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Measurement of *DSM-5* Section II Personality Disorder Constructs Using the MMPI-2-RF in Clinical and Forensic Samples

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In the current study, we evaluated the associations between the Minnesota Multiphasic Personality Inventory-2 Restructured Form (MMPI-2-RF; Ben-Porath & Tellegen, 2008) scale scores and the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM–5*; American Psychiatric Association, 2013) Section II personality disorder (PD) criterion counts in inpatient and forensic psychiatric samples from The Netherlands using structured clinical interviews to operationalize PDs. The inpatient psychiatric sample included 190 male and female patients and the forensic sample included 162 male psychiatric patients. We conducted correlation and count regression analyses to evaluate the utility of relevant MMPI–2–RF scales in predicting PD criterion count scores. Generally, results from these analyses emerged as conceptually expected and provided evidence that MMPI–2–RF scales can be useful in assessing PDs. At the zero-order level, most hypothesized associations between Section II disorders and MMPI–2–RF scales were supported. Similarly, in the regression analyses, a unique set of predictors emerged for each PD that was generally in line with conceptual expectations. Additionally, the results provided general evidence that PDs can be captured by dimensional psychopathology constructs, which has implications for both *DSM–5* Section III specifically and the personality psychopathology literature more broadly.

Keywords: MMPI–2–RF, personality disorders, *DSM–5*

Personality disorders (PDs) constitute a pervasive form of psychopathology and represent a serious public health problem. Indeed, approximately 10% of adults meet criteria for at least one PD (Torgersen, 2005). Prevalence rates in clinical settings are even higher, with some estimating that 50% of patients meet criteria for a PD (Mattia & Zimmerman, 2001). Previous research has shown that individuals with personality disorder diagnoses also exhibit a heightened risk for hospitalization (Bender et al., 2001), suicidal gestures and attempts (Soloff, Lis, Kelly, Cornelius, & Ulrich, 1994), criminality (Johnson et al., 2000), violent behavior (McMurran & Howard, 2009), and occupational and interpersonal impairment (Skodol et al., 2002). In addition, although PDs are not immune to intervention (Stone, 1993; Sanislow & McGlashan, 1998), they are often difficult to treat and may interfere with interventions for other types of psychopathology (e.g., Cyranowski et al., 2004; Feske et al., 2004; Feske, Perry, Chambless, Renneberg, & Goldstein, 1996). Therefore, the accurate assessment and diagnosis of PDs is important for clinical psychology practice.

In the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; *DSM–IV–TR*; American Psychiatric Association [APA], 2000), PDs were operationalized via 10 categorical diagnoses organized into three thematic clusters. Prior to the publication of the *DSM–5* (APA, 2013), the *DSM–5* Personality and Personality Disorders workgroup proposed an alternative hybrid dimensional-categorical model for the diagnosis of PDs. This alternative model includes dysfunctional dimensional personality traits coupled with impairment in functioning. In addition, to maintain continuity with the *DSM–IV–TR* model of PDs, six PD types also were proposed, which are characterized by unique configurations of dimensional trait profiles and impairment criteria

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patterned after the previous categorical diagnoses. The model was ultimately rejected and relegated to Section III (Emerging Measures and Models) of the *DSM–5* to continue to build more empirical support for the model, while the categorical *DSM–IV–TR* model was retained in Section II (Essential Elements: Diagnostic Criteria and Codes). Therefore, given that the *DSM–IV–TR* PDs remain the primary system for PD diagnosis, it is important that research continue to be directed toward measuring personality psychopathology from this diagnostic perspective. Furthermore, examining associations between dimensional trait constructs indexed by omnibus personality inventories and Section II PDs also might inform research on Section III. One such omnibus measure is the Minnesota Multiphasic Personality Inventory–2 Restructured Form (MMPI–2–RF; Ben-Porath & Tellegen, 2008).

The MMPI family of instruments has a long-standing history in the assessment of personality psychopathology (see, e.g., Harkness, Finn, McNulty, & Shields, 2012; Morey & Smith, 1988). Until the 1980s, virtually all of this research involved individual clinical scales, code types, and/or scale configurations (Morey & Smith, 1988). Since then, a substantial amount of MMPI/MMPI–2 PD research has focused on specific scales developed to assess PDs (Morey, Waugh, & Blashfield, 1985; Somwaru & Ben-Porath, 1995), with mixed findings (e.g., Bell-Pringle et al., 1997; Castlebury, Hilsenroth, Handler, & Durham, 1997; Hicklin & Widiger, 2000). The most promising MMPI–2 development in the assessment of PDs is the Personality Psychopathology Five scales (PSY–5; Harkness, McNulty, & Ben-Porath, 1995; Harkness, McNulty, Ben-Porath, & Graham, 2002), which represent a dimensional model of personality psychopathology. Research with these scales has shown associations with PD symptom counts in a small clinical sample (Trull, Useda, Costa, & McCrae, 1995), correlations between the MMPI–2 PSY–5 scales and MMPI–2 Personality Disorder scales (corrected for item overlap) in a large clinical sample (Bagby, Ryder, Ben-Dat, Bacchiochi, & Parker, 2002), incremental validity over other conceptually indicated MMPI–2 scales in the assessment of self-reported personality disorder criteria (Wygant, Sellbom, Graham, & Schenk, 2006), and associations with the Structured Clinical Interview for the *DSM–IV* Personality Questionnaire (SCID–II–PQ; First et al., 1997) scores in a clinical sample (Bagby, Sellbom, Costa, & Widiger, 2008; see also Harkness et al., 2012, for a review).

The most recent installment within the MMPI family of instruments, the MMPI–2–RF, has evidenced substantial promise with respect to alignment with contemporary models of personality and psychopathology (e.g., Sellbom, Ben-Porath, & Bagby, 2008; Van der Heijden, Egger, Rossi, & Derksen, 2012). However, very little research is available on the assessment of PDs involving scales from this inventory. To date, three studies have been published, which have all focused on the Restructured Clinical (RC) scales in the context of characterizing personality psychopathology. Kamphuis, Arbisi, Ben-Porath, and McNulty (2008) found that the RC scales outperformed the original MMPI–2 clinical scales in differentiating depressed and substance dependent inpatients with or without comorbid PD diagnoses. In addition, Eaton, Krueger, South, Simms, and Clark (2011) reported that the RC scales differentiated between latent class representations of personality pathology derived from dimensional personality traits in several large samples. Finally, and most recently, Van der Heijden and colleagues (2012) examined the conjoint higher order factor structure of the Millon Clinical Multiaxial Inventory–III (Millon, Millon, Davis, & Grossman, 1994) and RC scales in a large inpatient sample and found support for internalizing, externalizing, paranoia, and detachment factors. However, none of these three studies have examined the associations between the RC scales and specific PDs.

Beyond the RC scales, Sellbom, Smit, de Saeger, Smid, and Kamphuis (2014) recently examined the associations between the MMPI–2–RF Personality Psychopathology Five (PSY–5) scales and six of the 10 PDs, with an emphasis on evaluating the personality trait profiles proposed for *DSM–5* Section III PDs. These authors found that the PSY–5 scales generally predicted PDs in accordance with the *DSM–5* Section III model. However, this study focused solely on the PSY–5 scales and only on three PDs from each sample. Because of their specific conceptual focus, these authors did not examine the full set of MMPI–2–RF scales or the full range of PD diagnoses. Thus, there has not been a previous research study to examine the associations between Section II PDs and the full range of MMPI–2–RF scales. The current study was conducted to address this gap in the literature.

