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The MMPI–2 Restructured Clinical Scales in the Assessment of Posttraumatic Stress Disorder and Comorbid Disorders

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This study examined the psychometric properties of the Minnesota Multiphasic Personality Inventory—2 (MMPI–2) Restructured Clinical Scales (RCSs) in individuals with posttraumatic stress disorder (PTSD) receiving clinical services at Department of Veterans Affairs medical centers. Study 1 included 1,098 men who completed the MMPI–2 and were assessed for a range of psychological disorders via structured clinical interview. Study 2 included 136 women who completed the MMPI–2 and were interviewed with the Clinician Administered Scale for PTSD. The utility of the RCSs was compared with that of the Clinical Scales (CSs) and the Keane PTSD (PK) scale. The RCSs demonstrated good psychometric properties and patterns of associations with other measures of psychopathology that corresponded to current theory regarding the structure of comorbidity. A notable advantage of the RCSs compared with the MMPI–2 CSs was their enhanced construct validity and clinical utility in the assessment of comorbid internalizing and externalizing psychopathology. The PK scale demonstrated incremental validity in the prediction of PTSD beyond that of the RCSs or CSs.

Keywords: Minnesota Multiphasic Personality Inventory—2, Restructured Clinical Scales, posttraumatic stress disorder, internalizing, externalizing

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The Minnesota Multiphasic Personality Inventory—2 (MMPI–2; Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989) is one of the most widely used assessment instruments in mental health and, as such, is often used in the assessment of posttraumatic stress disorder (PTSD). Its extensive array of scales, established norms for a range of populations, and unparalleled breadth of research provide a solid foundation from which to evaluate the profiles of individuals with PTSD for clinical description, case conceptualization, and treatment planning purposes. Despite clear strengths, there are psychometric limitations to its main scales, the Clinical Scales (CSs). Within-scale item content is heterogeneous, and some scales tap multiple constructs, complicating the interpretation of scale elevations and limiting construct validity (Tellegen et al., 2003). There is considerable item overlap among the CSs, which contributes to artificially inflated intercorrelations (Helmes & Reddon, 1993;

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Tellegen et al., 2003). This makes it difficult to determine whether elevations on multiple scales are indicative of substantive patterns of symptom covariation or simply a result of common items. Recently, the MMPI–2 Restructured Clinical Scales (RCSs) were developed to address these issues and to increase the independence of each scale and provide purer, more valid indicators of pathology (Tellegen et al., 2003). This article describes two studies that examined the psychometric properties and diagnostic utility of the RCSs for the assessment of PTSD and comorbid disorders in men (Study 1) and women (Study 2) receiving services at U.S. Department of Veterans Affairs (VA) medical centers.

The Development of the RCSs

Tellegen et al. (2003) began the development of the RCSs by using factor analysis to identify MMPI–2 items on CS2 and CS7 that reflected demoralization, a construct defined by generalized distress and negatively valenced mood. They hypothesized that demoralization pervaded the CSs and contributed to CS elevations and their high intercorrelations. To create the remaining RCSs, Tellegen et al. performed an iterative series of factor analyses in which the 23 items of the preliminary Demoralization scale were analyzed along with the remaining items from each of the CSs. This exploratory process allowed them to identify the "distinctive core" (p. 14) of each CS by examining the item content that remained after accounting for demoralization-related variance. The scales were finalized by adding items to each scale that maximized its internal consistency and conceptual and statistical distinctiveness. This yielded nine nonoverlapping RCSs labeled Demoralization (RCd), Somatic Complaints (RC1), Low Positive Emotions (RC2), Cynicism (RC3), Antisocial Behavior (RC4), Ideas of Persecution (RC6), Dysfunctional Negative Emotions (RC7), Aberrant Experiences (RC8), and Hypomanic Activation (RC9). The RCSs are shorter than their corresponding CSs with some RCS–CS pairs sharing few items in common (Tellegen et al., 2003).

Finally, Tellegen et al. (2003) validated the RCSs in multiple samples. The RCSs have demonstrated good reliability (Tellegen et al., 2003) and discriminant validity, as assessed by comparisons with self-reported (Sellbom, Graham, & Schenk, 2006; Simms, Casillas, Clark, Watson, & Doebbeling, 2005) and clinician-based measures (Sellbom, Ben-Porath, & Graham, 2006; Simms et al., 2005; Tellegen et al., 2003) of psychiatric symptoms. They have also been shown to possess generally improved convergent and divergent validity over the CSs (Sellbom, Ben-Porath, & Graham, 2006; Simms et al., 2005; Tellegen et al., 2003).

The RCSs and the Assessment of Internalizing and Externalizing Psychopathology

A notable strength of the RCSs is that they were designed to align with contemporary dimensional models of psychiatric comorbidity. Research has suggested that patterns of covariation among common psychiatric disorders can be accounted for by latent factors reflecting individual differences in tendencies toward internalizing (defined by unipolar depressive, anxiety, and somatization disorders) and externalizing (defined by substance-related disorders and antisocial personality disorder; e.g., Kendler, Prescott, Myers, & Neale, 2003; Kessler, Chiu, Demler, Merikangas, & Walters, 2005; Krueger, 1999; Krueger, Chentsova-Dutton, Markon, Goldberg, & Ormel, 2003; Krueger, McGue, & Iacono, 2001). These dimensions of psychopathology are thought to be rooted in the temperament of the individual, with negative emotionality widely considered to be the higher order dimension of personality that contributes the most shared variance across the internalizing disorders. In contrast, positive emotionality is relatively specific to depression and social phobia, whereas anxious arousal differentiates panic disorder from the other internalizing disorders (Brown, 2007; Brown, Chorpita, & Barlow, 1998; Mineka, Watson, & Clark, 1998; Watson, 2005; Watson, Clark, & Carey, 1988). RCd, RC2, and RC7 were designed to capture these general and specific features of the internalizing spectrum. Negative emotionality is most directly assessed by RCd and RC7, with the former reflecting unpleasant affective valence (e.g., depressed mood) and the latter reflecting arousal (e.g., fear and anxiety; Tellegen et al., 2003, 2006). Low positive emotionality is reflected primarily in RC2.

In support of this, recent research has shown these three scales to correlate highly with trait measures of negative and positive emotionality and with symptoms of generalized distress, anxiety, fear, and depression (i.e., RCd with generalized distress, RC7 with anxiety and fear, and RCd and RC2 with depression; Sellbom & Ben-Porath, 2005; Sellbom, Ben-Porath, & Graham, 2006; Sellbom, Graham, & Schenk, 2006; Simms et al., 2005; Tellegen et al., 2003, 2006). However, RCd, RC2, and RC7 do not evidence specificity for distress, depression, and anxiety, respectively. Instead, these same studies revealed smaller but notable correlations between RC2 and anxiety and between RC7 and depression, for example. This suggests a need for more research to examine the specificity of these scales as they relate to individual internalizing disorders.

Psychopathology in the externalizing spectrum is indexed by RC3, RC4, and RC9. RC4 is related to measures of substance-related disorders and symptoms of antisociality, anger, and aggression (Forbey & Ben-Porath, 2007; Sellbom, Graham, & Schenk, 2006; Simms et al., 2005; Tellegen et al., 2003). RC9 is related to indicators of mania (Sellbom, Graham, & Schenk, 2006), aggression, and impulsivity (Forbey & Ben-Porath, 2007). Both scales are negatively correlated with the personality dimension constraint (Sellbom & Ben-Porath, 2005; Simms et al., 2005). Finally, RC3 has shown strong associations with trait alienation, mistrust, and aggression (Sellbom & Ben-Porath, 2005; Simms et al., 2005).

