	R	R	R	R	R	R
6. Avoidance of thoughts	AV	AV	AV	AV	AV	AV
7. Avoidance of reminders	AV	AV	AV	AV	AV	AV
8. Memory impairment	NACM	D	NACM	NA	NACM	NA
9. Negative beliefs	NACM	D	NACM	NA	NACM	NA
10. Blame of self or others	NACM	D	NACM	NA	NACM	NA
11. Negative trauma-related emotions	NACM	D	NACM	NA	NACM	NA
12. Lack of interest	NACM	D	NACM	AN	NACM	AN
13. Detachment	NACM	D	NACM	AN	NACM	AN
14. Inability to experience positive emotions	NACM	D	NACM	AN	NACM	AN
15. Irritability/anger	AAR	D	DA	DA	EB	EB
16. Reckless behavior	AAR	D	DA	DA	EB	EB
17. Hypervigilance	AAR	AAR	AA	AA	AA	AA
18. Exaggerated startle response	AAR	AAR	AA	AA	AA	AA
19. Difficulty concentrating	AAR	D	DA	DA	DA	DA
20. Difficulty sleeping	AAR	D	DA	DA	DA	DA

Note. DSM-5 = Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition; PTSD = posttraumatic stress disorder; R = reexperiencing; AV = avoidance; NACM = negative alterations in cognition and mood; D = dysphoria; NA = negative affect; AN = anhedonia; AAR = alterations in arousal and reactivity; DA = dysphoric arousal; EB = externalizing behavior; AA = anxious arousal.

most other studies that analyzed the fit of the *DSM-5* four-factor model and the proposed alternative models used self-report data, and most of them were based on the PTSD Checklist for the *DSM-5* (Armour, Contractor, et al., 2016; Armour et al., 2015 Mordeno et al., 2016; Wortmann et al., 2016), which assesses the 20 *DSM-5* PTSD symptoms via self-rating.

The first aim of the present study was to develop a German version of the CAPS-5 and to assess its psychometric properties. Based on the findings regarding the English version (Weathers et al., 2017), we hypothesized that the German translation would demonstrate good internal consistency, good interrater reliability, and good convergent and discriminant validity. Our second aim was to test the fit of the *DSM-5* model in comparison with the competing models described above.

Method

Participants and Procedure

Part of the data (Sample 1) was derived from a multicenter randomized controlled trial (RELEASE study: Treating Psychosocial and Neural Consequences of Childhood Interpersonal Violence in Adults; German Clinical Trials Registration ID: DRKS00006095), which compares dialectical behavior therapy for PTSD (Bohus et al., 2013; Steil, Dyer, Priebe, Kleindienst, & Bohus, 2011) and cognitive processing therapy (Resick et al., 2008) as two treatments for adult women with PTSD and borderline personality disorder (BPD) symptomatology after sexual and/or physical abuse before the age of 18 years. The analyses additionally comprised the data of a second sample that had participated in a study on emotion recognition and posttraumatic stress at the University of Zurich (Sample 2). Sample 1, which consists of women with PTSD after childhood physical and/or sexual abuse, was combined with Sample 2 with the aim to increase the sample size as well as to be able to include participants (males and females) of varying symptom severity who had been exposed to other types of traumatic events, for example, accidents or violence in adulthood, and who did not necessarily suffer from PTSD (see the inclusion criteria).

The inclusion criteria for Sample 1 were a PTSD diagnosis according to *DSM-5*, related to physical and/or sexual abuse before the age of 18 years; at least three criteria of BPD according to *DSM-IV* (APA, 1994), including emotional instability; age between 18 and 65 years; and female gender. The inclusion criteria for Sample 2 were age

between 18 and 65 years, the experience of a traumatic event according to *DSM-5*, normal or corrected-to-normal vision and native or equivalent German proficiency. (A PTSD diagnosis was *not* required.)