The Current Study

The current investigation aimed to evaluate the associations between MMPI–2–RF scale scores and *DSM–5* Section II PDs assessed via structured clinical interview. Given that the PSY–5 scales were evaluated using the present samples in previous research (Sellbom et al., 2014), the current study only focused on the remaining scales on the MMPI–2–RF. The PSY–5 scales were evaluated separately given that they were specifically designed to measure dimensional personality psychopathology. Separate studies were conducted primarily because separate research questions were asked. The initial paper focused on the PSY–5 constructs (as indexed by MMPI–2–RF scales) as conceptual cognates for their *DSM–5* Section III counterparts in the evaluation of trait profiles that had been proposed for the Section III PDs. The current study is broader and focused specifically on the construct validity of MMPI–2–RF scale scores in assessing Section II PD constructs.

Generally, we hypothesized that the MMPI–2–RF scales would account for a substantial proportion of variance in *DSM–5* Section II PD criterion counts. Specific MMPI–2–RF scale hypotheses were generated for each PD, based on a conceptual mapping of MMPI–2–RF scales onto individual criteria guided by the construct validity evidence associated with MMPI–2–RF scale scores (e.g., Tellegen & Ben-Porath, 2008; Tellegen, Ben-Porath, & Sellbom, 2009). Moreover, research on the traits and symptoms associated with each PD as well as research on the MMPI–2–RF scales that tend to be reflective of similar traits and symptoms were taken into account when generating these hypotheses. A full list of hypothesized associations is shown in Table 1. For instance, we hypothesized that a combination of both internalizing and externalizing scales on the MMPI–2–RF would be associated with Borderline PD (BPD), given that previous research on BPD shows symptoms associated with both internalizing and externalizing psychopathology (e.g., Sansone & Sansone, 2011, 2012; Zanarini, Frankenburg, Hennen, Reich, & Silk, 2004). Likewise, we hypothesized that several externalizing and interpersonal scales would be associated with Antisocial PD, given that this PD is characterized

Table 1
Hypothesized Personality Disorder and MMPI–2–RF Scale Associations

	MMPI–2–RF Scales		
Personality disorder	H–O scales	RC scales	SP scales
Paranoid		RC3, RC6, RC7	ANP
Schizotypal	EID, THD	RC2, RC6, RC7, RC8	NUC, STW, SAV, SHY, DSF
Antisocial	BXD	RC4, RC7 (–), RC9	ANP, JCP, SUB, AGG, IPP (–), SHY (–), DSF
Borderline	EID, THD, BXD	RCd, RC2, RC4, RC6, RC7, RC8	SUI, SFD, STW, AXY, ANP, SUB, AGG, FML
Narcissistic		RC7, RC8, RC9	SFD, NFC (–), AGG, IPP (–)
Avoidant	EID	RCd, RC2, RC7	SFD, NFC, SAV, SHY, DSF
Obsessive–Compulsive		RC2, RC4 (–), RC7, RC9 (–)	COG, NFC, STW, SAV, DSF

Note. MMPI–2–RF = Minnesota Multiphasic Personality Inventory–2 Restructured Form; H–O = Higher Order; RC = Restructured Clinical; SP = Specific Problems; RC3 = Cynicism; RC6 = Ideas of Persecution; RC7 = Dysfunctional Negative Emotions; ANP = Anger Proneness; EID = Emotional/Internalizing Dysfunction; THD = Thought Dysfunction; RC2 = Low Positive Emotions; NUC = Neurological Complaints; STW = Stress/Worry; SAV = Social Avoidance; RC8 = Aberrant Experiences; SHY = Shyness; DSF = Disaffiliativeness; BXD = Behavioral/Externalizing Dysfunction; RC4 = Antisocial Behavior; JCP = Juvenile Conduct Problems; SUB = Substance Abuse; RC9 = Hypomanic Activation; AGG = Aggression; IPP = Interpersonal Passivity; RCd = Demoralization; SUI = Suicidal/Death Ideation; SFD = Self–Doubt; AXY = Anxiety; FML = Family Problems; COG = Cognitive Complaints; NFC = Inefficacy.

by externalizing behaviors and difficulties maintaining interpersonal relationships (APA, 2013).

In addition, we used advanced quantitative methods (i.e., count regression modeling) to examine these associations. Although such methods are becoming increasingly used in personality assessment research (e.g., Coxe, West, & Aiken, 2009; Wright, Pincus, & Lenzenweger, 2012), many studies continue to be published using standard general linear model statistics, and as such have the potential to yield biased and poorly generalizable estimates when assumptions are unmet (see Wright, Pincus, & Lenzenweger, 2012). PD criterion counts are not normally distributed, but rather follow count (i.e., Poisson or negative binomial) distributions, which render standard ordinary least squares regression models inadequate. Thus, the current project demonstrated the utility of some advanced quantitative techniques for improving personality assessment research, and in particular, MMPI–2–RF research via the use of count regression models.

Finally, although the emphasis of the current project is placed on the assessment of Section II PDs using MMPI–2–RF scale scores, the current study nonetheless has implications for the alternative Section III PD model. More specifically it has implications for the six PD types included in the Section III model, given that the MMPI–2–RF is a dimensional model of psychopathology and personality. Given the dimensional nature of MMPI–2–RF scales and that they align in a hierarchical fashion similar to other trait models (e.g., Bagby et al., 2014; Sellbom, Ben-Porath, & Bagby, 2008; Tellegen & Ben-Porath, 2008), constellations of MMPI–2–RF predictors of the PDs can be very informative as the Section III model continues to evolve.

Method

Participants

We used two samples in the current study, both of which provide a varied distribution of personality psychopathology. As noted earlier, Sellbom et al. (2014) used these samples in a previous study. The Viersprong clinic sample predominantly included patients with internalizing disorders, whereas the Van der Hoeven clinic sample included patients with primarily externalizing and thought disorders. Therefore, a combination of both samples allowed us to examine the full spectrum of MMPI–2–RF scale and PD associations. Table 2 shows the prevalence breakdown for all 10 PDs within both samples individually, as well as in the combined sample. Prevalence for PDs differed across samples, and a chi-square analysis indicated there was also a significant difference between the two samples in regards to gender (one sample included all male participants). Therefore, we controlled for gender effects in each analysis as well as sampling effects given different settings and measurements of PDs (see the following). There were no significant differences across other demographic characteristics (e.g., race/ethnicity, age).