Criticisms of the RCSs

Critics have raised concerns about the goals and methods used in the development of the RCSs, as well as the clinical utility and validity of the scales. These issues were described in detail in a special issue of the *Journal of Personality Assessment* (e.g., Nichols, 2006; Rogers, Sewell, Harrison, & Jordan, 2006; Tellegen et al., 2006). Three points of debate that our data address include (a) the validity and utility of measuring complex psychological disorders with relatively homogeneous scales, (b) the validity of removing demoralization from the scales when demoralization

pervades psychopathology, and (c) the differences in the core constructs of the RCSs as compared with the CSs. Evidence that the CSs better predict clinical diagnoses would suggest that it is preferable to use multifaceted scales that each include a component of demoralization; in contrast, if the RCSs were superior in such predictions, this would suggest the value of an array of more narrowly defined, homogeneous scales that together assess both the common and the specific features of psychopathology.

The MMPI–2 in the Assessment of PTSD

When the MMPI–2 is used in the assessment of PTSD, the focus is often on modal codetypes and scores on the Keane PTSD (PK) scale (Keane, Malloy & Fairbank, 1984; Lyons & Keane, 1992). Various modal CS codetypes have been reported in samples of individuals with PTSD ranging from 2-8/8-2 (i.e., Depression and Schizophrenia; Fairbank, Keane, & Malloy, 1983; Keane et al., 1984; Munley, Bains, Bloem, & Busby, 1995; Wilson & Walker, 1990), 7-8/8-7 (i.e., Psychasthenia and Schizophrenia; Albrecht et al., 1994; Litz et al., 1991; Wetter, Baer, Berry, Robison, & Sumpter, 1993), to 6-8/8-6 (i.e., Paranoia and Schizophrenia; Mozley, Miller, Weathers, Beckham, & Feldman, 2005). The 46-item PK scale has demonstrated good sensitivity in the classification of individuals with the disorder (e.g., Greenblatt & Davis, 1999; Keane et al., 1984; Munley et al., 1995). It also appears to contribute incrementally, adding an additional 9% of variance beyond RCd in the prediction of PTSD status in a treatment-seeking inpatient sample; however, these results were not replicated in a compensation-seeking veteran sample (Arbisi, McNulty, & Ben-Porath, 2004). Investigators have criticized the PK scale on the grounds that it is primarily a marker for the MMPI–2 first factor (i.e., the general distress factor now captured by RCd; Greene, 2000). Given that the PK scale and RCd have eight items in common and are highly correlated (approaching $r = .90$; Arbisi et al., 2004; Nichols, 2006), Arbisi et al. (2004) have similarly suggested that the PK scale is a marker for generalized distress as opposed to a scale that specifically measures PTSD. One goal of this research was to address this issue by comparing the incremental validity and specificity of the PK scale in comparison to the RCSs and the CSs for the assessment of PTSD and comorbid disorders.

In sum, although numerous prior studies have described the MMPI–2 profiles of individuals with PTSD and addressed their clinical utility, no prior published study has examined the utility of the RCSs for the assessment of PTSD and comorbid psychopathology. Recent studies highlighting the heterogeneity of posttraumatic psychopathology have shown that some patients with PTSD display a predominantly internalizing pattern of behavioral disturbance characterized by comorbid depression, anxiety, and schizoid and avoidant personality disorders, whereas others exhibit a predominantly externalizing pattern characterized by impulsivity, comorbid substance-related disorders, and cluster B personality disorder features (Miller, Greif, & Smith, 2003; Miller, Kaloupek, Dillon, & Keane, 2004; Miller & Resick, 2007). Given that, there is a specific need for additional research examining the utility of the RCSs for the assessment of internalizing and externalizing PTSD comorbidity. This study provided the opportunity to examine this issue in detail. More generally, the goals of this work were to address gaps in the RCS literature by examining the psychometric properties and clinical utility of the RCSs in a sample of male veterans with PTSD and well-defined comorbidity (Study 1) and in a sample of women receiving VA services (Study 2).

Study 1

Aims and Hypotheses

The primary aims of Study 1 were as follows:

1. To provide sample descriptive statistics, including mean RCS scores and frequency of elevations for veterans with PTSD and to determine the internal consistency of each scale.

2. To examine the criterion validity of the RCSs by investigating their ability to predict current PTSD diagnosis and to quantify the incremental validity of the RCSs relative to the CSs and the PK scale. We expected RCd, RC2, and RC7 to be the strongest predictors of PTSD, given their association with (a) generalized distress (which may underlie the emotional numbing and hyperarousal symptoms; Simms, Watson, & Doebbeling, 2002; Watson, 2005), (b) low positive emotionality (a trait that relates to emotional numbing), and (c) anxious arousal (a feature likely to pervade hyperarousal symptoms), respectively. We also expected RC6 (Ideas of Persecution) and RC8 (Aberrant Experiences) to predict PTSD, given the associations between the disorder and their highly correlated CS counterparts. We also expected RC6 and RC8 to be sensitive to, respectively, (a) the high levels of distrust and paranoia common to PTSD and (b) its more unusual and strange features such as flashbacks, depersonalization, and derealization. The RCSs were expected to outperform the CSs in predictive validity.

3. To evaluate the construct validity of the RCSs by examining their ability to predict comorbid disorders of the internalizing and externalizing spectrum and the incremental validity of the RCSs relative to the CSs for this. On the basis of the theory and research reviewed earlier, we expected to find differential associations between select RCSs and internalizing versus externalizing comorbidity with RCd, RC1, RC2, and RC7 associated with internalizing and RC3, RC4, and RC9 associated with externalizing.

Method

Participants

Participants were male military veterans who served in the Vietnam theater of operations between August 1964 and May 1975. They were recruited for a study on the psychophysiological assessment of PTSD from inpatient and outpatient programs at 15 VA Medical Centers across the United States (for details, see Keane et al., 1998). Study candidates were excluded if they were already enrolled in another research study sponsored by the VA Cooperative Studies Program, if they were taking medications or had any medical conditions that might alter their autonomic responses, or if they refused to refrain from the use of alcohol or illicit substances for 24 hr before the assessment (Keane et al., 1998). In total, 2,115 participants were screened for participation, including 1,461 who met eligibility criteria. Of these, 1,266 completed the MMPI–2. Data from 168 of these participants were excluded because of invalid responses on the MMPI–2, as defined by an *F* greater than 100 and *F*(p) greater than 80 or *TRIN* greater than 100 or *VRIN* greater than 80 (Arbisi & Ben-Porath, 1995), leaving a final sample of 1,098. To permit comparisons between

participants with current PTSD and those who never met criteria for the disorder, an additional 158 participants who met lifetime but not current PTSD criteria on the basis of the Structured Clinical Interview for *DSM–III–R* (SCID; Spitzer, Williams, Gibbon, & First, 1989) were excluded from analyses involving current PTSD, yielding a subsample of 940 veterans of whom 596 (63%) met criteria for current PTSD. Rates of other SCID diagnoses and demographic characteristics are displayed in Table 1 for participants with and without PTSD. Participants with PTSD were younger than those without the disorder, $t(938) = 7.34$, $p < .001$, and had higher rates of other psychiatric diagnoses, χ^2s(1, $N = 940$) = 4.68 to 98.14, all $p < .05$, but did not differ in terms of ethnicity, $\chi^2(4, N = 937) = 9.04$, $p = .06$.

Measures

MMPI–2 (Butcher et al., 1989). The MMPI–2 is a 567-item true–false inventory that assesses a broad range of self-reported psychopathology. Participants completed a paper-and-pencil version of the instrument. We conducted analyses on raw scale scores, but present descriptive MMPI–2 data as *T* scores to aid interpretation of these results.

