Validity of the Somatic Complaints Scales of the MMPI-2-RF in an Outpatient Chronic Pain Clinic

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Abstract

Chronic pain has become a significant medical issue. The Minnesota Multiphasic Personality Inventory-2-Restructured Form (MMPI-2-RF) is a broadband psychological test that has been validated for use across various medical settings and can aid in the assessment and treatment planning of chronic pain. In the current investigation, it was hypothesized that the somatic complaints scales of the MMPI-2-RF would demonstrate good convergent validity from a structured psychodiagnostic interview and other measures of pain and somatization, and lack gender bias. Patients (n = 200) who produced valid MMPI-2-RFs in an outpatient chronic pain clinic were included in the study. Patients were also administered the Modified Somatic Perception Questionnaire (MSPQ), Pain Disability Index (PDI), and the Structured Clinical Interview for DSM-IV-TR (SCID). Zero-order and partial correlations (controlling for gender) were calculated between MMPI-2-RF scale scores and other criteria. Stepdown hierarchical regression analyses were used to detect bias. By and large, higher scale scores on the somatic/cognitive scales of the MMPI-2-RF were modestly or substantially correlated with MSPQ scores, PDI scores, and SCID Somatization symptom count, even after controlling for gender. Regression analyses suggested that the MMPI-2-RF scale scores were not biased as a function of gender. These findings support the validity of specific MMPI-2-RF scales to help identify somatization and psychosocial functioning among patients with chronic pain. Identification of somatization early within the course of treatment of chronic pain may help focus treatment targets, including referrals for psychological interventions such as Cognitive Behavior Therapy for Chronic Pain.

Keywords: MMPI, Chronic Pain, Somatization, Assessment, PDI, MSPQ

Validity of the Somatic Complaints Scales of the MMPI-2-RF in an Outpatient Chronic Pain Clinic

Chronic pain has become a significant medical issue (Dueñas et al., 2016). Indeed, the Centers for Disease Control and Prevention (CDC) analyzed the 2016 National Health Interview Survey (NHIS) data and found an estimated 20.4% or 50 million adults in the United States experience chronic pain (Dahlhamer et al., 2018). Chronic pain is associated with a myriad of physical and mental health conditions that contribute to higher health care costs (Dahlhamer et al., 2018). Individuals with chronic pain may experience limitations that permeate numerous areas of their life. Major life domains that tend to be negatively affected include work productivity, social interaction, recreational activities, and self-care practices.

The association between psychopathology and chronic pain has been well-studied. Mental health issues, like depression, may precede the pain disorder (Bair et al., 2003; McCord & Drerup, 2011). Previous work has demonstrated correlations between chronic pain and depressive, anxiety, somatoform, substance use, and personality disorders (Dersh et al., 2002). Accurately assessing the psychosocial functioning of patients may result in the patient attaining treatment that is more beneficial in addressing and reducing chronic pain. Treatment for chronic pain may include cognitive behavioral therapy and low to moderate intensity cardiovascular exercises to decrease pain (Ehde et al., 2014; McBeth et al., 2012). Both treatments can be implemented to help the patient improve daily functioning.

Multidisciplinary pain management appears to be the best approach to assess and treat patients with these comorbid conditions. In cases where psychopathology precedes or coexists with chronic pain, proper diagnosis and treatment of the mental health condition can help lessen

the role psychosocial characteristics play in the presentation of chronic pain and the patients experience with adhering to treatment (McCord & Drerup, 2011).

Comorbid psychological disorders among patients with chronic pain include depression, anxiety, substance use, and somatization disorders (Marek, Anderson, et al., 2020; Von Korff et al., 2005). Somatization occurs when physical symptoms are indeed present (e.g., chronic pain, weakness) but result in the individual having excessive thoughts, feelings, and behaviors related to the physical symptoms (Association, 2013; Dimsdale et al., 2009). Notably, somatization tends to predict poorer treatment outcomes in chronic pain settings (Block et al., 2017; Marek, Block, et al., 2015; Marek et al., 2019). Although both men and women seek treatment for chronic pain, some studies suggest somatization tends to be reported more among women than men (Barsky et al., 2001; Bragazzi et al., 2014; Ladwig et al., 2001; Ladwig et al., 2000). Still, other studies suggest there are no gender differences or, if differences exist, they tend to be quite small (Delisle et al., 2012; Marek, Anderson, et al., 2020). On one hand, women may tend to score higher on measures of somatization because women tend to utilize health care services more than men (Ladwig et al., 2001). On the other hand, measures of somatization may include elements of bias that tend to exaggerate gender differences. Identifying methods of assessing somatization that is free of gender bias may be warranted.