Viersprong clinic sample. This sample included of 229 psychiatric patients at the Viersprong clinic for personality disorders in The Netherlands who had been administered both assessment measures. Individuals who provided invalid MMPI–2–RF protocols based on standard criteria outlined in the MMPI–2–RF test manual (Cannot Say > 17; Variable Response Inconsistency [VRIN] or True Response Inconsistency [TRIN] > 79T; Infrequent Responses [F-r] = 120T; Infrequent Psychopathology

Table 2
Personality Disorder Prevalence Rates

Personality disorder	Clinical sample	Forensic sample	Combined sample
Antisocial	0.8	58.0	22.7
Avoidant	17.3	11.1	14.9
Borderline	9.2	24.7	15.2
Dependent	1.2	4.3	2.4
Histrionic	0.0	3.7	1.4
Narcissistic	2.3	38.9	16.4
Paranoid	1.5	21.6	9.2
Schizoid	0.0	6.8	2.6
Schizotypal	0.4	17.9	7.1
Obsessive–Compulsive	5.8	11.7	8.1

Note. Prevalence rates listed as the percentage of individuals from the total sample meeting criteria for each disorder.

Responses [Fp-r] > 99T; see Ben-Porath & Tellegen, 2008) were excluded from the analyses, which led to the exclusion of 39 (17%) patients. There were no significant differences between included and excluded participants on any demographic characteristics. The final sample (n = 190) had a mean age of 31.03 (SD = 9.45; range = 18–60) and were 52% female. In regards to race/ethnicity, the majority of participants were of Dutch descent (94.9%), with 1.2% of Turkish ethnicity, and the remaining participants of other ethnicities. All participants were native Dutch speakers or spoke Dutch as their primary language. On admission to the clinic, 75% were single/unmarried, 21% were married or in a cohabitant relationship, and 4% were divorced. Approximately half of participants met criteria for at least one *DSM–IV–TR* PD (50.7%), whereas 11.4% of participants met diagnostic criteria for more than one diagnosis. The most prevalent PD diagnoses were Avoidant (25.3%), Borderline (12.7%), Obsessive–Compulsive (8.0%), and Narcissistic PDs (4.5%). Comorbidity rates with Axis I disorders were also common, with 66.8% of individuals meeting criteria for one or more additional psychological disorders. These additional disorders included predominantly anxiety disorders (41.9%), affective disorders (38%), substance use disorders (13.1%), and eating disorders (7.9%).

Van der Hoeven clinic sample. This sample included 178 male forensic psychiatric patients at a facility in The Netherlands, which treats predominantly violent psychiatric offenders. Patients were typically convicted of crimes such as murder, attempted murder, rape, child molestation, or other nonsexual violent crimes. Similar to the Vierspong sample, we excluded 16 participants with invalid MMPI–2–RF protocols. Participants had a mean age of 33.77 (SD = 9.51; range = 19–67). Again, the majority of patients were of Dutch ethnicity (74.7%), with 11.7% of Surinamese ethnicity, 5.6% Moroccan, 3.7% Turkish, and the remaining 4.3% of other or mixed ethnicities. On admission, the majority of patients (60.9%) were single/unmarried. In regards to PD diagnoses, 88.9% of participants met criteria for at least one PD diagnosis and 57.4% met criteria for two or more PD diagnoses. Of these, Antisocial PD was most prevalent (51.6%), followed by Narcissistic (38.9%), Borderline (24.7%), Paranoid (22.4%), Avoidant (12.2%), Obsessive–Compulsive (12.1%), Schizotypal (8.0%), Schizoid (6.7%), Dependent (4.8%), and Histrionic (3.6%). Comorbid psychotic disorders also were prevalent, with 21% also meeting criteria for a psychosis-spectrum disorder.

Measures

Participants in both samples were administered the following measure.

MMPI–2–RF. Participants were administered the Dutch translation of the MMPI–2 (Derksen, de Mey, Sloore, & Hellenbosch, 1993), from which MMPI–2–RF scales can be scored. Butcher, Derksen, Sloore, and Sirigatti (2003) provided a favorable appraisal of this Dutch version. Indeed, substantial evidence pointed to correspondence of the two versions, and even the specifically derived Dutch norms differed only modestly from the U.S. counterpart. The MMPI–2–RF (Ben-Porath & Tellegen, 2008) is a restructured version of the MMPI–2 consisting of 338 true or false items. This inventory includes nine validity scales, three Higher Order scales (H–O), nine Restructured Clinical (RC) scales, 23 Specific Problems (SP) scales, two Interest scales, and five PSY–5 scales. Only the H–O, RC, and SP scales were used in the current study. Empirical research has shown that MMPI–2–RF scale scores can be derived from Dutch MMPI–2 administrations with no loss in psychometric functioning (Van Der Heijden, Egger, & Derksen, 2008, 2010).

Viersprong clinic sample.

SCID–II. The SCID–II (First, Gibbon, Spitzer, Williams, & Benjamin, 1997) is a structured clinical interview developed to assess and diagnose each of the 10 *DSM–IV* PDs. Excellent interrater reliability was demonstrated for the Dutch translation of this measure (Weertman, Arntz, & Kerkhofs, 2000), with a mean kappa of .84 (range .77–.94) for the 10 *DSM–IV* PDs (Lobbestael, Leurgans, & Arntz, 2011); however, no interrater reliability data were available for the current sample. All SCID–II interviews were administered by specifically trained clinicians with extensive experience, some of whom were involved as national trainers in SCID administration. Internal consistencies (Cronbach's alpha) for the SCID–II PD dimensional scores were acceptable and ranged from .74 (Obsessive–Compulsive PD) to .84 (Avoidant PD).

Van der Hoeven clinic sample.

SIDP–IV. The Structured Interview for *DSM–IV* Personality (SIDP–IV; Pfohl, Blum, & Zimmerman, 1997) follows a topically arranged format (work, interpersonal relations, impulse control, etc.) yielding symptom scores on a 0 (*absent*) to 3 (*strong presence*) scale that are combined into the 10 *DSM–IV* dimensional counts of PD symptoms. Its psychometric properties are well-established (Widiger, 2002) and the Dutch version of this measure has been used in previous research on PDs (e.g., Sellbom et al., 2014). No interscorer reliability data were available in this sample, however, raters were extensively trained mental health professionals. Internal consistencies (Cronbach's alpha) for the SIDP–IV dimensional PD scores were acceptable and ranged from .71 (Borderline PD) to .77 (Narcissistic PD).

Procedures

Viersprong clinic sample. Participants were recruited from three different inpatient treatment units and a pretreatment observational unit used to assess for appropriate treatment. The SCID–II was administered as part of the standard intake procedure in the facility. Once patients were admitted to Viersprong, the MMPI–2 was administered as part of the treatment selection process.

Van der Hoeven clinic sample. Participants were recruited during the treatment process at this facility. Treatment is comprehensive, in that it provides psychotherapy, vocational training, general education, physical exercise, and recreational activities. In addition, extensive psychological assessment is conducted following admission to the facility (typically within 3 months). It was at this time that participants from this sample were administered the SIDP–IV and the MMPI–2.