SCID (Spitzer et al., 1989). Selected modules of the SCID I and II interviews were administered by doctoral-level clinicians to assess current and lifetime diagnoses according to *Diagnostic and Statistical Manual of Mental Disorders* (third ed., revised; American Psychiatric Association, 1987) diagnostic criteria. All interviews were audiotaped, and secondary ratings of 128 participants' taped interviews were used to determine interrater reliability. In addition, 36 participants were reinterviewed by a second clinician to further examine interrater reliability. When combined, these two sources of information yielded mean reliability coefficients of .81 for current versus never PTSD and .48 to .84 for the other diagnoses, major depressive disorder (MDD), panic disorder (PD), obsessive–compulsive disorder (OCD), alcohol- and drug-related disorders, and antisocial personality disorder (ASPD).

Table 1
Means (and Standard Deviations) of Descriptive Characteristics for Study 1

Descriptive characteristic	PTSD ($n = 596$)	No PTSD ($n = 344$)	t	χ^2
Demographic measures				
Age	42.58 (3.10)	44.48 (4.84)	7.34***	
Ethnicity (%)				*ns*
White	68	71		
Black	18	18		
Hispanic	10	6		
Asian/Pacific Islander	1	3		
American Indian/ Alaskan Native	3	1		
SCID diagnoses (%)				
Major depressive disorder	35	6		98.14***
Panic disorder	12	0		42.33***
Obsessive–compulsive disorder	6	1		12.66***
Alcohol-related disorders	22	16		4.68*
Drug-related disorders	12	7		5.79*
Antisocial personality disorder	12	5		12.97***

Note. Significance tests were independent sample *t* tests for continuous measures and chi-square tests for categorical data. PTSD = posttraumatic stress disorder; SCID = Structured Clinical Interview for *DSM–III–R*.
* $p < .05$. *** $p < .001$.

Statistical Analyses

First, we examined the descriptive and psychometric characteristics of the RCSs relative to the CSs by examining patterns of scale elevations in the PTSD and never-PTSD subsamples and calculating the internal consistency of each scale using the whole sample. Second, we evaluated the criterion validity of the RCSs by (a) examining the correlations between the RCSs and PTSD diagnostic status and severity and (b) performing a logistic regression with all nine RCSs entered simultaneously as predictors of current SCID PTSD diagnosis. We then evaluated the incremental validity of the RCSs relative to the CSs and the PK scale by performing two three-step hierarchical logistic regressions. Third, we examined the construct validity of the RCSs by (a) correlating the RCSs with dichotomous indicators of current psychopathology in the PTSD subsample and (b) correlating the RCSs with internalizing and externalizing PTSD comorbidity factor scores derived from a confirmatory factor analysis of the SCID disorders. Finally, we examined the incremental validity of the RCSs compared with the CSs for the prediction of internalizing and externalizing comorbidity using hierarchical multiple regressions.

Results

Descriptive Data

Investigation of the mean RCS and CS *T* scores in the current PTSD group revealed five clinically significant (i.e., $T \geq 65$) RCS elevations (RCd, RC1, RC2, RC7, and RC8) and seven CS elevations (scales 1, 2, 4, 6, 7, 8, and 0; see Table 2). A larger percentage of participants produced *T* scores of 75 or more on the CSs as compared with the RCS; at least 50% of the sample produced elevations at this level on CS1, CS2, CS4, CS7, and CS8 (only RCd was elevated to this extent in at least 50% of the sample). The mean PK scale was also elevated ($M = 84.40$) in the PTSD subsample, with nearly 75% of this subsample producing a score of 75 or more. Veterans with current PTSD scored significantly higher on all RCSs and CSs than those who never met criteria for PTSD (see Table 2). The magnitude of this difference on all the RCSs and CSs (except for CS5) was medium to large (i.e., Cohen's *d*s $\geq .50$ and .80, respectively; Cohen, 1988).

Internal consistency of the RCSs was excellent and ranged from .80 for RC9 to .94 for RCd ($M = .86$), and mean interitem correlations within each scale ranged from .13 for RC9 to .39 for RCd ($M = .24$; see Table 3). Internal consistency of the CSs ranged from .46 for CS5 to .94 for CS7 and CS8 ($M = .81$, excluding CS5), and mean interitem correlations within each CS ranged from .02 for CS5 to .23 for CS1 ($M = .11$, excluding CS5). In a few instances (scales 6 and 9), coefficient alpha estimates for the RCSs were much higher than those for the corresponding CSs;

Table 2
Means, Standard Deviations, and Frequency of Scale Elevations for the RCSs, CSs, and PK Scale by PTSD Status

Variable	Male sample (Study 1)				Female sample (Study 2): PTSD (n = 82)
	PTSD (n = 596)	No PTSD (n = 344)	t	d	
RCd: Demoralization			21.59	1.43	
M (*SD*)	73.59 (11.46)	55.66 (13.55)			71.89 (9.10)
% ≥ 65	76.00	25.30			79.30
% ≥ 75	56.50	12.50			50.00
RC1: Somatic Complaints			16.25	1.12	
M (*SD*)	72.03 (16.26)	54.94 (14.18)			74.85 (12.66)
% ≥ 65	64.90	22.40			75.60
% ≥ 75	43.80	10.80			50.00
RC2: Low Positive Emotions			15.74	1.08	
M (*SD*)	69.54 (14.47)	54.67 (13.01)			73.30 (15.55)
% ≥ 65	57.90	19.80			70.70
% ≥ 75	39.30	10.20			37.80
RC3: Cynicism			9.57	0.65	
M (*SD*)	61.88 (12.47)	53.83 (12.39)			61.40 (12.97)
% ≥ 65	41.10	17.70			45.10
% ≥ 75	14.40	6.40			14.60
RC4: Antisocial Behavior			10.16	0.69	
M (*SD*)	63.94 (11.74)	55.54 (13.01)			62.59 (9.63)
% ≥ 65	48.00	27.90			41.50
% ≥ 75	19.00	8.40			8.50
RC6: Ideas of Persecution			11.43	0.78	
M (*SD*)	63.85 (13.13)	53.92 (12.30)			63.71 (12.29)
% ≥ 65	56.40	21.20			45.10
% ≥ 75	20.30	4.70			19.50
RC7: Dysfunctional Negative Emotions			19.25	1.30	
M (*SD*)	69.43 (13.13)	52.26 (13.24)			68.43 (12.12)
% ≥ 65	65.10	21.20			58.50
% ≥ 75	40.90	8.70			30.50
RC8: Aberrant Experiences			16.73	1.16	
M (*SD*)	67.72 (14.25)	52.42 (12.12)			63.99 (13.50)
% ≥ 65	56.50	15.40			51.20
% ≥ 75	30.00	5.80			23.20
RC9: Hypomanic Activation			9.54	0.65	
M (*SD*)	57.35 (11.08)	50.34 (10.47)			52.10 (9.78)
% ≥ 65	24.30	10.80			11.00
% ≥ 75	8.70	2.30			1.20
CS1: Hypochondriasis			17.94	1.23	
M (*SD*)	76.60 (17.82)	55.84 (15.77)			74.70 (13.65)
% ≥ 65	72.80	25.90			79.30
% ≥ 75	51.30	13.10			56.10
CS2: Depression			18.24	1.24	
M (*SD*)	77.70 (15.35)	59.06 (14.66)			80.63 (14.30)
% ≥ 65	80.40	35.20			89.00
% ≥ 75	61.10	16.30			72.00
CS3: Hysteria			12.54	0.86	
M (*SD*)	64.96 (13.14)	54.12 (12.07)			73.22 (15.96)
% ≥ 65	53.40	18.00			70.70
% ≥ 75	23.50	6.10			53.70
CS4: Psychopathic Deviate			17.53	1.16	
M (*SD*)	75.27 (12.07)	59.85 (14.45)			72.26 (12.92)
% ≥ 65	80.40	33.40			72.00
% ≥ 75	58.90	19.80			42.70
CS5: Masculinity-Femininity			4.60	0.31	
M (*SD*)	51.82 (8.59)	49.01 (9.67)			55.67 (12.56)
% ≥ 65	6.00	6.20			23.20
% ≥ 75	0.50	0.90			4.90
CS6: Paranoia			16.81	1.15	
M (*SD*)	72.69 (15.02)	56.12 (13.75)			74.32 (13.10)
% ≥ 65	67.10	23.80			72.00
% ≥ 75	41.60	9.00			41.50