The MMPI-2-RF (Ben-Porath & Tellegen, 2008/2011; Tellegen & Ben-Porath, 2008/2011) is commonly used across medical settings (Marek & Ben-Porath, 2017) and the chronic pain comparison group data for men and women are also available. The authors of the MMPI-2-RF addressed numerous psychometric problems with its predecessors and the test yields better reliability and validity coefficients compared to its previous iterations. The MMPI-2-RF is comprised of 338 items, including nine validity scales, and 42 substantive scales. The

substantive scales of the test assess five domains congruent with contemporary models of psychopathology and is identified as one of the measures that align with the Hierarchical Taxonomy of Psychopathology (HiTOP) (Kotov et al., 2017).

Although the MMPI-2-RF measures several domains related to emotional and behavioral problems that can co-occur with chronic pain (e.g., mood, anxiety, substance abuse), the test also assesses somatization. An examination of the factor structure of the Specific Problems Scales of the MMPI-2-RF demonstrated four domains: Internalizing, Externalizing, Detachment, and Somatization (Marek, Anderson, et al., 2020; Sellbom, 2017). Across numerous medical samples (including chronic pain), the somatization factor tends to correlate most highly with external criteria related to somatization and demonstrates adequate discriminant validity against other criteria (including other internalizing criteria) (Marek, Anderson, et al., 2020). With regard to chronic pain treatment facilities, the scale scores of the MMPI-2-RF demonstrated good psychometric properties, including convergent and discriminant validity, and predicts outcomes after treatment (Tarescavage et al., 2015, 2018). The scale scores on the MMPI-2-RF also serve as a better differential diagnostic tools over the MMPI-2 (McCord & Drerup, 2011). Research has also elucidated that MMPI-2-RF scale scores are not be biased as a function of gender, race, or age among patients seeking bariatric surgery (Marek, Ben-Porath, et al., 2015). The MMPI-2-RF has also been developed to work well in the pre-surgical psychological evaluation of spine surgery and spinal cord stimulator (SCS) patients (Block & Ben-Porath, 2018). Indeed, the Somatic/Cognitive Specific Problems Scales tend to correlate well with criteria such as functional disability and pain and also predicts short-term outcomes in spine surgery/SCS settings (Block et al., 2013; Block et al., 2019; Block et al., 2017; Block et al., 2014; Marek, Ben-Porath, et al., 2020; Marek, Block, et al., 2015; Marek et al., 2019).

To date, the validity of the Somatic/Cognitive Specific Problems Scales of the MMPI-2-RF have been validated in a chronic pain sample (Tarescavage et al., 2015); however, validity of the MMPI-2-RF scale scores not been cross-validated in a secondary chronic pain treatment seeking sample and examinations of gender-bias have not been explored. Moreover, external criteria in previous studies (Marek, Anderson, et al., 2020; McCord & Drerup, 2011; Tarescavage et al., 2015) tend to focus more on broader psychosocial variables and are limited in scope regarding assessment of somatization. Additionally, limited research is available regarding the differential validity (predictive bias) of the MMPI-2-RF scale scores. Thus, the current investigation seeks to cross-validate the Somatic/Cognitive Specific Problems Scales of the MMPI-2-RF by using symptom counts of somatization-related disorders derived from a structured psychodiagnostic instrument and other self-report measures more narrowly focused to assess somatization. Additionally, MMPI-2-RF scale score bias will also be examined. It is hypothesized that the Somatic/Cognitive Specific Problems Scales of the MMPI-2-RF will yield good convergent validity in an outpatient chronic pain sample. Additionally, it is hypothesized that the Somatic/Cognitive Specific Problems Scales of the MMPI-2-RF will not exhibit gender bias in assessing somatization between men and women.