Data Analysis

To capitalize on statistical power, the two samples were combined for the purpose of these analyses (where evidence indicates this is appropriate; see later) and only PDs with a base rate of at least 5% were evaluated in this study to ensure sufficient variability on PD criterion counts. Analyses were conducted with dimensional criterion count scores of Antisocial, Avoidant, Borderline,

Narcissistic, Obsessive–Compulsive, Paranoid, and Schizotypal PDs derived from symptom counts on the SIDP–IV and SCID–II. Analyses were not conducted using Schizoid, Histrionic, and Dependent PDs due to low base rates of these disorders in our samples. We first calculated partial correlations between MMPI–2–RF scale scores and SCID–II and SIDP–IV dimensional PD criterion count scores. The two samples used different measures for the same criterion count scores (i.e., the criterion counts for PDs from both measures are on the same scale and were treated as the same score). Therefore, we controlled for this by using sampling and gender as covariates and treated them as random (as opposed to fixed) effects as they were assumed to primarily be dependent on the criterion (PD) variables. Moreover, because there were significant gender differences across samples, we inserted gender as a covariate as well. The other demographic differences (e.g., race/ethnicity, age) were nonsignificantly different across samples, and did not exert an effect on outcomes.

We also estimated a series of multiple regression models to determine which hypothesized MMPI–2–RF scales uniquely contributed to the prediction of PD count scores. In addition, we evaluated any additional statistically significant nonhypothesized MMPI–2–RF scales with zero-order correlations of .20 with the PD count scores, which were deemed meaningful in the current sample, given that this study used multimethod assessment modalities. These scales were included to account for deviations from our hypotheses via hierarchical regression analyses in which these additional nonhypothesized scales were added into the analyses as a final step. Due to item overlap across the MMPI–2–RF hierarchy, the H–O, RC, and SP scales were evaluated in separate analyses. Because the dimensional PD scores adhere to a count distribution, we used standard or zero-inflated Poisson and negative binomial (NB) regression models to estimate individual parameters. A zero-inflated regression model simultaneously estimates two equations: (1) that predicts the count distribution data and (2) that predicts the likelihood of a "certain zero," or participants who will not show symptoms of the PD. This was chosen when excess zeros were present in the data for a particular PD. A Poisson model assumes that the mean and variance of the count distribution are equal, which, when not met, will yield biased standard errors and, by extension, significance tests for parameters may be incorrect. The NB distribution, on the other hand, accounts for this by estimating an additional parameter for the overdispersion of variance beyond what is anticipated by the Poisson distribution. The specific parameterization (Poisson vs. NB and standard vs. zero-inflated) for each PD criterion count was determined via a test of fit statistics (likelihood ratio testing as well as Akaike and Baysean information criteria) for each model.

Results

Preliminary Analyses

Prior to the main analyses, we evaluated the assumption that the same construct was measured regardless of sample and interview. For this purpose, we used multiple-group confirmatory factor analysis to test for measurement invariance. We tested each PD construct separately. A configural invariance model was estimated in which factor loadings were allowed to freely vary across samples; this model was compared to a weak invariance model in which factor loadings were held constant across samples. As the indicators are binary, a mean and variance adjusted weighted least squares estimation was used and nested models were compared using the DIFF TEST function in Mplus 7 (Muthén & Muthén, 2012). Full results can be found in Table 3. For avoidant, borderline, paranoid, and obsessive–compulsive PDs there was no significant difference between configural and weak invariance models, indicating weak measurement invariance. Antisocial PD

Table 3
Measurement Invariance in Latent Modeling Examining Construct Equivalence

Personality disorder	χ^2	*df*	*p*	DIFF TEST	*p*	CFI	TLI	RMSEA
Antisocial								
Configural	84.85	28	<.001			0.977	0.966	.107
Weak	91.23	34	<.001	12.59	.050	0.977	0.972	.098
Partial Weak[a]	85.09	33	<.001	6.34	.270	0.979	0.973	.095
Avoidant								
Configural	27.14	28	.510			1.00	1.00	.000
Weak	27.67	34	.770	2.63	.850	1.00	1.01	.000
Borderline								
Configural	75.80	54	.030			0.976	0.968	.050
Weak	81.80	62	.050	9.53	.300	0.978	0.974	.040
Narcissistic								
Configural	55.35	54	.420			0.998	0.998	.012
Weak	83.84	62	.030	25.87	.001	0.973	0.969	.045
Partial Weak[b]	63.13	59	.330	8.08	.150	0.995	0.994	.020
Paranoid								
Configural	26.38	28	.550			0.970	0.965	.034
Weak	31.41	34	.590	5.50	.480			
O–C PD								
Configural	45.76	40	.240			0.982	0.975	.029
Weak	56.61	47	.160	10.60	.160	0.970	0.965	.034

Note. OC = Obsessive–Compulsive; CFI = confirmatory fit index; TLI = Tucker–Lewis index; RMSEA = root mean squared error of approximation.
[a] Factor loading for one criterion released. [b] Factor loadings for three criteria released.

required one factor loading to be released for partial invariance to be reached, whereas Narcissistic PD required three to be freely estimated to reach partial weak invariance. Following from these analyses, Narcissistic PD was examined separately for forensic and clinical samples.

Primary Analyses

The results for the partial correlation analyses are shown in Table 4, whereas the results from the multiple regression analyses appear in Table 5.

Antisocial PD

Correlation analyses rendered an expected pattern of results. BXD, RC4, RC9, ANP, JCP, SUB, AGG, (low) IPP, and (low) SHY (Behavioral/Externalizing Dysfunction, Antisocial Behavior, Hypomanic Activation, Anger Proneness, Juvenile Conduct Problems, Substance Abuse, Aggression, Interpersonal Passivity, and Shyness, respectively) all showed significant associations with the Antisocial PD count score. Although (low) RC7 (Dysfunctional Negative Emotions) and DSF (Disaffiliativeness) were also hypothesized to have associations with Antisocial PD, correlation

Table 4
Partial Correlations Between Section II Personality Disorder Criterion Counts and MMPI–2–RF Scale Scores

	AsPD	AvPD	BPD	NPD[a]	PPD	SPD	OCPD
Higher Order scales							
EID	.00	.36	.20	−.18	.11	.14	.23
THD	.03	.07	.24	−.13	.10	.27	.17
BXD	.45	−.10	.36	.09	.18	−.02	−.10
Restructured Clinical scales							
RCd	.01	.26	.23	−.18	.07	.12	.18
RC1	−.02	.18	.12	−.17	.05	.12	.05
RC2	−.03	.27	.02	−.13	.10	.08	.14
RC3	.03	.02	.24	−.04	.17	.17	.07
RC4	.41	−.04	.36	.06	.18	.00	−.12
RC6	.06	.04	.22	−.06	.16	.28	.09
RC7	−.01	.40	.23	−.17	.15	.17	.22
RC8	.04	.08	.29	−.14	.11	.24	.09
RC9	.23	.14	.30	.11	.14	.09	.03
Specific Problem scales							
MLS	−.05	.09	.06	−.06	.06	.10	.10
GIC	.01	.15	.10	−.14	.01	.06	.00
HPC	−.06	.10	.09	−.14	−.03	.07	.02
NUC	.06	.18	.13	−.16	.03	.14	.09
COG	.05	.12	.24	−.18	.07	.19	.16
SUI	.02	.24	.12	−.14	.12	.19	.09
HLP	.02	.18	.14	−.09	.07	.17	.14
SFD	.00	.28	.16	−.26	−.02	.01	.13
NFC	.04	.23	.13	−.14	.08	.10	.06
STW	.03	.15	.23	−.05	.09	.10	.23
AXY	−.04	.22	.18	−.15	.14	.17	.21
ANP	.16	.00	.29	.11	.14	.08	.17
BRF	−.01	.14	.12	−.14	.08	.12	.15
MSF	.00	.17	.04	.11	−.03	−.03	−.02
JCP	.39	−.06	.23	.01	.06	−.11	−.14
SUB	.32	.03	.23	.06	.12	.04	−.10
AGG	.22	.01	.38	.10	.22	.13	.08
ACT	.05	−.12	.19	.09	.01	.10	.02
FML	.02	.08	.22	−.04	.17	.12	.10
IPP	−.11	.38	−.16	−.28	−.07	−.05	.00
SAV	−.07	.39	.02	−.25	.07	.11	.15
SHY	−.13	.49	.00	−.34	.00	.05	.10
DSF	−.04	.21	.08	−.14	.03	.10	.09