(*table continues*)

Table 2 (*continued*)

Variable	Male sample (Study 1) PTSD (n = 596)	No PTSD (n = 344)	t	d	Female sample (Study 2): PTSD (n = 82)
CS7: Psychasthenia			22.02	1.49	
M (*SD*)	76.41 (14.16)	55.21 (14.33)			76.00 (12.78)
% ≥ 65	78.90	25.00			80.50
% ≥ 75	58.90	11.90			59.80
CS8: Schizophrenia			22.12	1.51	
M (*SD*)	81.76 (17.29)	56.48 (16.14)			82.38 (11.93)
% ≥ 65	82.60	27.60			92.70
% ≥ 75	66.90	15.10			76.80
CS9: Hypomania			11.14	0.76	
M (*SD*)	60.54 (10.84)	52.44 (10.56)			55.30 (11.36)
% ≥ 65	36.10	13.10			23.20
	11.70	4.10			6.10
CS0: Social Introversion			15.64	1.06	
M (*SD*)	66.63 (12.39)	53.47 (12.50)			66.51 (11.30)
% ≥ 65	58.90	21.50			57.30
% ≥ 75	29.70	7.30			26.80
PK			24.56	1.65	
M (*SD*)	84.40 (15.53)	57.95 (16.56)			79.83 (12.34)
% ≥ 65	87.80	31.10			86.60
% ≥ 75	74.80	19.50			67.10

Note. Scores are *T* scores. Significance tests for the male sample were independent sample *t* tests. All *t* tests were statistically significant at the $p < .001$ level. Effect size is Cohen's *d*. PTSD = posttraumatic stress disorder; RCSs = Restructured Clinical Scales; CSs = Clinical Scales; PK = Keane PTSD Scale.

in general, the mean scale interitem correlation was higher for each RCS relative to the corresponding CS.

The RCSs tended to correlate highly with their corresponding CSs (M = .66), with one pair of scales (RC3 and CS3) evidencing a negative association (r = −.07) and the remaining RCSs correlating with their CS counterparts at .57 or greater (maximum = .95 for RC1 and CS1).[1] The RCSs were generally more distinct from one another (mean interscale correlation = .38, based on all nine scales) as compared with the CSs (mean interscale correlation = .50; based on nine scales).[2] The highest interscale correlations were .90 for CS7 and CS8 and .74 for RCd and RC7. We also examined the correlations between the PK scale and the RCSs and CSs; these values ranged from .28 for RC4 to .88 for RCd (mean for all RCSs = .59) and from .42 for CS3 to .91 for CS7 and CS8 (mean for all CSs, excluding CS5, = .68).

Table 3
Internal Consistency of the RCSs, CSs, and PK Scale

MMPI-2 scale	Coefficient α RCSs	Coefficient α CSs	Mean interitem r RCSs	Mean interitem r CSs
Demoralization (24)	.94		.39	
1 (27/32)	.90	.91	.24	.23
2 (17/57)	.85	.82	.24	.08
3 (15/60)	.85	.71	.27	.04
4 (22/50)	.81	.77	.16	.06
5 (56)		.46		.02
6 (17/40)	.81	.69	.19	.06
7 (24/48)	.90	.94	.27	.24
8 (18/78)	.84	.94	.23	.15
9 (28/46)	.80	.63	.13	.04
0 (69)		.90		.11
PK (46)	.75		.06	

Note. The numbers in parentheses in the first column reflect the number of items on each RCS followed by the number of items on the corresponding CS. RCSs = Restructured Clinical Scales; CSs = Clinical Scales; PK = Keane PTSD Scale; MMPI–2 = Minnesota Multiphasic Personality Inventory—2.

Criterion Validity of the RCSs for the Assessment of PTSD and Their Incremental Validity Relative to the CSs and the PK scale

Table 4 lists the correlations between the RCSs, CSs, PK scale, and both PTSD severity (SCID symptom count) and diagnostic status (current vs. never). The PK scale and all RCSs and CSs were significantly associated with both PTSD severity and diagnostic status. RCd was the RCS that correlated most strongly with overall PTSD severity and diagnostic status and with each of the three PTSD symptom clusters (rs ranged from .51 to .62). In comparison, CS7 and CS8 were the CSs that correlated most strongly with these same measures of PTSD (rs ranged from .54 to .65). *T* tests to compare the magnitude of dependent correlations (Cohen & Cohen, 1983) further revealed that RCd and RC7 were more strongly related to the avoidance and numbing (rs = .59 and .54, respectively) and hyperarousal symptoms (rs = .59 and .57, respectively) than they were to the reexperiencing symptoms (rs = .51 and .48, respectively). *T* tests also demonstrated that the association between the PK scale and PTSD severity (r = .70) was significantly larger than the association between RCd and PTSD severity (r = .62) and larger than the association between CS7 and

[1] A table of correlations between the RCSs and CSs is available from Mark W. Miller.

[2] This calculation included CS1–CS4 and CS6–CS0 (CS5 was omitted).

Table 4
Correlations Between the RCSs, CSs, and PK Scale and PTSD

	PTSD severity									
	Total symptoms		B symptoms		C symptoms		D symptoms		PTSD diagnosis	
Scale	RCSs	CSs	RCSs	CSs	RCSs	CSs	RCSs	CSs	RCSs	CSs
Demoralization	.62		.51		.59		.59		.57	
1	.52	.57	.42	.48	.45	.50	.53	.59	.45	.51
2	.54	.58	.43	.49	.52	.54	.50	.56	.46	.51
3	.34	.44	.28	.37	.30	.37	.34	.44	.31	.38
4	.30	.55	.24	.44	.28	.51	.32	.53	.32	.50
5		.14		.11		.16		.12		.15
6	.38	.54	.30	.45	.34	.48	.38	.52	.33	.48
7	.58	.65	.48	.54	.54	.60	.57	.63	.53	.59
8	.50	.65	.43	.54	.44	.60	.50	.64	.46	.59
9	.32	.34	.28	.29	.27	.28	.33	.36	.32	.34
0		.53		.42		.51		.50		.46
PK	.70		.59		.64		.67		.63	

Note. PTSD = posttraumatic stress disorder; RCSs = Restructured Clinical Scales; CSs = Clinical Scales; PK = Keane PTSD Scale; B symptoms = PTSD reexperiencing symptoms; C symptoms = PTSD avoidance and numbing symptoms; D symptoms = PTSD hyperarousal symptoms. PTSD total and symptom cluster severity scores are sums of the PTSD items on the Structured Clinical Interview for *DSM–III–R.* All correlations were significant at the $p < .001$ level.

CS8 and PTSD severity (rs = .65), although the magnitude of these differences was small (comparisons of pairs of correlations may reach statistical significance even if the correlations are of similar magnitude because of the large sample size).