The exclusion criteria for Sample 1 were a lifetime diagnosis of schizophrenia or bipolar I disorder according to *DSM-IV*, current pregnancy, mental retardation (IQ <70), or severe conditions (e.g., a suicide attempt in the past 2 months, current substance dependence, or a body mass index <16.5) requiring another intervention prior to the treatment of PTSD. The exclusion criteria for Sample 2 were acute suicidality, medication with strong effects on the autonomic nervous system, and major somatic illness.

Before being included in Sample 1, patients participated in three assessment sessions to establish Axis-I diagnoses and BPD symptomatology and to check for the inclusion and exclusion criteria. In the third session, the CAPS-5 interview was administered. Between these sessions, participants were asked to fill out self-report questionnaires, including those used for the present study. Participants in sample 2 were screened for inclusion and exclusion criteria as well as for trauma exposure by means of a phone interview. They then participated in an interview to confirm the phone-reported trauma history and to establish Axis-I diagnoses. In the same assessment session, the CAPS-5 interview was administered. Personality disorders were not assessed in Sample 2.

The CAPS interviews were conducted by clinical psychologists (Sample 1) and master's students (Sample 2) who had participated in a 1-day training workshop and were supervised during the studies by experienced cognitive behavior therapists. To determine the interrater reliability, two different procedures were applied. All seven raters of the RELEASE study (Sample 1) watched 2 videotapes that were randomly selected from 12 videotapes of assessments that were tape-recorded at the beginning of Study 1. Additionally, a second rater selected from all raters in this study watched the 12 videotapes. In both cases, the raters were asked to assess the respective CAPS-5 total severity score, which was the unit of analysis for determining interrater reliability.

Study 1 was approved by the ethics committee of Goethe University, Humboldt University, and Mannheim University. Study 2 was approved by the Cantonal Ethics Committee of Zurich. All subjects gave written informed consent in accordance with the Declaration of Helsinki.

Measures

Axis-I diagnoses were assessed using the *Structured Clinical Interview for DSM-IV* (SCID-I; German version: Wittchen, Wunderlich, Gruschwitz, & Zaudig, 1997) in Sample 1 and by the *Mini International Neuropsychiatric Interview* (MINI; German version: Ackenheil, Stotz-Ingenlath, Dietz-Bauer, & Vossen, 1999) in Sample 2. Due to a lack of German *DSM-5*–based structured clinical interviews at the beginning of Studies 1 and 2, we had to assess Axis-I diagnoses according to *DSM-IV*. In Sample 1, the borderline section of the *International Personality Disorder Examination* (IPDE) was used to assess BPD criteria (Loranger et al., 1994).

In Sample 1, trauma exposure was measured by the *Life Events Checklist* (LEC-5; Weathers et al., 2013), a self-report measure that assesses exposure to 17 traumatic events. In Sample 2, trauma exposure was measured by the *Posttraumatic Diagnostic Scale* (PDS), Part 1, which assesses exposure to 12 traumatic events (Foa, 1995; German version: Ehlers, Steil, Winter, & Foa, 1996) and was administered as a phone interview.

In both samples, the *Childhood Trauma Questionnaire* (CTQ; Bernstein & Fink, 1998) was used to assess the severity of abuse and neglect during childhood and adolescence. The CTQ consists of 28 items that assess the frequency of the following forms of maltreatment: emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect. Responses are given on 5-point scale ranging from 1 (*never*) to 5 (*very often*). The CTQ total score ranges from 25 to 125, and the five subscale scores range from 5 to 25. Three items belong to a Minimization-Denial subscale.