Note. Correlations underlined indicate statistically significant associations. MMPI–2–RF = Minnesota Multiphasic Personality Inventory–2 Restructured Form; AsPD = Antisocial Personality Disorder; AvPD = Avoidant Personality Disorders; BPD = Borderline Personality Disorder; NPD = Narcissistic Personality Disorder; PPD = Paranoid Personality Disorder; SPD = Schizotypal Personality Disorder; OCPD = Obsessive–Compulsive Personality Disorder; EID = Emotional/Internalizing Dysfunction; THD = Thought Dysfunction; BXD = Behavioral/Externalizing Dysfunctiong; RCd = Demoralization; RC1 = Somatic Complaints; RC2 = Low Positive Emotions; RC3 = Cynicism; RC4 = Antisocial Behavior; RC6 = Ideas of Persecution; RC7 = Dysfunctional Negative Emotions; RC8 = Aberrant Experiences; RC9 = Hypomanic Activation; MLS = Malaise; GIC = Gastrointestinal Complaints; HPC = Head Pain Complaints; NUC = Neurological Complaints; COG = Cognitive Complaints; SUI = Suicidal/Death Ideation; HLP = Helplessness; SFD = Self–Doubt; NFC = Inefficacy; STW = Stress/Worry; AXY = Anxiety; ANP = Anger Proneness; BRF = Behavior Restricting Fears; MSF = Multiple Specific Fears; JCP = Juvenile Conduct Problems; SUB = Substance Abuse; AGG = Aggression; ACT = Activation; FML = Family Problems; SAV = Social Avoidance; SHY = Shyness; IPP = Interpersonal Passivity; DSF = Disaffiliativeness.
[a] forensic sample only. [b] Correlations for NPD were conducted only using the forensic sample.

Table 5
Regression Analyses Predicting PDs and Using Hypothesized MMPI–2–RF Scales

Step	MMPI–2–RF scale	χ^2/χ^2_{change}	*p*	*z*	*p*	*B* Std. *X*
Antisocial PD						
RC scales						
1		198.12	<.001			
	Sample			−12.79	<.001	0.28
	Gender			−3.06	.002	0.26
2		67.53	<.001			
	RC4			6.71	<.001	1.35
	RC7			−2.46	.014	0.87
	RC9			1.40	.163	1.07
SP Scales						
1		198.12	<.001			
	Sample			−12.79	<.001	0.28
	Gender			−3.02	.002	0.26
2		73.81	<.001			
	ANP			1.31	.189	1.07
	JCP			4.33	<.001	1.21
	SUB			3.12	.002	1.14
	AGG			0.70	.483	1.03
	IPP			0.13	.894	1.01
	SHY			−2.23	.026	0.89
	DSF			−1.24	.215	0.94
Avoidant PD						
RC scales						
1		23.43	<.001			
	Sample			4.20	<.001	0.91
	Gender			−0.15	.879	0.89
2		145.04	<.001			
	RCd			−2.41	.016	0.78
	RC2			4.91	<.001	1.38
	RC7			7.92	<.001	1.82
SP scales						
1		23.43	<.001			
	Sample			4.20	<.001	0.86
	Gender			−0.15	.879	0.94
2		199.20	<.001			
	SFD			1.94	.054	1.16
	NFC			−0.72	.473	0.92
	SHY			8.08	<.001	1.59
	SAV			3.80	<.001	1.21
	DSF			0.19	.853	1.01
3		19.48	<.001			
	SUI			0.21	.838	1.01
	AXY			0.43	.669	1.02
	IPP			4.41	<.001	1.27
Borderline PD						
H–O scales						
1		59.14	<.001			
	Sample			−7.63	<.001	0.57
	Gender			4.59	<.001	1.45
2		54.35	<.001			
	EID			2.11	.035	1.17
	THD			1.78	.075	1.10
	BXD			5.62	<.001	1.37
RC scales						
1		106.38	<.001			
	Sample			−9.98	<.001	0.57
	Gender			6.01	<.001	1.40
2		108.52	<.001			
	RCd			1.79	.074	1.15
	RC2			−1.29	.199	0.93
	RC4			6.89	<.001	1.30
	RC6			0.49	.627	1.02
	RC7			0.43	.665	1.03
	RC8			2.01	.044	1.09

Table 5 (*continued*)

Step	MMPI–2–RF scale	χ^2/χ^2_{change}	*p*	*z*	*p*	*B* Std. *X*
SP scales						
1		106.38	<.001			
	Sample			−9.98	<.001	0.55
	Gender			6.01	<.001	1.41
2		113.47	<.001			
	SUI			−1.09	.276	0.95
	SFD			0.54	.586	0.99
	STW			1.21	.226	1.06
	AXY			1.74	.082	1.07
	ANP			0.42	.676	1.02
	SUB			2.17	.030	1.06
	AGG			5.37	<.001	1.23
	FML			0.48	.630	1.03
3		11.45	.003			
	COG			1.84	.066	1.10
	JCP			2.79	.005	1.12
Forensic (RC)		50.20	<.001			
	RCd			0.89	.371	1.07
	RC2			−1.03	.304	0.95
	RC4			5.17	<.001	1.27
	RC6			−0.76	.447	0.96
	RC7			−0.29	.769	0.97
	RC8			2.29	.022	1.15
Forensic (SP)		46.73	<.001			
	SUI			0.53	.593	1.03
	SFD			−1.86	.063	0.91
	STW			1.90	.057	1.12
	AXY			0.84	.400	1.05
	ANP			0.61	.539	1.04
	SUB			2.82	.005	1.15
	AGG			1.68	.093	1.10
	FML			0.05	.964	1.00
Clinical (RC)		86.49	<.001			
	RCd			3.58	<.001	1.45
	RC2			−1.75	.080	0.88
	RC4			2.95	.003	1.18
	RC6			2.71	.007	1.18
	RC7			0.95	.342	1.09
	RC8			0.56	.573	1.04
Clinical (SP)		119.24	<.001			
	SUI			−2.70	.007	0.85
	SFD			5.02	<.001	1.62
	STW			−0.17	.861	0.99
	AXY			2.34	.019	1.16
	ANP			0.64	.524	1.05
	SUB			0.26	.794	1.02
	AGG			4.22	<.001	1.36
	FML			1.34	.179	1.10
Narcissistic PD						
RC scales						
1		11.98	.007			
	RC7			−2.07	.039	0.85
	RC8			−1.05	.295	0.92
	RC9			2.67	.008	1.18
SP scales						
1		28.52	<.001			
	SFD			−1.82	.068	0.92
	NFC			−0.59	.555	1.01
	AGG			1.47	.142	1.08
	IPP			−3.76	<.001	0.85
2		5.48	.006			
	SHY			−2.02	.043	0.95
	SAV			−0.85	.394	0.87
Paranoid PD						
RC scales		99.70	<.001			
	Sample			−8.05	<.001	0.36
	Gender			−1.18	.237	0.84