We further investigated these associations by performing a logistic regression in which the RCSs were entered simultaneously in an equation predicting current PTSD status. This yielded a significant overall model, $\chi^2(9, N = 940) = 395.492$, $p < .001$, Nagelkerke $R^2 = .47$. Five RCSs contributed unique variance to the prediction of PTSD status (odds ratios for each significant predictor follow: RCd = 1.09, RC1 = 1.05, RC2 = 1.09, RC3 = 0.93, and RC8 = 1.15). Of these, only RCd and RC8 had 95% confidence intervals (CIs) that did not approach 1.0 (CIs = 1.04–1.15 and 1.06–1.24, respectively).[3] We then examined the incremental validity of the RCSs in the prediction of PTSD diagnostic status by performing a hierarchical logistic regression analysis in which the PK scale was entered in the first step, the CSs were entered simultaneously in the second step, and the RCSs were entered in the third step. The first step of the equation yielded a significant overall model, $\chi^2(1, N = 940) = 421.79$, $p < .001$, Nagelkerke $R^2 = .50$. The addition of the CSs in the second step did not add to the model prediction, $\Delta\chi^2(10, N = 940) = 14.40$, $p = .15$. The addition of the RCSs in the third step of the model added significantly to the prediction of PTSD diagnosis, $\Delta\chi^2(9, N = 940) = 20.48$, $p < .05$, and explained an additional 3.0% of variance as compared with Step 1. Finally, when the order of scale entry was reversed in a second hierarchical logistic regression, the CSs explained an additional 4.0% of variance in PTSD diagnosis beyond that attributable to the RCSs, $\Delta\chi^2(10, N = 940) = 37.68$, $p < .001$, and the PK scale explained an additional 2.1% beyond that attributable to the RCSs and CSs, $\Delta\chi^2(1, N = 940) = 23.53$, $p < .001$. In particular, a one-unit increase in scores on the PK scale was associated with a 17% increase in odds of being diagnosed with PTSD on the SCID, even after accounting for all the variance attributable to the RCSs and CSs.[4]

[3] We also examined the relationship between the RCSs and a dimensional indicator of PTSD severity by regressing PTSD severity (as assessed by SCID symptom count) on the RCSs for the 1,098 participants with valid MMPI–2 profiles. Results indicated that in total, the RCSs explained 45% of the variance in PTSD severity, with RCd, RC1, RC2, RC3, RC8, and RC9 accounting for this (βs = 0.24, 0.13, 0.22, −0.08, 0.13, and 0.09, respectively). The overall variance accounted for, and the general pattern of results in this regression, are similar to the results of the regression examining the RCSs in the prediction of dichotomous PTSD diagnosis.

[4] Arbisi et al. (2004) suggested that the PK scale overlaps considerably with RCd and that it is relatively nonspecific to PTSD. To investigate this, we conducted secondary analyses (hierarchical regressions) examining the incremental validity of the PK scale in comparison to RCd in the prediction of PTSD diagnostic status. When PK was entered in the first step of the equation, it accounted for 50% of the variance and was associated with a 16% increase in odds for PTSD, whereas inclusion of RCd in the second step did not contribute additional variance to the prediction of PTSD. When the order of entry was reversed, RCd accounted for 41% of the variance in PTSD diagnosis in the first step and was associated with a 21% increase in odds for PTSD. When the PK scale was entered into the second step of the equation, it explained an additional 8.4% of the variance beyond that attributable to RCd. To examine the specificity of the association between PK and PTSD, we compared the correlations between the PK scale and dichotomous indicators of current PTSD and other SCID diagnoses. *T* tests comparing the magnitude of the correlations revealed that the PK scale was more highly correlated with PTSD ($r = .59$) than with any of the other SCID diagnoses, with the next strongest association occurring between PK and MDD ($r = .36$). Finally, to further examine the specificity of the PK scale, we also compared the correlations between the PK scale and PTSD severity (a dimensional variable) and the internalizing and externalizing comorbidity factor scores in the subsample of male veterans with current PTSD. The association between the PK scale and PTSD severity ($r = .42$) was significantly greater than the association between the PK scale and internalizing comorbidity ($r = .17$) or externalizing comorbidity ($r = .08$).

Construct and Incremental Validity Relative to Diagnoses of Comorbid Disorders

To examine the construct validity of the RCSs for the assessment of comorbid disorders, we first calculated Pearson correlation coefficients between (a) the RCSs and dichotomous indicators of current alcohol- and drug-related disorders, ASPD, PD, MDD, and OCD in the PTSD subsample and (b) the RCSs and factor scores reflecting current externalizing and internalizing PTSD comorbidity. To compute the factor scores, we first submitted the dichotomous indicators of current SCID diagnoses to a confirmatory factor analysis using the Mplus (Muthén & Muthén, 1998–2007) statistical software. A tetrachoric correlation matrix was analyzed using the weighted least square estimator to account for the dichotomous nature of the data. Two correlated latent factors reflecting internalizing and externalizing dimensions were specified a priori on the basis of numerous prior studies of the latent structure of common mental disorders (e.g., Kendler et al., 2003; Kessler et al., 2005; Krueger, 1999) and evidence that this structure may also account for patterns of comorbidity in individuals with PTSD (Miller, Fogler, Wolf, Kaloupek, & Keane, 2008; Miller et al., 2003, 2004; Miller & Resick, 2007). The disorders specified to load on internalizing were MDD (the marker indicator), PD, and OCD, whereas ASPD (the marker indicator) and alcohol- and drug-related disorders were specified to load on the externalizing factor. This model fit the data well, $\chi^2(8, N = 596) = 8.88$, $p = .35$, root-mean-square error of approximation = .014, Tucker-Lewis index = .98, comparative fit index = .99 (the reader is directed to Brown, 2006, and Hu & Bentler, 1999, for additional information about this analytic approach and the fit statistics), allowing us to proceed with the factor score estimation.

Correlations between the RCSs, CSs, and the externalizing dimension generally suggested improved convergent and divergent validity of the RCSs (see Table 5). The externalizing factor was positively correlated with RC3 ($r = .12$), RC4 ($r = .32$), and RC9 ($r = .20$), whereas drug-use disorders were negatively correlated with RC2 ($r = -.11$). In addition, *t* tests revealed that RC4 displayed a significantly stronger relationship to the externalizing factor as compared with CS4 (*r*s = .32 vs. .10, respectively).

For internalizing disorders, the pattern of associations was more complex. RCd, RC1, RC2, RC6, and RC7 exhibited the strongest associations with the internalizing factor but differential associations with individual internalizing disorders. For example, RCd correlated significantly with MDD ($r = .24$) and PD ($r = .13$; *t* tests revealed that the RCd–MDD correlation was significantly greater than the RCd–PD correlation). RC1 and RC2 correlated positively with MDD (*r*s = .09 and .19, respectively) and PD (*r*s = .10 and .17, respectively). RC6 and RC7 correlated significantly with MDD (*r*s = .08 and .13, respectively) and OCD (*r*s = .16 and .10, respectively), and RC8 was significantly associated only with OCD ($r = .12$). The RCSs evidenced superior divergent validity compared with the CSs with respect to internalizing disorders. For example, CS4 correlated equivalently with the internalizing factor ($r = .12$) and the externalizing factor ($r = .10$; a *t* test revealed no significant difference between the magnitude of these correlations), whereas RC4 was not significantly correlated with the internalizing factor ($r = -.06$).