The CAPS-5 (Weathers et al., 2013; German version: Schnyder, 2013) assesses the severity of 20 symptoms over the past 4 weeks in relation to the index trauma. Symptoms are assessed on a 5-point scale ranging from 0 (*no impairment*) to 4 (*extreme impairment*). A symptom is considered present and accordingly counts toward a PTSD diagnosis if its severity rating is 2 or higher. Furthermore, questions refer to the onset and duration of symptoms, subjective distress, social and occupational functioning, and overall PTSD severity. In addition to establishing a PTSD diagnosis, the CAPS-5 interview permits the identification of a dissociative subtype (depersonalization and derealization). The total score, with a maximum of 80, gives an indication of clinical severity. Symptom cluster severity scores can be calculated by summing the individual item severity scores for the four criteria (B-E). The *DSM-5* version of the CAPS (Weathers et al., 2013) was translated into German by Ulrich Schnyder and then back-translated by a psychologist who is experienced in psychiatric epidemiology, is a native English speaker and lived in German-speaking countries for several years. Only a few adjustments had to be made after the back-translation. In the present studies, traumatic events were identified with the LEC (Sample 1) or the PDS, Part 1 (Sample 2). The symptom assessment then referred to the currently most distressing event or several events in the same context, for example, sexual abuse by the father (index trauma).

In Sample 2, the PDS, Part 3 (Foa, 1995; German Version: Ehlers et al., 1996), was administered to all participants. The German version of the PDS is a reliable and

valid instrument for the assessment of PTSD symptoms (Griesel, Wessa, & Flor, 2006). During the data collection, the PDS for *DSM-5* were not yet available; therefore, a modified version of the PDS was created by adding five items and deleting three items (resulting in 20 items) to cover the items introduced for PTSD diagnosis in the *DSM-5*. Items are rated 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*). The total severity score ranges from 0 to 60.

In both samples, the Beck Depression Inventory–II (BDI-II; Beck, Steer, & Brown, 1996; German version: Hautzinger, Keller, & Kühner, 2006) was administered to all participants. The BDI is a 21-item questionnaire that measures depressive symptoms over the past 2 weeks. Answers are given on a 4-point scale with at least four possible answer choices that increase in intensity. The sum score ranges from 0 to 63. The German version of the BDI is a reliable and valid measure for depression (Hautzinger et al., 2006).

Data Analysis

Analyses were performed using SPSS 22 and M*plus* (Version 6.1; Muthén & Muthén, 2010). The amount of missing data in the CAPS was very low (<0.1%). Single missing values were substituted with multiple imputations, which in SPSS are based on a Markov Chain Monte Carlo algorithm (Little & Rubin, 2002).

First, we analyzed the internal consistency. To determine interrater reliability, ICCs were determined for the CAPS-5 total severity score using $ICC_{(1,1)}$ for the ratings made by all seven raters and $ICC_{(2,1)}$ for the ratings made by the second rater (Shrout & Fleiss, 1979). ICCs exceeding 0.75 were considered good (Porteney & Watkins, 2008).

Then, we examined convergent validity by calculating the Pearson correlation coefficients between the CAPS total score and the PDS total score as well as between the respective subscales. To test for discriminant validity, we analyzed the association between CAPS and BDI-II scores. Correlations were interpreted according to Cohen's (1988) convention of small ($r \geq .10$), medium ($r \geq .30$), and large ($r \geq .50$).

Finally, to test for the fit of the different models for the PTSD symptom structure, confirmatory factor analyses (CFAs) were conducted using the maximum likelihood estimator with robust standard errors (MLRs). Items were specified to load on only one factor, factors were allowed to correlate, and error covariances were fixed to zero. Goodness of fit was evaluated according to the Satorra–Bentler χ^2 value, degrees of freedom (*df*), the χ^2/df ratio, the root mean square error of approximation (RMSEA) and its 90% confidence interval (CI), the comparative fit index (CFI), the Tucker–Lewis index (TLI), and the standardized root mean square residual (SRMR). We followed generally accepted standards concerning model fit (Schermelleh-Engel, Moosbrugger, & Müller, 2003): values between 0 and 2 for the χ^2/df ratio indicate a good model fit, and values between 2 and 3 indicate only an acceptable fit. RMSEA values ≤ 0.06, 90% CI ≤ 0.06, CFI and TLI ≥ 0.95, and SRMR values ≤ 0.08 indicate an excellent fit (Hu & Bentler, 1999). Multiple indices were used because they provide different information regarding model fit and together allow a more conservative and reliable evaluation of the solutions (Brown, 2015).