Method

Participants

A total of 230 patients who were seeking outpatient treatment for chronic low back pain were available. Of those, 30 patients were removed from further analyses because they produced an invalid MMPI-2-RF according to criteria outlined in the MMPI-2-RF Technical Manual (Tellegen & Ben-Porath, 2008/2011): Variable Response Inconsistency-Revised $\geq$ 80, Fixed Response Inconsistency-Revised $\geq$ 80, Infrequent Responses-Revised $\geq$ 120, Infrequent

Psychopathology Responses ≥ 100. Of the 200 patients included in analyses, 58.5% were women and 41.5% were men. A majority of the sample identified as being White (96.0%) whereas 3% identified as being Black, .5% identified as being Asian American, and .5% reported being of another ethnicity. The sample had a mean age of 50.12 years old (SD = 14.39) and reported an average of 12.83 years of education (SD = 2.07). Listed in Table 1 are additional demographic data associated with this sample. Use of this database was approved by the third author's Institutional Review Board and patients provided consent at the time of their evaluation that their archival data could be used for research.

Measures

Minnesota Multiphasic Personality Inventory – 2 – Restructured Form (MMPI-2-RF; Ben-Porath & Tellegen, 2008/2011; Tellegen & Ben-Porath, 2008/2011). The MMPI-2-RF is a 338-item, self-report inventory that assesses personality and psychosocial functioning congruent with contemporary models of psychopathology/personality (Kotov et al., 2017; Sellbom, 2019). The MMPI-2-RF captures a broad range of psychological functioning, including internalizing, externalizing, thought disorder, interpersonal, and somatization. Notably, the scale scores of the MMPI-2-RF yield good reliability and validity (including convergent, discriminant, and predictive validity) coefficients when used with chronic low back pain patients (Marek, Anderson, et al., 2020; Tarescavage, 2015; Tarescavage et al., 2015).

Pain Disability Index (PDI; Pollard, 1984). The PDI is a 7-item, self-report measure that assesses how pain disrupts various domains of functioning (e.g., social activity, responsibilities). The scale score of the PDI yields good reliability and validity coefficients when used in various chronic pain settings (Jerome & Gross, 1991; Tait et al., 1990). In the current sample, Cronbach's alpha was equal to .88 (mean inter-item correlation = .51) indicating good reliability.

Modified Somatic Perception Questionnaire (MSPQ; Main, 1983). The MSPQ is a 13-item, self-report measure that assesses somatic and autonomic perception in patients with chronic pain. Although the scale score of the measure yields some questionable psychometrics regarding its ability to predict functional disabilities and outcomes (Deyo et al., 1989; Donaldson et al., 2011). In the current sample, Cronbach's alpha was equal to .84 (mean inter-item correlation = .29) indicating good reliability.

Structured Clinical Interview for DSM-IV-TR Disorders: Somatoform Disorders Module (SCID; First et al., 2002). The SCID used in this study is a structured clinical interview to aid in formulating reliable psychiatric diagnosis consistent with the DSM-IV-TR (Association, 2000). For the current study, only the somatoform disorders module was utilized. Standardized administration was modified to remove skip-out decision rules to fully assess the range of symptomatology for each of these conditions with a dimensional symptom count. Additionally, DSM-5 (Association, 2013) uses different criteria to diagnose somatic symptom-related disorders. Due to advances in understanding psychodiagnosis from a dimensional perspective (Kotov et al., 2017), examining the number of overall symptoms across somatization disorders likely serves as better dimensional proxy for severity of somatization-related functioning. Thus, a symptom count variable was used in the current study, such that more symptoms reported indicates more severe somatization.