(*table continues*)

Table 5 (*continued*)

Step	MMPI–2–RF scale	χ^2/χ^2_{change}	*p*	*z*	*p*	*B* Std. *X*
	RC3			1.15	.251	1.10
	RC6			−0.09	.927	0.99
	RC7			2.95	.003	1.36
Inflated						
	RC3			−0.87	.385	0.64
	RC6			−1.97	.049	0.30
	RC7			2.90	.004	0.82
SP scales		113.88	<.001			
	Sample			−8.40	<.001	0.40
	Gender			−1.40	.161	0.83
	ANP			0.42	.678	1.05
	AGG			2.28	.023	1.22
Inflated						
	ANP			0.26	.797	1.34
	AGG			−1.48	.140	0.45
Schizotypal PD						
H–O scales		110.99	<.001			
	Sample			−6.64	<.001	0.36
	Gender			−3.04	.002	0.50
	EID			0.20	.840	1.03
	THD			3.14	.002	1.30
Inflated						
	EID			−0.58	.564	0.69
	THD			−0.21	.833	0.91
RC scales						
1		104.91	<.001			
	Sample			−7.60	<.001	0.33
	Gender			−2.74	.006	0.49
2		26.06	<.001			
	RC2			0.61	.543	1.07
	RC6			2.27	.023	1.22
	RC7			1.05	.296	1.15
	RC8			1.25	.210	1.14
SP scales		131.61	<.001			
	Sample			−8.07	<.001	0.31
	Gender			−2.68	.007	0.54
	NUC			1.19	.235	1.11
	STW			1.27	.205	1.13
	SAV			1.29	.197	1.16
	SHY			−0.05	.957	0.99
	DSF			−0.26	.795	0.97
Inflated						
	NUC			−0.44	.659	0.82
	STW			0.75	.455	1.37
	SAV			0.86	.389	1.54
	SHY			0.16	.875	1.08
	DSF			−0.02	.985	0.00
O–C PD						
RC scales		51.26	<.001			
	Sample			−6.03	<.001	0.56
	Gender			0.18	.854	1.02
	RC2			3.02	.003	1.33
	RC4			−1.48	.138	0.89
	RC7			4.16	<.001	1.46
	RC9			0.06	.954	1.01
Inflated						
	RC2			1.93	.054	5.67
	RC4			2.63	.009	4.89
	RC7			1.90	.057	2.64
	RC9			−2.35	.019	0.23
SP scales		50.22	<.001			
	Sample			−5.77	<.001	0.57
	Gender			1.04	.297	1.09
	COG			1.04	.300	1.10
	NFC			−0.97	.330	0.91
	STW			2.58	.010	1.29
	SAV			2.47	.013	1.22

Table 5 (*continued*)

Step	MMPI–2–RF scale	χ^2/χ^2_{change}	*p*	*z*	*p*	*B* Std. *X*
Inflated	DSF			1.75	.080	1.14
	COG			0.47	.636	1.59
	NFC			2.35	.019	19.03
	STW			−1.86	.063	0.01
	SAV			1.12	.265	24.69
	DSF			1.79	.074	13.07

Note. PD = personality disorder; MMPI–2–RF = Minnesota Multiphasic Personality Inventory–2 Restructured Form; RC = Restructured Clinical; RC4 = Antisocial Behavior; RC7 = Dysfunctional Negative Emotions; RC9 = Hypomanic Activation; SP = Specific Problems; ANP = Anger Proneness; JCP = Juvenile Conduct Problems; SUB = Substance Abuse; AGG = Aggression; IPP = Interpersonal Passivity; SHY = Shyness; DSF = Disaffiliativeness; RC = Restructured Clinical; RCd = Demoralization; RC2 = Low Positive Emotions; SFD = Self-Doubt; NFC = Inefficacy; SAV = Social Avoidance; SUI = Suicidal/Death Ideation; AXY = Anxiety; H–O = Higher Order; EID = Emotional/Internalizing Dysfunction; THD = Thought Dysfunction; BXD = Behavioral/Externalizing Dysfunction; RC3 = Cynicism; RC6 = Ideas of Persecution; RC8 = Aberrant Experiences; STW = Stress/Worry; FML = Family Problems; COG = Cognitive Complaints; NUC = Neurological Complaints. B Std. X = unit increase on criterion variable given a 1 SD increase on the predictor variable.

analyses did not support these hypotheses in this sample. A hierarchical negative binomial regression model was estimated in which the Antisocial PD score was regressed onto the control and hypothesized MMPI–2–RF variables in two separate models for RC and SP scales, respectively. RC4 and RC9 emerged as unique contributors to the prediction of Antisocial PD criterion counts in the RC scale model, whereas JCP, SUB, and (low) SHY scores were significant in the SP scale model. Contrary to expectations, scales reflecting anger and aggression (e.g., ANP, AGG) did not uniquely contribute to this prediction.

Avoidant PD

In the correlation analyses, Avoidant PD counts were significantly associated with each of the hypothesized MMPI–2–RF scales. In addition, several other scales that were not hypothesized also emerged. However, the majority of these, with the exception of SUI (Suicidal/Death Ideation), AXY (Anxiety), and IPP, were of a very small magnitude. We conducted hierarchical regression analyses to evaluate the unique variance each of the hypothesized MMPI–2–RF scales accounted for this PD; a standard Poisson model best fit the data. In regards to the RC scales, each of the hypothesized scales (RCd [Demoralization], RC2 [Low Positive Emotions], and RC7) emerged as a unique predictor. In the SP analysis, only SHY and SAV (Social Avoidance) were uniquely predictive of Avoidant PD among hypothesized scales. However, when SUI, AXY, and IPP were added in the third step, IPP also emerged as a significant predictor.

Borderline PD

As expected, Borderline PD criterion counts were associated with a range of MMPI–2–RF scales indexing internalizing (EID [Emotional/Internalizing Dysfunction], RCd, RC7, SUI, SFD [Self-Doubt], STW [Stress/Worry], AXY, ANP), externalizing (BXD, RC4, SUB, AGG), thought dysfunction (THD [Thought Dysfunction], RC6, RC8 [Aberrant Experiences]), and interpersonal difficulties (FML [Family Problems]). In addition, Borderline PD showed significant associations with additional nonhypothesized scales; most notably, the COG (Cognitive Complaints) and JCP scales. In regards to the regression analyses, three separate hierarchical negative binomial regression models were evaluated, one in which the Borderline PD criterion count was regressed onto the hypothesized H–O, RC, and SP scales separately. Among the H–O scales, only EID and BXD accounted for significant variance in the Borderline PD score, whereas, surprisingly, only RC4 was a significant predictor of this PD among the RC scales. Likewise, only AGG uniquely predicted the Borderline PD criterion count among the SP scales, even when additional meaningfully correlated scales were entered into the third step of the analysis.