To further compare the models, we used the Satorra–Bentler χ^2 difference test (Satorra & Bentler, 2001) for nested models and the Bayesian information criteria (BIC). Lower BIC values indicate a better model fit. A 6- to 10-point difference provides strong support for the model with the lower BIC and a difference of more than 10 points provides very strong support for this model (Raftery, 1995).

An additional exploratory factor analysis can be found in the online supplementary material.

Results

Descriptive Statistics

The sample included 174 participants from Study 1 and 100 from Study 2. In total, 244 women and 30 men, with an average age of 36.31 years (*SD* = 11.59; range 18-65 years), participated in the present study. They had received an average of 11.3 years (*SD* = 2.52; range 8-18 years) of education (including primary school, secondary school, and university).

The average number of *DSM-IV* Axis-I disorders was 2.45 (*SD* = 1.65; range 0-7), and 81.4% (*n* = 223) of the sample met the diagnostic criteria for PTSD. Of these patients, 53.8% (*n* = 120) suffered from the dissociative subtype, according to the CAPS-5, and reported at least moderate symptoms of depersonalization (42.6%) and/or derealization (39.0%). The most frequent Axis-I diagnoses in addition to PTSD were affective disorders (58.4%) and anxiety disorders (49.6%). Moreover, 18.6% did not suffer from any *DSM-IV* Axis-I disorder, and 31% suffered from BPD (measured only in Sample 1).

The mean CAPS severity score was 34.69 (*SD* = 15.86; range: 0-70) in the whole sample (*n* = 274; Sample 1: *M* = 40.99, *SD* = 9.79; Sample 2: *M* = 23.71; *SD* = 18.27). The most frequently reported index trauma was childhood sexual abuse (54.4%; *n* = 149), followed by childhood physical abuse (20.8%; *n* = 57) and then accidents (9.1%, *n* = 25). The average number of traumatic event types experienced in Sample 1, as reported in the LEC, was 6.81 (*SD* = 2.76, range 1-15). In Sample 2, the average number of traumatic event types experienced, as measured with Part 1 of the PDS, was 2.46 (*SD* = 1.29; range 1-7). The mean CTQ scores for the whole sample were 15.99, *SD* = 6.95 (emotional abuse); 11.20, *SD* = 6.04 (physical abuse); 14.04, *SD* = 7.50 (sexual

Table 2. Internal Consistencies and Item Correlations of the Clinician-Administered PTSD Scale.

	Cronbach's α	Item–total correlations	Interitem correlations
Reexperiencing	.82	.69-.82	.35-.69
Avoidance	.65	.85-.88	.49
Alterations in cognition and mood	.85	.55-.81	.16-.68
Alterations in arousal and reactivity	.70	.44-.77	.12-49
Total score	.93	.37-.81	.10-.69

Table 3. Model Fit Indices.

	χ^2	*df*	χ^2/df	RMSEA	RMSEA 90% CI	CFI	TLI	SRMR	BIC
DSM-5 model	255.281	164	1.557	0.045	[0.034, 0.056]	0.956	0.949	0.042	15753.851
Dysphoria model	262.073	164	1.598	0.047	[0.036, 0.057]	0.952	0.945	0.043	15762.388
Dysphoric arousal model	246.144	160	1.538	0.044	[0.033, 0.055]	0.958	0.950	0.041	15766.110
Anhedonia model	215.582	155	1.390	0.038	[0.025, 0.049]	0.971	0.964	0.039	15757.029
Externalizing behaviors model	226.397	155	1.461	0.041	[0.029, 0.052]	0.965	0.957	0.040	15771.651
Hybrid model	192.629	149	1.293	0.033	[0.017, 0.045]	0.979	0.973	0.037	15764.904

Note. χ^2 = Satorra–Bentler chi-square; *df* = degrees of freedom; RMSEA = root mean square error of approximation; CI = confidence interval; CFI = comparative fit index; TLI = Tucker–Lewis index; SRMR = standardized root mean square residual; BIC = Bayesian information criteria; *DSM-5* = *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*.

abuse); 17.58, *SD* = 5.65 (emotional neglect); and 10.61, *SD* = 4.23 (physical neglect), reflecting moderate to severe levels in all assessed forms of maltreatment (Häuser, Schmutzer, Brähler, & Glaesmer, 2011).