To further quantify the incremental validity of the RCSs relative to the CSs for the prediction of externalizing and internalizing PTSD comorbidity, we conducted hierarchical regression analyses. In the first regression predicting externalizing factor scores, we

Table 5
Pearson Correlations Between the RCSs, CS, and PK Scale and PTSD Comorbidity

	Externalizing comorbidity				Internalizing comorbidity			
Variable	Externalizing factor	AUD	DUD	ASPD	Internalizing factor	MDD	PD	OCD
RCd	.08	.10*	.01	.05	.18***	.24***	.13**	.04
RC1	−.02	.00	−.02	.02	.12**	.09*	.10*	.03
RC2	−.05	.00	−.11**	.00	.19***	.19***	.17***	.01
RC3	.12**	.11**	.05	.11*	−.05	.07	−.08	.04
RC4	.32***	.24**	.21***	.32***	−.06	.00	−.06	.06
RC6	.02	.04	−.01	.08	.13***	.08*	.09*	.16***
RC7	.05	.08	.00	.02	.13***	.13***	.09*	.10*
RC8	.07	.08	.04	.04	.09*	.04	.06	.12**
RC9	.20***	.14***	.17***	.16***	.00	−.05	−.01	.13**
CS1	.00	.00	−.02	.04	.14***	.13**	.12**	.02
CS2	.00	.02	.11**	.01	.19***	.24***	.15***	−.03
CS3	−.05	−.02	−.05	−.04	.19***	.17***	.17***	−.03
CS4	.10*	.10*	.02	.15***	.12**	.18***	.09*	.06
CS5	.03	.00	.07	.00	.03	.04	.05	−.07
CS6	−.01	.01	−.03	.03	.19***	.16***	.14**	.12**
CS7	.05	.07	−.01	.04	.18***	.18***	.13**	.07
CS8	.05	.06	.00	.09*	.15***	.17***	.10*	.08*
CS9	.17***	.12**	.13**	.16***	.02	.00	−.01	.16***
CS0	−.07	−.02	−.11**	−.03	.16***	.17***	.13**	.03
PK	.08	.10*	.01	.07	.17***	.22***	.12**	.07

Note. RCSs = Restructured Clinical Scales; CSs = Clinical Scales; PK = Keane PTSD Scale; PTSD = posttraumatic stress disorder; AUD = alcohol-use disorders; DUD = drug-use disorders; ASPD = antisocial personality disorder; MDD = major depressive disorder; PD = panic disorder; OCD = obsessive–compulsive disorder.
* $p < .05$. ** $p < .01$. *** $p < .001$.

entered all the RCSs in the first step. This yielded a significant overall model, $F(9, 586) = 9.48$, $p < .001$, $R^2 = .13$, in which RC4 was positively associated ($\beta = 0.28$) and RC7 was negatively associated ($\beta = -0.15$) with externalizing. There was also a statistical trend ($p = .057$) for an association between RC9 and externalizing ($\beta = 0.10$). The CSs did not add to the prediction of externalizing when entered in the second step of the regression. However, when the order of scale entry was reversed in a second hierarchical regression, the RCSs contributed an additional 9.0% of variance (in the second step) beyond the CSs in the prediction of the externalizing factor. RCd, RC3, and RC4 accounted for this (βs = 0.24, 0.13, and 0.37, respectively).

The hierarchical regression examining the incremental validity of the RCSs for the prediction of the internalizing factor also yielded a significant overall model with the RCSs entered into the first step, $F(9, 586) = 6.29$, $p < .001$, $R^2 = .09$, with RC2 and RC6 showing positive associations (βs = 0.13 and 0.16) and RC3 and RC4 negative ones (βs = −0.22 and −0.10), with this factor. RCd evidenced a weak statistical trend ($p = .10$) in its association with the internalizing factor ($\beta = 0.12$). As before, when the CSs were added to the second step of the regression, they did not add significantly to the prediction of internalizing. When the order of scale entry was reversed, the RCSs did add significantly to the model over the CSs in the second step, but explained only a modest amount (3%) of additional variance in the internalizing factor (RC3 and RC6 accounted for this with βs = −0.19 and 0.18, respectively).

Discussion

This study examined the psychometric properties of the RCSs in a sample of male Vietnam veterans receiving VA services. Reliability analyses showed that the RCSs possess excellent internal consistency, with coefficient alpha estimates superior to their CS counterparts evident for two scales and superior average interitem correlation coefficients for six. This is consistent with Tellegen et al.'s (2003) aim of creating homogeneous scales that assess the core components of psychopathology. The RCSs were also more distinct from one another compared with the more highly intercorrelated CSs. Evidence for improved divergent validity comes from the findings that (a) more participants scored in the clinically elevated range on multiple CSs as compared with the RCSs and (b) every CS evidenced higher correlations (on face value) with all indicators of PTSD as compared with the RCSs. Both of these findings likely reflect cross-scale item overlap and the contribution of demoralization-related variance to the CSs.

Generalizing across descriptive, correlation-based, and regression-based analyses and in support of our hypotheses, the RCSs most conceptually related to the core symptoms and associated features of PTSD (RCd, RC1, RC2, RC7, and RC8) were also the most strongly related to measures of the disorder. However, analyses that examined the incremental validity of the RCSs compared with the CSs and PK scale showed that the three types of scales performed equally well in the prediction of the SCID PTSD diagnosis. This suggests that it may be more parsimonious to use the PK scale for PTSD assessment with the MMPI–2 given that this single scale performed as well as five RCSs and four CSs.

We also compared the incremental validity of the PK scale with just RCd in the prediction of PTSD because prior studies that have performed this comparison have reported mixed results (Arbisi et al., 2004). We found that only the PK scale contributed incremental variance, and the size of this effect was similar to that obtained by Arbisi et al. (2004) in their treatment-seeking sample. One possible reason for this may be that the PK scale simply provides better coverage of the PTSD construct than does RCd. The PK scale includes items that resemble reexperiencing symptoms ("Once in a while I think of things too bad to talk about" and "I have nightmares every few nights"), effortful avoidance ("I am so touchy on some subjects that I can't talk about them"), and hyperarousal ("At times I feel like smashing things"), whereas no such items are found on RCd. In general, the PK scale performed well in this study. Although it was highly correlated with RCd, the scale showed stronger associations with PTSD than with other internalizing disorders, and regression analyses demonstrated its incremental validity in the prediction of PTSD (as compared with either all the RCSs or just RCd). It would be useful if future research continued to evaluate the relative performance of the PK scale and the RCSs in other PTSD samples; in particular, a more stringent test of the scale's convergent and discriminant validity would come from samples that include both PTSD and psychiatric control groups.

We also examined the construct validity of the RCSs for the assessment of comorbid psychopathology by examining the association of the RCSs to dichotomous indicators of SCID disorders and to internalizing (PD, MDD, and OCD) and externalizing (alcohol- and drug-related disorders and ASPD) factor scores. As hypothesized, RC3, RC4, and RC9 were correlated with externalizing, and RCd, RC1, RC2, RC6, and RC7 were associated primarily with internalizing, providing evidence for the convergent and divergent validity of these RCSs. The association between RC6 and internalizing, albeit unanticipated, may reflect processes associated with the interpersonal alienation and avoidance that often accompany these disorders. Finally, incremental validity analyses showed the RCSs to be superior to the CSs in the prediction of both externalizing and internalizing comorbidity. This was particularly true for the prediction of externalizing in which RCd, RC3, and RC4 contributed an additional 9% of variance beyond that of the CSs. Similar results were reported by Simms et al. (2005), who found that the RCSs and CSs explained equivalent amounts of variance in depressive and anxiety disorder diagnoses, and RC4 contributed incremental variance to the prediction of substance-related disorders. RC4 has also been shown to contribute incrementally (over CS4) to the prediction of self-reported ASPD features (Sellbom, Graham, & Schenk, 2006).

Strengths of this study were its large sample size and the use of structured diagnostic interviews with good interrater reliability for the assessment of PTSD and comorbid disorders. Its primary limitation was that the sample included only male veterans, which rendered it unclear to what extent these results would generalize to women. We addressed this issue in Study 2 by examining the RCSs in a large clinical sample of women receiving VA services.

Study 2

Aims

The primary aim of this study was to replicate and extend a subset of the findings of Study 1 by examining the psychometric

properties of the RCSs in a female clinical sample of veterans and active duty military personnel with symptoms of PTSD. The first goal was to provide descriptive data concerning the mean RCS scores and frequency of elevations in this sample. Second, we examined the associations between the RCSs, CSs, PK scale, and dimensional indicators of PTSD.