Procedure

Data were drawn from a retrospective, deidentified database. Patients consented to have their clinical data used archivally for research purposes. Participants were administered the MMPI-2-RF, MSPQ, PDI, and SCID somatoform disorders module as part of their routine clinical evaluations. Means and standard deviations were calculated by gender for each scale

score used in the study (Tables 2 and 3). Additionally, *t*-tests were calculated to test whether scale scores differed significantly and meaningfully between gender. Cohen's *d* effect sizes were calculated for each *t*-test. Pearson Product-Moment correlations (Table 4) were calculated to examine the convergent validity of the MMPI-2-RF Somatic/Cognitive Scales. Also contained in Table 4 are partial correlations controlling for gender.

To test whether the MMPI-2-RF Somatic/Cognitive scale scores are biased as a function of gender, stepdown hierarchical regression analyses were conducted (Lautenschlager & Mendoza, 1986). Briefly, a regression model that included only the MMPI-2-RF scale score as a predictor (prediction model) was compared with one that included that scale, the gender, and the interaction of the two (full model). R^2 was examined to compare models (.010 = Small Effect Size; .090 = Medium Effect Size; .250 = Large Effect Size)(Cohen, 1988). If there is a significant increase in R^2 between models, potential bias is occurring and follow-up tests to determine if bias is occurring in the slope or the intercept were then conducted. To conduct a test of slope bias, the full model is compared to a model with the MMPI-2-RF scale score and gender. If there is a significant increase in R^2 between models, slope bias is present and intercept bias is then tested. To test for intercept bias when slope bias is present, the full model was compared to a model with the MMPI-2-RF scale score and the moderator. If there is a significant increase in R^2 between models, intercept bias is present. If slope bias was not detected, intercept bias was then tested by comparing the prediction model with a model that includes the MMPI-2-RF scale score and gender. Again, a significant increase in R^2 between models indicates that intercept bias is present. All continuous predictors were centered around their means and centered values were also used in the computation of the moderating variable. These results are reported in Table 5.

Results

Listed in Table 2 are means, standard deviations, and inferential statistics between MMPI-2-RF Somatic/Cognitive scales and gender. By and large, women tended to score higher on a number of MMPI-2-RF Somatic/Cognitive scales, including Somatic Complaints, Head Pain Complaints, and Cognitive Complaints. These differences yielded small to medium effect sizes.

Displayed in Table 3 are means, standard deviations, and inferential statistics between the PDI scale score, MSPQ scale score, and SCID somatization symptom count broken down by gender. Women tended to score higher on the MSPQ compared to men and this difference yielded a medium effect size.

Listed in Table 4 are zero-order and partial correlations (controlling for gender) between the MMPI-2-RF Somatic/Cognitive scales and the criteria measures (PDI, MSPQ, and SCID somatization symptom count). The Somatic Complaints scale scores were positive and modestly associated with PDI scores and SCID somatization symptom count. A substantial association was founded between Somatic Complaint scale scores and MSPQ scales scores. Malaise scores were modestly related to PDI scores and MSPQ count and small to moderately related to SCID somatization symptom count. The Gastrointestinal Complaints scale score was small to modestly associated with SCID somatization symptom count and moderately associated with MSPQ scores. MSPQ scale scores were also modestly associated with Head Pain Complaints, Neurological Complaints, and Cognitive Complaints scale scores. Small to modest associates were evidenced between Head Pain Complaints, Neurological Complaints, and Cognitive Complaints scale scores and PDI scores and SCID somatization symptom count. When

comparing the zero-order correlations to the partial correlations, the magnitude of the associations did not substantially change as a result of controlling for gender.

Displayed in Table 5 are results of slope/intercept bias analyses of the MMPI-2-RF Somatic/Cognitive scales by gender with the three criteria (PDI, MSPQ, SCID somatization symptom count). No evidence of bias emerged when predicting PID scores and SCID somatization symptom count. When using the MSPQ as a dependent variable, analyses demonstrated significant increments in R^2 when using Malaise, Neurological Complaints, and Cognitive Complaints scales. Although statistically significant, these increments were small in effect size. Nonetheless, slope and intercept bias analyses were conducted. None of the analyses supported indices of slope bias. Intercept bias was present in all three follow-up analyses, though the effect sizes were quite small. In all instances, Malaise, Neurological Complaints, and Cognitive Complaints scales tended to over-predict somatization in men and under-predict them in women.