An average PDS sum score of 23.11 (*SD* = 14.79) was found for sample 2. The mean BDI-II total scores (whole sample) were in a clinically relevant range (*M* = 27.77; *SD* = 14.91).

Reliability

The internal consistency for the CAPS total score was α = .93. Cronbach's alpha for the subscales ranged from .65 to .85 (see Table 2). Item–total correlations and interitem correlations for the total scale and the subscales are displayed in Table 2. The lowest item–total correlation was found for reckless behavior (.44). Interitem correlations below the recommended range of .15 to .50 (Clark & Watson, 1995) were found between reckless behavior and hypervigilance (.13), reckless behavior and exaggerated startle response (.13), and reckless behavior and concentration difficulties (.12).

Interrater reliability regarding the total severity score was high for the ratings made by all seven raters with respect to the two videotapes, $ICC_{(1,1)} = .81$, as well as for the ratings made by the second rater with respect to 12 videotapes, $ICC_{(2,1)} = .89$.

Convergent and Discriminant Validity

The CAPS-5 total severity score and the PDS sum score (Sample 2) were highly correlated ($r = .87$; $p < .01$), indicating good convergent validity. The corresponding subscales also showed highly significant, large correlations (reexperiencing: $r = .75$; $p < .01$; avoidance: $r = .69$; $p < .01$; alterations in cognition and mood: $r = .77$; $p < .01$; alterations in arousal and reactivity: $r = .84$; $p < .01$). The correlation between the CAPS-5 severity score and the BDI-II score (Samples 1 and 2) was also large ($r = .72$; $p < .01$).

Confirmatory Factor Analysis

Table 3 shows the goodness-of-fit indices of the six models. For the anhedonia model and the hybrid model, we encountered some linear dependencies between the latent variables (see Brown, 2015; Wothke, 1993) that resulted in a nonpositive definite latent variable correlation matrix. Nevertheless, as the input matrix was positive definite and the iterations terminated normally, these models can be interpreted and the goodness-of-fit indices are reported in Table 3. All six models based on the goodness-of-fit indices yielded a good to excellent fit.

χ^2 difference tests for nested models (see Table 4) revealed that the anhedonia model (Model 4), the externalizing behaviors model (Model 5), and the hybrid model (Model 6) provided a better fit than the *DSM-5* model (Model 1). Nevertheless, the *DSM-5* model was not outperformed by the dysphoric arousal model (Model 3). The *DSM-5* model and the dysphoria model (Model 2) could not be compared with χ^2 difference tests because these models are not nested. However, the BIC difference of 8.54 indicates a better fit of the *DSM-5* model. Furthermore, all other models also provided better fit than the dysphoria model.

Table 4. Results of the Satorra–Bentler χ^2 Difference Tests Comparing the Nested Models.

Models	$\Delta\chi^2(df)$
Model 1 vs. Model 3	9.245 (4)
Model 1 vs. Model 4	36.573 (9)**
Model 1 vs. Model 5	29.370 (9)**
Model 1 vs. Model 6	60.520 (15)**
Model 2 vs. Model 3	15.600 (4)**
Model 2 vs. Model 4	42.073 (9)**
Model 2 vs. Model 5	35.676 (9)**
Model 2 vs. Model 6	66.215 (15)**
Model 3 vs. Model 4	25.956 (5)**
Model 3 vs. Model 5	20.092 (5)**
Model 3 vs. Model 6	50.524 (11)**
Model 4 vs. Model 6	23.644 (6)**
Model 5 vs. Model 6	29.942 (6)**

Note. Model 1 = *DSM-5 (Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition)* model; Model 2 = dysphoria model; Model 3 = dysphoric arousal model; Model 4 = anhedonia model; Model 5 = externalizing behaviors model; Model 6 = hybrid model.
**$p < .01$.