Method

Participants

Participants were 136 women referred for outpatient PTSD treatment between 1995 and 2005 at the New Mexico Veterans Affairs Healthcare System who had valid MMPI–2 profiles, as defined in Study 1. Thirty-one additional women produced invalid profiles on the MMPI–2 and were omitted from analyses. Eighty-two participants met criteria for current PTSD, as assessed by the Clinician Administered PTSD Scale (CAPS; Blake et al., 1995). The majority (93%) of participants who did not meet criteria for current PTSD met criteria for a lifetime diagnosis of PTSD, as assessed by the CAPS. Given this, we were unable to contrast positive versus negative PTSD cases. The majority of women reported experiencing a sexual assault–related trauma (65.9%), and an additional 26.5% reported experiencing multiple types of trauma, including sexual assault, combat, physical abuse, and emotional abuse. Participants reported their race and ethnicity as follows: White (56%), Hispanic (25%), Black (11%), and American Indian/Alaskan Native (3%). Ethnicity is unknown for 5% of the participants. The mean age was 43 (range = 19–69).

Measures

CAPS (Blake et al., 1995). The CAPS is the current gold standard in PTSD assessment. It is a semistructured interview that assesses the frequency and intensity of the 17 core *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., or *DSM–IV*; American Psychiatric Association, 1994) symptoms of PTSD and features associated with the disorder. The interview was administered by doctoral-level clinicians. We used a conservative and validated scoring rule (Weathers, Ruscio, & Keane, 1999) to determine positive PTSD diagnosis: The CAPS severity score had to be 65 or more and at least one Reexperiencing, three Avoidance and Numbing, and two Hyperarousal symptoms had to be endorsed. Each symptom had to receive a frequency score of 1 or more and an intensity score of 2 or more to be counted (see Weathers et al., 1999 for further explanation).

MMPI–2 (Butcher et al., 1989). See Study 1 for a description of this measure. For Study 2, we analyzed *T* scores, as we did not have access to the raw scale or item scores.[5]

Statistical Analyses

We first examined descriptive data for the RCSs and CSs in the 82 participants with current PTSD. We then computed Pearson correlations between current PTSD severity and the RCSs, CSs, and PK scale for the entire sample as a marker of criterion validity. Regrettably, we had no suitable measures of internalizing and externalizing comorbidity to examine the construct validity of the RCSs in the female sample.

Results

Descriptive Data

Examination of the RCS and CS mean scores in the subsample of 82 female participants with current PTSD revealed clinically significant elevations ($T \geq 65$) on four RCSs (RCd, RC1, RC2, and RC7) and eight CSs (CS1, CS2, CS3, CS4, CS6, CS7, CS8, and CS0; see Table 2). There were more instances in which the CSs were elevated at the $T \geq 75$ level in at least 50% of the sample (on CS1, CS2, CS3, CS7, and CS8) than there were in which the RCSs were elevated at this level (only RCd and RC1). *T* scores on the PK scale were 75 or more in 67% of the sample. The average interscale correlation among the nine RCSs was .34, whereas the average interscale correlation among the nine CSs (excluding CS5) was .41. With the exception of CS3 and RC3, which correlated with one another at −.13, each RCS and CS pair tended to correlate highly with one another (mean *r* for all other pairs = .61, range = .40 for RCS and CS 4 to .87 for RCS and CS 1). The strongest associations between the PK scale and the RCSs and CSs were .83 with RCd and .82 with CS8.

Criterion Validity

We next examined the correlations between overall PTSD severity and *DSM–IV* cluster severity, as assessed by the CAPS, and the RCSs, CSs, and the PK scale. These results are presented in Table 6. The RCSs and CSs evidenced differential associations with PTSD severity and each symptom cluster: RC1 and CS8 were the scales most strongly associated with total PTSD severity (*r*s = .38 and .36, respectively); RC1 and CS1 were the scales most strongly related to Reexperiencing symptoms (*r*s = .30 and .28, respectively); RCd and CS8 were the scales most strongly associated with Avoidance and Numbing symptoms (*r*s = .37 and .31, respectively); and RC1 and CS6 were the scales most highly correlated with Hyperarousal symptoms (*r*s = .40 and .38, respectively). The PK scale correlated with overall PTSD at .39 and its association with the symptom clusters ranged from .30 to .36.

Discussion

The aims of the second study were to examine the replicability of a subset of findings obtained in Study 1 using an archival sample of women receiving clinical services at a VA Medical Center. Analyses revealed largely comparable patterns of results across the two samples. Four out of the five RCSs that were clinically elevated in the male sample (RCd, RC1, RC2, and RC7) were also elevated in the female sample (and RC8, which was elevated in the male sample, fell just short of this threshold in the female sample). One sample difference that did emerge was that the severity of overall PTSD and the reexperiencing and hyperarousal symptoms were most strongly related to RC1 in the female

[5] We were unable to compute internal consistency coefficients for the RCSs and CSs in Study 2 because these data were archival clinical data stored electronically in VA patient medical records. The VA computer system stores MMPI–2 data in raw form and rescores it every time the record is retrieved according to currently available scales (including the RCSs). We were unable to extract this item-level data from the medical records because of limited resources.

Table 6
Pearson Correlations Between PTSD Severity and the RCSs, CSs, and PK Scale in the Female Sample (N = 136)

	PTSD severity							
	Total symptoms		B symptoms		C symptoms		D symptoms	
MMPI-2 scale	RCSs	CSs	RCSs	CSs	RCSs	CSs	RCSs	CSs
Demoralization	.34***		.21**		.37***		.28**	
1	.38***	.33***	.30***	.28***	.28**	.23**	.40***	.35***
2	.25**	.30***	.13	.20**	.30***	.30***	.19*	.23**
3	.16	.26***	.11	.20*	.12	.17*	.20*	.31***
4	.11	.17*	.05	.10	.10	.15	.11	.20*
5		.04		.03		.00		.08
6	.16	.35***	.10	.22**	.10	.30***	.21*	.38***
7	.32***	.26**	.24**	.22**	.28**	.22**	.29**	.22*
8	.17	.36***	.11	.27***	.13	.31***	.19*	.34***
9	.17	.08	.16	.14	.06	−.03	.25**	.13
0		.19*		.09		.27**		.08
PK	.39***		.30***		.36***		.33***	

Note. PTSD = posttraumatic stress disorder; RCSs = Restructured Clinical Scales; CSs = Clinical Scales; PK = Keane PTSD Scale; B symptoms = PTSD reexperiencing symptoms; C symptoms = PTSD avoidance and numbing symptoms; D symptoms = PTSD hyperarousal symptoms; MMPI–2 = Minnesota Multiphasic Personality Inventory—2.
* $p < .05$. ** $p < .01$. *** $p < .001$.

sample, whereas these measures were most strongly related to RCd in the male sample. This finding is novel given that prior work has generally not suggested that gender moderates the association between psychological distress and somatization (Piccinelli & Simon, 1997). We were unable to test directly whether gender operates as a moderator in this way; further investigation of RC1 in male versus female PTSD samples would help to resolve the issue. A second difference between samples was that the magnitude of the correlations between the RCSs, CSs, PK scale, and PTSD were weaker in the women. Possible explanations for these differences include (a) there was less score dispersion in the female sample, as all participants endorsed significant PTSD symptoms, which would be expected to attenuate the magnitude of associations, and (b) *T* scores were analyzed in the female sample, whereas raw scores were analyzed in the male sample, and the use of standardized scores would be expected to affect the magnitude of associations by weighting the variance of all the scales equally.

General Discussion

The primary aim of this research was to examine the psychometric properties and clinical utility of the RCSs for the assessment of PTSD and comorbid psychopathology and to establish norms for men and women with PTSD receiving services at the VA. Although not specifically designed to assess PTSD symptoms, the RCSs that were most consistently associated with the disorder were scales that measure constructs that overlap with aspects of PTSD, such as reexperiencing and flashbacks (RC8), numbing (RC2), and hyperarousal (RC7). In addition, the RCSs captured the somatic complaints (RC1) and the negative emotionality, dysphoria, and sense of demoralization (RCd and RC7) that often accompany the disorder. Recent structural models of PTSD have suggested that negative emotionality and dysphoria account for covariation among the majority of the emotional numbing and hyperarousal symptoms (Simms et al., 2002). Consistent with this, RCd and RC7 were more strongly associated with the PTSD cluster C and D symptoms than with cluster B in both the male and female samples.