Discussion

Overall, analyses largely supported the hypotheses. Notably, the Somatic/Cognitive Specific Problems Scales of the MMPI-2-RF tended to correlate well with two alternative self-report measures of somatic symptoms and converged well with clinician interview data from the SCID. Because women tended to score higher on several scales of the MMPI-2-RF, differential validity also needed to be considered. By and large, the MMPI-2-RF scale scores used in this study demonstrate little to no evidence of differentially predicting somatization across gender.

MMPI-2-RF scale scores converged well with external criteria. Notably, scale scores yielded good convergent validity coefficients with both self-report and interview-based methods of assessing for somatization. Past studies often relied on indices of functional disability, reports

of medical problems, and medical chart diagnoses that may infer a somatization component (e.g., Chronic Fatigue Syndrome) (Block et al., 2013; Marek, Anderson, et al., 2020; Marek, Ben-Porath, et al., 2020; Tarescavage et al., 2015). The coefficients in the current investigation add to the current literature suggesting that the MMPI-2-RF Somatic/Cognitive scale scores yield good construct validity in chronic pain settings by using both interview and self-report data specific to the construct of somatization.

Descriptive information reported in this study demonstrated a common observation across medical samples. Notably, women tended to have higher scores on somatic scale scores across measures. However, consistent with some past reports (Delisle et al., 2012), these differences yielded small effect sizes. Once gender was controlled for, the MMPI-2-RF validity coefficients were not much affected. Follow-up analyses to test for potential gender bias in the MMPI-2-RF Somatic/Cognitive scale scores were largely unsupported. A few scale scores (Malaise, Neurological Complaints, and Cognitive Complaints) slightly over-predicted MSPQ scores for men and under-predicted MSPQ scores for women. However, these instances of intercept bias did not occur across other indices of somatization, including symptom count derived from a structured clinical interview. Because men tended to score lower on the MSPQ and women tended to score higher on the MSPQ, it is likely that the these observed effects reflect gender differences in the MSPQ vs. over-/under-prediction on the MMPI-2-RF scale scores. It is also important to note that the intercept bias coefficients in these analyses tended to be small in effect size. Thus, gender-based differential validity was not supported. Overall, there was a lack of differential validity in the MMPI-2-RF Somatic/Cognitive scale scores. Thus, the MMPI-2-RF Somatic/Cognitive scale scores are not biased as a function of gender among patients seeking treatment for chronic pain. Importantly, MMPI-2-RF scale scores tend to be

unbiased in their assessment of psychological constructs in medical settings as evidenced here and elsewhere (Marek, Ben-Porath, et al., 2015). Contemporary models of psychopathology (Kotov et al., 2017) suggest that somatization is a separate spectrum from internalizing (mood, anxiety, distress) and empirical evidence to date supports this claim (Kotov et al., 2011; Marek, Anderson, et al., 2020; Sellbom, 2017). Using a test, such as the MMPI-2-RF, can offer a more delineated assessment of somatization while also providing assessment of distress, mood, anxiety, and substance-related problems. To add MMPI-2-RF is one of the recommended measures listed to assess HiTOP (Kotov et al., 2017). Additionally, using a test such as the MMPI-2-RF limits the need to administer multiple screeners in piecemeal fashion, some of which have not been well-validated in medical populations.

These findings also point towards broader implications in future research regarding somatization. Similar to past studies (Barsky et al., 2001; Bragazzi et al., 2014; Ladwig et al., 2001; Ladwig et al., 2000), women in the current investigation reported greater severity of somatization than men; however, scale differences did not result in differential validity suggesting that the MMPI-2-RF accurately assesses somatization regardless of gender. Ladwig et al. (2001) reported that women were at a much higher risk for somatization than men, but gender differences in risk for somatization were similar once emotional distress and socioeconomic status were accounted for. Ladwig et al. (2001)'s study implied that other sociodemographic and psychological variables may play a role in somatic symptom expression. Bragazzi et al. (2014) also reported that cultural differences accounted for disparities in scores on the MSPQ, suggesting that somatic symptom expression may be influenced by cultural norms. Overall, future research needs to better understand and account for cultural differences or socioeconomic

status in assessing somatization and understanding how those demographics affect treatment outcomes.