The anhedonia model (Model 4), the externalizing behaviors model (Model 5), and the hybrid model (Model 6) provided a better fit than the dysphoric arousal model (Model 3). The anhedonia model (Model 4) and the externalizing behaviors model (Model 5) could not be compared with χ^2 difference tests because they are not nested. However, the BIC difference of 14.62 indicates a better fit of the anhedonia model. Finally, the hybrid model (Model 6) provided a significantly better fit than the anhedonia model (Model 4) and the externalizing behaviors model (Model 5). To sum up, the seven-factor hybrid model (Model 6) showed the best fit, followed by the six-factor anhedonia model (Model 4). The model with the best fit without linear dependencies was the externalizing behaviors model (Model 5), followed by the *DSM-5* model.

The factor loadings of the hybrid model, the anhedonia model, and the externalizing behaviors model are presented in Table 5. For these three models, all items had significant loadings (>.30; Brown, 2015) on their respective factors (range .37-.87 for the hybrid model; range .32-.87 for the anhedonia model; and range .37-.85 for the externalizing behaviors model). Furthermore, in all three models, the items reckless behavior and memory impairment had the lowest loadings. Table 6 shows the factor correlations for the hybrid model, the anhedonia model, and the externalizing behaviors model.

Discussion

This study was the first to evaluate the German version of the CAPS for *DSM-5* and analyze the underlying factor structure. It was conducted in a trauma-exposed clinical sample in which more than 80% of participants fulfilled the diagnostic criteria for PTSD, mostly related to childhood sexual and physical abuse. The results indicated good psychometric properties and overall supported the *DSM-5* PTSD model.

The first aim was to validate the German version of the CAPS for *DSM-5*. As hypothesized, we found good internal consistencies for the total scale and the subscales. The internal consistencies were even somewhat higher than those found for the original English scale (Weathers et al., 2017) and for the German version of the CAPS for the *DSM-IV* (Schnyder & Moergeli, 2002). The lowest Cronbach's alpha was found for the "avoidance" scale, likely because this subscale consists of only two items. Furthermore, the psychometrically most problematic item was "reckless behavior," which showed only small correlations with most of the other items from the same cluster, as also observed in the American validation study (Weathers et al., 2017). In addition to the high internal consistency, we found high agreement between the raters regarding the CAPS severity score, which indicates that little measurement error is attributable to the individual raters.

With regard to convergent validity, we found a high correlation between the CAPS-5 and PDS (as a self-rating of PTSD symptoms) for both the total score and the subscales, which suggests strong construct validity. We also found a strong association between PTSD symptoms and depression (as measured by the BDI-II). This high correlation might be explained by the high comorbidity of PTSD and affective disorders (Elhai, Grubaugh, Kashdan, & Frueh, 2008), which in our sample was almost 60%. Other studies, such as the American validation study, also found large correlations between the CAPS and measures of depressive symptoms ($r = .52$; Weathers et al., 2017), which, following a newer network approach, might be explained by the bridging role of several symptoms (e.g., sleep disturbance and feelings of guilt) between the two disorders (Afzali et al., 2017). In summary, our study provides strong evidence that the German version of the CAPS for *DSM-5* is a reliable and valid interview to assess PTSD symptom severity.

The second aim of this study was to test the fit of the *DSM-5* PTSD model in comparison with the competing models. PTSD in the *DSM-5* is currently defined by a four-factor structure ("reexperiencing," "avoidance," "negative alterations in cognition and mood," and "alterations in arousal and reactivity"), and several alternative models regarding the latent structure of PTSD have been proposed (Armour, Műllerová, et al., 2016). Like many other studies (e.g., Armour, Contractor, et al., 2016; Wang et al., 2015; Weathers, 2017; Wortmann et al., 2016), we found the best fit indices for the hybrid model, followed by the six-factor anhedonia model. However, both models have to be interpreted with caution due to linear dependencies that caused a latent variable covariance

Table 5. Standardized Factor Loadings for the Hybrid Model, the Anhedonia Model, and the Externalizing Behaviors Model.