In view of the lack of significant predictors in these analyses (particularly the lack of internalizing psychopathology representation beyond the H–O scales), we conducted additional post hoc analyses. In particular, we evaluated the two different samples individually to determine if this was due to sampling variation. Indeed, Sellbom et al. (2014) found markedly different patterns for the PSY–5 scales predicting BPD criterion counts in these two samples. The forensic sample had a higher prevalence of Borderline PD than the standard clinical sample, and therefore the higher associations with externalizing scales may have been due to the sample. Negative binomial (forensic) and Poisson (clinical) regression models showed that RC4 was a unique predictor in both samples, whereas RCd also contributed significantly in the clinical sample and RC8 in the forensic sample. Among the SP scales, SUI, SFD, STW, and AGG uniquely predicted Borderline PD criterion counts in the clinical sample, whereas only STW, SUB, and AGG were significant in the forensic sample. Thus, whereas externalizing proclivities are evident in both samples, MMPI–2–RF scale scores reflecting internalizing appears only to be predictive of Borderline PD in the inpatient clinical sample.

Narcissistic PD

As previously noted, Narcissistic PD could not be examined in the combined sample because of the lack of evidence for measurement invariance. Due to the low base rate of Narcissistic PD in the Vierspong sample, analyses for this disorder were only conducted in the forensic sample. In terms of correlations between MMPI–2–RF scale scores and Narcissistic PD counts, (low) RC7, (low) SFD, and (low) IPP emerged as significant associations among scales that were hypothesized. Several scales that were hypothe-

sized (RC8, RC9, NFC [Inefficacy], and AGG) did not emerge. There were several additional scales (EID, RCd, RC1 [Somatic Complaints], NUC [Neurological Complaints], COG, SAV, SHY) that significantly correlated with NPD scores as well, although the majority of these were of very small magnitude. A negative binomial regression analysis indicated RC7 and RC9 emerged as a unique predictor among the RC scales. Among the SP scales, a hierarchical negative binomial regression indicated only (low) IPP emerged as a significant predictor when hypothesized scales were entered into the analysis. However, (low) SHY was also a significant predictor in the third step when additional correlated scales were entered as well.

Obsessive–Compulsive PD

Among the hypothesized MMPI–2–RF scales, RC2, [low] RC4, RC7, COG, STW, and SAV were significantly correlated with the Obsessive–Compulsive PD count variable. Contrary to expectation, RC9, NFC, and DSF did not show significant correlations. In terms of unexpected findings, EID, RCd, HLP (Helplessness), SFD, AXY, ANP, BRF (Behavior Restricting Fears), and JCP also evinced significant associations with the Obsessive–Compulsive PD criterion counts. However, only EID and AXY reached a meaningful magnitude. Hierarchical negative binomial regression models were estimated and, among the RC scales, (low) RC4 and RC7 were unique predictors. In regards to the SP problem scales, STW and NFC scales were unique predictors in the first step of the analysis. The AXY scale had a meaningful correlation with this PD, and was added in the third step of the analysis, however, it did not account for a significant amount of variance in the Obsessive–Compulsive PD criterion count.

Paranoid PD

Correlation analyses revealed that all hypothesized MMPI–2–RF scales were significantly correlated with Paranoid PD criterion counts. Similar to other PDs, there were also many significant, albeit very small, correlations with additional nonhypothesized scales (EID, BXD, RC4, RC8, RC9, SUI, AXY, SUB, AGG, FML). Zero-inflated negative binomial regression analyses indicated that only RC7 was uniquely predictive of Paranoid PD criterion counts among the RC scales, and only AGG was a significant predictor in the model with the SP scales. In the zero-inflated models, low scores on RC6 and RC7 were significant predictors of a certain zero among the RC scales. In case of the SP scales, AGG was no longer significant.

Schizotypal PD

Among the hypothesized MMPI–2–RF scales, EID, THD, RC6, RC7, RC8, NUC, and SAV were found to have significant associations with Schizotypal PD count scores in the correlation analyses. Although RC2, STW, SHY, and DSF also were hypothesized to be associated with such scores, none of these correlations were significant. However, several nonhypothesized scales (RCd, RC1, RC3, COG, SUI, HLP, AXY, BRF, JCP, AGG, and FML) showed significant, albeit very small, correlations. Zero-inflated negative binomial regression analyses were used to determine the unique variance accounted for by the two hypothesized H–O scales and the SP scales. A standard negative binomial was preferred and utilized to assess the unique contributions of the hypothesized RC scales. In the H–O analysis, only EID was shown to have significant predictive utility. Neither scale was a significant predictor in the zero-inflation equation. Among the RC scales, only RC6 was predictive of the Schizotypal count criterion, and unexpectedly, none of the SP scales emerged as significant predictors. Likewise, no SP scales were predictive of a certain zero in the zero-inflation equation.

Discussion

In the current study, we aimed to evaluate the associations between *DSM–5* Section II PDs and conceptually relevant scales on the MMPI–2–RF. These results provide evidence that MMPI–2–RF scales can be useful in the assessment of PDs. In addition, these results showed that PDs can be linked to dimensional psychopathology constructs as conceptually indicated. At the zero-order level, most hypothesized associations between Section II disorders and MMPI–2–RF scales were supported. Likewise, in the regression analyses, a unique set of predictors emerged for each PD in a manner that was generally conceptually expected.

There were several PDs for which the pattern of results largely supported the hypotheses. For instance, although correlation analyses showed several nonhypothesized associations, the regression analyses indicated that Obsessive–Compulsive PD is captured primarily by MMPI–2–RF scales indexing negative affect and a lack of disinhibitory proclivities. Likewise, the results for Avoidant PD were close to what was hypothesized. Each of the hypothesized scales was significantly correlated with this PD, and in the regression analyses, the majority of these scales emerged as significant predictors. In addition, the results for Antisocial PD were similar to what was hypothesized. The scales with the highest associations were MMPI–2–RF externalizing scales and additional associated scales suggested a connection between Antisocial PD and a lack of anxiety, which is in line with some theories of psychopathy (e.g., Lykken, 1995). Of note, each PD evaluated in this study was significantly associated with the RC7 (Dysfunctional Negative Emotions) scale. Although these were hypothesized associations, it is nonetheless an important finding, which indicates that negative emotionality (or a lack thereof) is common across PDs. This is of course consistent with previous research using the Five Factor Model, which has shown the neuroticism domain and its facets to be associated with many of these same PDs (e.g., Bagby, Costa, Widiger, Ryder, & Marshall, 2005). Overall, although each disorder differed to some extent from what was originally hypothesized, the majority of results were conceptually intuitive and can be used to better assess these PD constructs from the perspective of the MMPI–2–RF.