Relationship Between the RCSs and Comorbid Internalizing Disorders

In keeping with theories positing that negative emotionality is the common factor underlying the unipolar mood and anxiety disorders (Brown et al., 1998; Mineka et al., 1998; Watson, 2005; Watson et al., 1988), we found RCd and RC7 (the RCSs most directly linked to this construct) to be most strongly related to a composite measure of internalizing psychopathology based on SCID diagnoses. These scales also showed a differential pattern of associations with individual internalizing disorders that was consistent with prior research on the structure of this spectrum of psychopathology (Brown et al., 1998; Watson, 2005; Watson et al., 1988). For example, the strength of the association between RCd and MDD was nearly double that of the association between RCd and PD, and OCD was significantly related to RC7 (as was PD) but not to RCd. These findings are consistent with the notion that MDD is more heavily saturated with generalized dysphoria (i.e., RCd) compared to more phenotypically circumscribed disorders such as OCD or PD that are thought to align more with a dimension of pathological fear (Krueger, 1999; Miller et al., 2008; Slade & Watson, 2006; Watson, 2005). Similarly, Tellegen et al. (2006) found that RC7 was more related to measures of fear and RCd was more strongly related to indicators of generalized distress.

From an emotion theory standpoint, these findings suggest that it may be useful to conceptualize RCd as reflecting low-arousal trait negative emotionality, whereas RC7 reflects high-arousal negative affect, such as fear, anxious arousal, and anger. One caveat to this, though, is that RC7 may not be specific to these states because it also tends to be correlated with depression (e.g., Tellegen et al., 2003, 2006). Finally, the finding that RC1 was modestly correlated with the internalizing factor, MDD, and PD suggests that it may be sensitive to the physical complaints com-

monly associated with MDD and to the heightened sensitivity to interoceptive cues that characterizes PD. More broadly, this is consistent with evidence that somatization-based disorders load on the internalizing factor (Krueger et al., 2003; Slade & Watson, 2006).

Research on the structure of anxiety and unipolar mood disorders has suggested that low positive emotionality is the dimension of affect/temperament that best differentiates depression (Watson et al., 1988) and social phobia (Brown et al., 1998) from other disorders of the internalizing spectrum. Consistent with this, prior work has shown that RC2 (Low Positive Emotions), which was designed to provide a purer measure of anhedonia than CS2, has stronger negative correlations with personality-based measures of positive emotionality compared with CS2 (Sellbom & Ben-Porath, 2005; Simms et al., 2005). On this basis, we expected RC2 to show a selective association (among the RCSs) with major depression. However, this was not the case. As reported previously by Simms et al. (2005), in male veterans RC2 showed comparable associations with MDD and PD, suggesting that RC2 may yield good convergent validity but weaker divergent validity. One implication of these findings is that the construct tapped by RC2, which includes the social withdrawal, detachment, avoidance, and discomfort common to many of the internalizing disorders, may not provide a specific index of symptoms in the domain of anhedonia. Instead, evidence that RC2 is inversely related to constructs such as social potency and social closeness (Sellbom & Ben-Porath, 2005) suggests that it may be more appropriate to conceptualize this scale as reflecting introversion and low positive temperament broadly rather than low positive affect specifically, the latter being captured to a greater extent by RCd.

Relationship Between the RCSs and Comorbid Externalizing Disorders

The RCSs evidenced good convergent, divergent, and incremental validity for the assessment of disorders of the externalizing spectrum. RC4 was related to alcohol- and drug-use disorders and to ASPD, suggesting that RC4 may represent a useful marker for disconstraint, the personality substrate for the externalizing disorders (Krueger et al., 2001; Miller, Vogt, Mozley, Kaloupek, & Keane, 2006). Consistent with prior work (Forbey & Ben-Porath, 2007), RCd was also significantly associated with alcohol-use disorders, which supports the argument that negative emotionality, although more strongly associated with the internalizing spectrum, may also play a role in externalizing disorders (Miller et al., 2006, 2008; Mineka et al., 1998). RC3 was also associated with externalizing disorders, whereas CS3 showed stronger associations with internalizing disorders. Finally, this study points to the relevance of RC9 for the assessment of externalizing disorders. Related to this, Sellbom, Graham, and Schenk (2006) reported that RC9 contributed incremental variance over CS9 in the prediction of self-reported manic symptoms.

Controversies Associated With the RCSs

Our findings are relevant to important controversies associated with the RCSs. Nichols (2006) questioned the "syndromal fidelity" of the RCSs and the clinical utility of the scales. He argued that the removal of demoralization negatively affected the validity of RC2 because RC2 is "missing substantial core variance for depression" (p. 131) in comparison to CS2. To the contrary, our results underscore the value of removing demoralization from the CSs onto its own scale because, overall, this allowed RCd, RC2, and RC7 to better distinguish the anxious-misery–based disorders (e.g., MDD, PTSD, and generalized anxiety disorder) from fear-based ones (e.g., PD, OCD, and the phobias; Krueger, 1999; Miller et al., 2008; Slade & Watson, 2006). In contrast, the CSs did not discriminate between these disorders, a pattern also observed by Simms et al. (2005). Our findings also address a debate concerning the validity of using the homogeneous RCSs to measure heterogeneous disorders (see Caldwell, 2006; Finn & Kamphuis, 2006; Nichols, 2006; Tellegen et al., 2006) and suggest that these unidimensional scales appear to enhance the assessment of complex psychopathology. Overall, our findings suggest that the changes made to the core constructs of the RCSs, relative to the CSs they were derived from, have yielded a set of scales with improved reliability, validity, and clinical utility.

Strengths, Limitations, and Conclusion

To our knowledge, these studies are the first to comprehensively evaluate the performance of the RCSs for the assessment of PTSD and related comorbidities. The primary strengths of this work were (a) the inclusion of a large, well-defined sample of male veterans; (b) the inclusion of a second sample of women, permitting examination of the generalizability of a subset of results obtained in Study 1; and (c) the use of clinician-administered structured interviews for the assessment of PTSD (in both studies) and comorbid disorders (in Study 1). Study limitations included the exclusive focus on individuals receiving VA services, the inability to include data from men and women in the same analysis, and the lack of a never-PTSD comparison group in the female sample. All of these factors may have attenuated the range of responses on our measures and in turn affected the magnitude of the correlations, limiting the generalizability of these results. Finally, although most of our effect sizes were moderate to large, the sheer number of analyses may have increased the likelihood of Type I errors.

In conclusion, results of this study suggest that the RCSs have largely met the goals set forth by Tellegen et al. (2003). The RCSs have improved psychometric characteristics and purer associations with clinical phenomena compared with the CSs, and they map better onto current theory regarding the structure of psychopathology. Our findings provide strong support for the future use of the RCSs for assessment of PTSD and its comorbidities.

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Correction to Wolf et al. (2008)

In the article "The MMPI—2 Restructured Clinical Scales in the Assessment of Posttraumatic Stress Disorder and Comorbid Disorders," by Erika J. Wolf, Mark W. Miller, Robert J. Orazem, Mariann R. Weierich, Diane T. Castillo, Jaime Milford, Danny G. Kaloupek, and Terence M. Keane (*Psychological Assessment*, 2008, Vol. 20, No. 4, pp.327–340), the URL for the supplemental material was incomplete. The complete URL is http://dx.doi.org/10.1037/a0012948.supp.