The current investigation has several limitations. Because the sample reported that they were predominately white/Caucasian, differential validity of the MMPI-2-RF Somatic/Cognitive scale scores as a function of race/ethnicity was not able to be conducted due to low statistical power. Nonetheless, other studies using chronic pain patients and bariatric surgery patients suggest that the MMPI-2-RF scales are likely not biased as a function of race/ethnicity (Marek, Anderson, et al., 2020; Marek, Ben-Porath, et al., 2015). Another limitation was the lack of treatment outcome data. Although the MMPI-2-RF Somatic/Cognitive scale scores tend to predict emotional functioning and functional disability after treatment in both non-surgical (Tarescavage et al., 2018) and surgical (Block et al., 2017; Marek, Block, et al., 2015) settings, no study to date has examined how somatization changes as a function of treatment. Follow-up studies examining predictors of treatment outcomes should consider using a measure of somatization in addition to measures of internalizing and externalizing functioning.

An important implication of the current investigation is how these results will likely carry over to the MMPI-3 (Ben-Porath & Tellegen, 2020a, 2020b) and to the broader understanding of psychosocial functioning. Many of the Somatic/Cognitive Scales of the MMPI-2-RF are being carried over and enhanced for the MMPI-3. New normative data have been collected and item content has been revised and updated. The MMPI-3 is aligned with contemporary models of psychopathology, and comparison group data for spine surgery patients will be available when the new test is published. Somatic Complaints, Malaise, Neurological Complaints, and Cognitive Complaints will all appear on the MMPI-3 (with some enhancements), along with a newly developed scales addressing eating-related concerns, impulsivity, self-importance, and

compulsivity. Because the test will be similar to the MMPI-2-RF, results from the current investigation will likely provide some continuity for the MMPI-3. Across both the MMPI-2-RF and MMPI-3, these tests differentially assess problems with mood, anxiety, distress, and somatization. Because many patients who present in medical settings often exhibit a fair amount of demoralization (Fava et al., 1995), tests' and measures' discriminant validity are often confounded. By using psychological tests and measures that appropriately differentiate between these constructs, practitioners can better understand their patients and can use test scores to aid in differential diagnosis and treatment planning. Taken together, the MMPI-2-RF is a well-validated, broadband test of personality and psychosocial functioning. The test can assess for a wide-range of functioning, including somatization. Accumulating evidence also suggests that the scale scores of the test tend to not be biased as a function of demographics. When used in a chronic pain setting, mental health professionals can gather a vast amount of information about the client that are pertinent to the diagnosis and treatment planning of their patients in under an hour.

Compliance with Ethical Standards

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Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.

Informed consent: Informed consent was obtained from all individual participants included in the study at the time the data were collected.

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573 Table 1.

574 Additional demographic data of patients in the current sample.

575

Demographic Characteristics	**Prevalence**
Reason for Evaluation	
Spinal Cord Stimulator	43.00%
Medication Management	43.50%
Psychological Services	13.50%
Receiving Disability Benefits	36.08%
Currently Participating in Outpatient Mental Health Treatment	11.73%
History of Participating in Outpatient Mental Health Treatment	50.00%
History of Inpatient Psychiatric Hospitalization	12.24%
Currently Prescribed a Psychotropic Medication	60.91%
History of Having Took a Psychotropic Medication	66.84%
Currently Taking a Pain Medication	93.88%
Currently Undergoing Physical or Occupational Therapy	1.04%

Degenerative Disc-Spinal Injury	78.71%
Herniated Nucleus Pulposus	57.89%
Disc Bulge/Protrusion	75.33%
Neural Impingement	50.99%
Laminectomy	35.75%
Fusion/Hardware	39.69%

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Table 2.