PTSD symptoms (*DSM*-5)	Hybrid model	Factor loadings	Anhedonia model	Factor loadings	Externalizing behaviors model	Factor loadings
1. Intrusive memories	R	.78	R	.78	R	.78
2. Nightmares	R	.49	R	.49	R	.49
3. Flashbacks	R	.61	R	.61	R	.61
4. Emotional cue reactivity	R	.85	R	.85	R	.84
5. Psychical cue reactivity	R	.76	R	.76	R	.76
6. Avoidance of thoughts	AV	.78	AV	.78	AV	.78
7. Avoidance of reminders	AV	.63	AV	.63	AV	.63
8. Memory impairment	NA	.43	NA	.43	NACM	.43
9. Negative beliefs	NA	.79	NA	.80	NACM	.79
10. Blame of self or others	NA	.63	NA	.62	NACM	.62
11. Negative trauma-related emotions	NA	.87	NA	.87	NACM	.85
12. Lack of interest	AN	.71	AN	.70	NACM	.64
13. Detachment	AN	.72	AN	.72	NACM	.67
14. Inability to experience positive emotions	AN	.72	AN	.72	NACM	.70
15. Irritability/anger	EB	.63	DA	.51	EB	.63
16. Reckless behavior	EB	.37	DA	.32	EB	.37
17. Hypervigilance	AA	.76	AA	.74	AA	.75
18. Exaggerated startle response	AA	.50	AA	.51	AA	.51
19. Difficulty concentrating	DA	.70	DA	.66	DA	.70
20. Difficulty sleeping	DA	.70	DA	.65	DA	.70

Note. PTSD = posttraumatic stress disorder; *DSM-5 = Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*; R = reexperiencing; AV = avoidance; NA = negative affect; NACM = negative alterations in cognition and mood; AN = anhedonia; EB = externalizing behavior; DA = dysphoric arousal; AA = anxious arousal.

Table 6. Correlations Among the Factors for the Hybrid Model, the Anhedonia Model, and the Externalizing Behaviors Model.

Hybrid model

	R	AV	NA	AN	EB	AA
R	—	—	—	—	—	—
AV	.94	—	—	—	—	—-
NA	.89	.95	—	—	—	—
AN	.80	.82	.89	—	—	—
EB	.79	.78	.87	.75	—	—
AA	.79	.86	.73	.84	.45	—
DA	.92	.87	.79	.87	.66	.78

Anhedonia model

	R	AV	NA	AN	DA	—
R	—	—	—	—	—	—-
AV	.94	—	—	—	—	—
NA	.89	.95	—	—	—	—-
AN	.80	.82	.89	—	—	—-
DA	.98	.93	.89	.92	—	—
AA	.80	.87	.74	.85	.78	—

Externalizing behaviors model

	R	AV	NACM	EB	AA	—
R	—	—	—	—	—	—
AV	.94	—	—	—	—	—

(continued)

Table 6. (continued)

Externalizing behaviors model

	R	AV	NACM	EB	AA	—
NACM	.88	.94	—	—	—	—
EB	.79	.79	.86	—	—	—
AA	.79	.86	.79	.46	—	—
DA	.92	.87	.84	.67	.78	—

Note. R = reexperiencing; AV = avoidance; NA = negative affect; AN = anhedonia; EB = externalizing behavior; AA = anxious arousal; DA = dysphoric arousal; NACM = negative alterations in cognition and mood.

matrix that was not positive definite. The linear dependencies might be a result of the definition of some factors in both models by only few indicators, for example, the hybrid model consists of four clusters that are defined by only two to three symptoms, which increases the risk for such methodological problems (Brown, 2015). Additionally, the relatively small sample size and the fact that our study included a mostly clinical sample might also have influenced the occurrence of this problem. Accordingly, linear dependencies were also reported in the recently published German validation study of the PTSD Checklist for *DSM-5* (PCL-5), which, similar to our study, included mostly treatment-seeking traumatized participants (Krüger-Gottschalk et al., 2017). Thus, due to our relatively homogeneous sample, it would not be justified based on our data to give up the hybrid model and the anhedonia model, which have previously shown the best fit (e.g.,

Armour, Contractor, et al., 2016). However, future studies should address the relationship between sample characteristics and the fit of the different PTSD models.

In our study, the model with the best fit and a positive definite covariance matrix was the externalizing behaviors model, which consists of a six-factor structure ("reexperiencing," "avoidance," "negative alterations in cognition and mood," "externalizing behavior," "anxious arousal," and "dysphoric arousal"). This model, which splits the *DSM-5* cluster "alterations in arousal and reactivity" into "externalizing behavior," "dysphoric arousal," and "anxious arousal," may have shown a particularly good fit due to the characteristics of our sample, which mainly consisted of women suffering from PTSD related to childhood abuse with high rates of BPD, and thus, many potential sufferers of complex PTSD (Maercker et al., 2013).

The *DSM-5* model also demonstrated an excellent fit and outperformed the dysphoria model. Thus, in line with recent results by Armour, Contractor, et al. (2016), our study supports the *DSM-5* model. This result conflicts with studies based on the *DSM-IV* that suggested that the dysphoria model is slightly superior to the emotional numbing model (Yufik & Simms, 2010), which corresponds to the later *DSM-5* model. However, the fact that our study was based on interview data might have influenced the results, as the emotional numbing model was found to be superior when clinical interview data were used instead of a self-report measure (Palmieri, Weathers, Difede, & King, 2007). Furthermore, in our study, the *DSM-5* model was also superior to the dysphoric arousal model, which is in contrast to the results of the systematic review by Armour, Műllerová, et al. (2016) and again supports the *DSM-5* model.

With regard to our first aim (validation of the German version of the CAPS-5), the strength of the presented study is that we included a mostly clinical sample with a high percentage of women suffering from PTSD, whereas the American CAPS-5 validation study used a military sample (Weathers et al., 2017). However, our validation study also has a number of limitations. Even though we included participants who experienced a wide range of traumatic events, the generalizability of the results is still limited as most of the participants were women suffering from PTSD after childhood abuse. Furthermore, only two self-rating questionnaires were used to assess convergent and discriminant validity. Because of the high association between PTSD and depression, research should also consider other constructs further away from PTSD, for example, psychotic symptoms (see Charney & Keane, 2007) or psychopathy (see Weathers et al., 2017), when assessing discriminant validity. A limitation regarding interrater reliability is that we used ratings of only 12 videotapes and did not analyze the test–retest reliability. Future validation studies should further assess the sensitivity of the CAPS interview to treatment changes.

With regard to our second aim (investigating the underlying factor structure of PTSD symptoms), the strength of the present study is that we used the CAPS as a gold standard clinical interview, while most former studies have used only self-ratings (e.g., Mordeno et al., 2016; Wang et al., 2015). Limitations again include the relatively small sample size, which might have affected the results of the CFA, as well as the limited generalizability of the results due to the relatively homogeneous sample. Larger and more representative samples are needed to overcome these limitations.

Conclusion

In summary, our results demonstrate that the German version of the CAPS-5 is a psychometrically sound measure of *DSM-5* PTSD diagnosis and symptom severity. The psychometric quality of the CAPS-5 was supported in a sample completely different from that of the American validation study (Weathers et al., 2017). Regarding the underlying factor structure of *DSM-5* PTSD symptoms, the results generally support the *DSM-5* model, whose diagnostic criteria were recently judged to represent the best evidence-based criteria currently available for PTSD (Weathers, 2017), although other models reached an even better fit in our study. Future studies will thus have to address whether the *DSM-5* factor structure will need further refinement, as suggested by many studies, and whether those refinements will be suitable for varying PTSD samples and different cultures.

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