Sample Means and SDs of MMPI-2-RF Scale Scores by Gender

	Men (n = 83)		Women (n = 117)				
	M	SD	M	SD	*t (df)*	*p*-value	Cohen's d
MMPI-2-RF Scale Scores							
Somatic Complaints	70	11	74	12	2.58 (198)	.011	.35
Malaise	76	9	77	9	.92 (198)	.358	.11
Gastrointestinal Complaints	61	16	66	18	1.88 (198)	.062	.29
Head Pain Complaints	63	9	67	11	3.05 (191.69)	.003	.39
Neurological Complaints	71	12	73	13	1.27 (198)	.207	.16
Cognitive Complaints	60	13	64	14	2.15 (198)	.033	.30

Note: MMPI-2-RF (Minnesota Multiphasic Personality Inventory – 2 – Restructured Form); n(sample size); M(Mean); SD (Standard Deviation);

Table 3.

Sample Means and SDs of External Criteria by Gender

	Men		Women				
	M	SD	M	SD	*t (df)*	*p*-value	Cohen's d
PDI Scale Score	41.97	19.25	44.75	14.61	1.01 (116.90)	.313	.17
MSPQ Scale Score	10.42	6.84	13.93	7.25	3.17 (169)	.002	.50
SCID Somatization Symptom Count	8.28	5.25	9.79	5.51	1.93 (196)	.055	.28

Note: Sample sizes differed between measures. For the PDI scale scores, data were available for 68 men and 102 women. For the MSPQ scale scores, data were available for 69 men and 102 women. For SCID Somatization Symptom Count, data were available for 81 men and 117 women. PDI (Pain Disability Index); MSPQ (Modified Somatic Perception Questionnaire); SCID (Structured Clinical Interview for DSM-IV-TR); n(sample size); M(Mean); SD (Standard Deviation);

Table 4.

Correlations and Partial Correlations Between Minnesota Multiphasic Personality Inventory-2-Restructured Form Somatic/Cognitive Scale and External Criteria

	PDI	Partial Correlation PDI	MSPQ	Partial Correlation MSPQ	SCID-Based Somatization Sx-Total	Partial Correlation SCID-Based Somatization Sx-Total
RC1	.28**	.27**	.62**	.60**	.35**	.33**
MLS	.48**	.48**	.33**	.32**	.20**	.20**
GIC	.10	.09	.45**	.43**	.27**	.25**
HPC	.22**	.21**	.49**	.46**	.28**	.26**
NUC	.30**	.30**	.44**	.43**	.28**	.27**
COG	.26**	.25**	.34**	.32**	.29**	.28**

Note: Partial correlation coefficients control for gender; PDI = Pain Disability Index; MSPQ = Modified Somatic Perception Questionnaire; SCID = Structured Clinical Interview for DSM-IV-TR; RC1 = Somatic Complaints; MLS = Malaise; GIC = Gastrointestinal Complaints; HPC = Head Pain Complaints; NUC = Neurological Complaints; COG = Cognitive Complaints

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

Table 5

Differential Validity Analyses

Criteria	MMPI-2-RF Scale	Prediction Model R^2	Full Model R^2	Full and Prediction Model ΔR^2	Slope Bias ΔR^2	Intercept Bias ΔR^2
PDI	RC1	.080	.082	.002	-	-
	MLS	.232	.236	.004	-	-
	GIC	.050	.053	.003	-	-
	HPC	.050	.053	.003	-	-
	NUC	.092	.120	.028	-	-
	COG	.067	.071	.004	-	-
MSPQ	RC1	.386	.401	.015	-	-
	MLS	.107	.163	.056**	.012	.044**
	GIC	.237	.256	.019	-	-
	HPC	.237	.256	.019	-	-
	NUC	.198	.235	.037*	.004	.033**
	COG	.118	.158	.040*	.002	.039**
SCID	RC1	.120	.127	.007	-	-
	MLS	.042	.058	.016	-	-
	GIC	.077	.086	.009	-	-
	HPC	.077	.086	.009	-	-
	NUC	.079	.091	.012	-	-
	COG	.085	.103	.018		

Note: *p <.05; **p<.01; R^2.010 = Small Effect Size, .090 = Medium Effect Size, .250 = Large Effect Size