Several unexpected findings call for further discussion. In a large number of cases, particularly in the correlation analyses, there were several additional (and nonhypothesized) MMPI–2–RF scales, which were significantly associated with PDs. Likewise, there also were hypothesized scales that did not evince significant associations. For instance, results were particularly surprising for Schizotypal PD. Although MMPI-2-RF scales reflecting psychotic symptomatology were associated with this disorder (i.e., THD and RC6), there was no evidence for the internalizing dysfunction that is typically associated

with this disorder. Schizotypal PD had one of the lower base rates for PDs in this sample, and it is therefore possible that this was a result of range restriction, as well as that those scoring low on this PD were elevated on other PD criterion counts better reflective of internalized dysfunction (e.g., Avoidant and Borderline PDs). In addition, associations of Borderline PD appeared to be sample dependent. Although this was not hypothesized, it was not altogether surprising. Borderline PD is a very heterogeneous disorder and was captured differently depending on the sample in which it was being measured (Sellbom et al., 2014).

Theoretical and Practical Implications

The current study has several implications. First, this study established the first empirical associations between Section II PD criterion counts and scales on the MMPI–2–RF. These results indicate that the MMPI–2–RF could be a useful instrument in the assessment of personality disorders. Differential scale elevation patterns can signal to a clinician that a certain PD (or PDs) would warrant further examination; for instance, a series of elevations on RC2, RC7, SFD, SAV, and SHY could raise considerations of Avoidant PD. Although discriminant validity was occasionally questionable in the correlation analyses, the regression analyses better elucidated which scales on the MMPI–2–RF are particularly clinically useful in assessing different PDs, and these models consisted almost exclusively of hypothesized scales, with nonhypothesized scales rarely contributing incremental predictive utility. Furthermore, the current study further established that PDs can be evaluated using dimensional personality and psychopathology constructs that underlie MMPI–2–RF scale scores.

In addition, these results have implications more specifically for some of the six PD diagnostic categories that were retained in Section III. Although the MMPI–2–RF scales are not directly equivalent to the dimensional personality traits included in the Section III model, previous research has established a connection between this model and these scale scores (Anderson et al., 2013; Sellbom et al., 2014), and therefore, the results of the current study may help raise questions and suggest potential revisions to the Section III model. For instance, in the current study Antisocial PD was captured by a lack of social anxiety, which is not currently included in the trait profile for Antisocial PD in the Section III model. It is, however, more in line with the psychopathy specifier in Section III, which focuses on a lack of negative affectivity/anxiousness and social gregariousness (APA, 2013; see also Anderson et al., 2014; Strickland et al., 2013, for empirical support). Our findings indicate that these traits also may be reflective of an Antisocial PD diagnosis as well and such consideration would serve to bring this operationalization more in line with its intended target construct of psychopathy.

Not surprising, Borderline PD is a very heterogeneous construct, as reflected in these findings, and its associations appeared to be dependent on the type of sample. Internalizing and externalizing dysfunction in this disorder were emphasized differently across samples, indicating that research on the Section III model also may want to assess if similar patterns occur with this model as well; also, the utility of a diagnostic construct with setting specific manifestations appears questionable at best (see also Tyrer, 1999). In addition, the current study showed that Obsessive–Compulsive PD was best captured by dysfunctional negative emotions, stress, anxiety, and a lack of antisocial/externalizing behaviors. Although the Section III model includes traits reflective of negative affectivity, two of the four traits proposed for this disorder are from the detachment domain, whereas one trait comes from the (low) disinhibition (i.e., compulsivity) domain, and one from the negative affectivity domain. The results from this study support negative affectivity and a lack of disinhibitory behaviors. However, the current findings suggest that negative affectivity constructs better accounted for the variance in this disorder, rather than detachment constructs.

Finally, the current findings also have broader implications. These results lend support to the idea that personality psychopathology can and does converge with broad dimensional psychopathology constructs. The current *DSM* model views personality psychopathology and other psychological disorders as discrete categories. However, these results indicate that PD criteria and dimensional psychopathology traits and symptoms (as measured by the MMPI–2–RF) covary at meaningful nonchance levels. Thus, the treatment of PDs as a distinct class of entities from clinical disorders, along with other emerging evidence that dimensional personality traits covary equally strongly with "clinical" disorders as they do PDs (Kotov, Gamez, Schmidt, & Watson, 2010; Samuel & Widiger, 2008; see also Hopwood & Sellbom, 2013), seems less and less tenable.

Strengths, Limitations, and Future Directions

The current study is important and innovative for several reasons. First, to our knowledge, there is no published empirical study that has directly evaluated the MMPI–2–RF scales beyond the PSY–5 scales to assess PD constructs as measured via structured interview. Given the frequency of this measure's use, and the high prevalence of PDs in mental health settings, it is important to understand the associations between the MMPI–2–RF and PD diagnoses. This is particularly important given that these categorical diagnoses continue to be the primary method for PD diagnosis. Furthermore, although there has been research on the use of the MMPI–2–RF in assessing Section III PD dimensional traits (e.g., Anderson et al., 2013; Sellbom et al., 2014), there was been limited research on the measurement of Section II PDs. In addition, the current study used two psychiatric samples with high PD prevalence rates and structured clinical interviews were administered to both samples to determine PD diagnoses. This method eliminates the effect size inflation due to mono-method operation bias typically observed in this line of research, and adds validity to the PD assessment, given that these interviews were conducted by trained and experienced mental health professionals. Finally, the current study utilized advanced statistical methods that are infrequently used in personality assessment research. Incorrect parameterization via ordinary least square regression can render problematic results (Wright, Pincus, & Lenzenweger, 2012) given that personality disorder constructs tend to follow count distributions (Wright, Pincus, & Lenzenweger, 2012). The current study added to a growing literature using more appropriate and advanced statistical methods with the MMPI–2–RF.

There are several limitations in the current study that warrant consideration. First, although structured interviews were used

to evaluate PD diagnoses, different evaluators conducted these interviews, and interrater reliability estimates were unavailable in this study. However, this limitation was mitigated by the fact that highly trained and experienced professionals administered the assessments, and criterion count scores did evince internal consistency reliability. In addition, prevalence rates for each PD differed both between samples and within samples. This likely affected statistical power in certain cases, given that base rates were fairly small for some disorders (e.g., Schizotypal PD), and therefore generalizability for these results across samples of individuals with PD diagnoses may differ depending on the PD. Finally, three PDs (Dependent, Histrionic, and Schizoid) did not have a high enough prevalence rate in our samples to conduct analyses due to the likelihood of severe range restriction. Future research will need to focus on recruiting individuals who meet criteria for these diagnoses to better understand their associations with the MMPI–2–RF scale scores.

In conclusion, the current study provided a much needed evaluation of the associations between the MMPI–2–RF and *DSM–5* Section II PD diagnoses. Through the use of advanced statistical methods, we showed that scales on the MMPI–2–RF meaningfully converge with PDs and also that PDs can be measured through the use of dimensional constructs. This provides support for the use of the MMPI–2–RF in assessing and diagnosing PDs, and by the same token provides some supportive evidence for the *DSM–5* Section III PD model, which utilizes dimensional psychopathology and personality constructs to index PDs. Finally, although we used instruments translated into Dutch, the correspondence between the Dutch and English versions is strong, so the findings are likely to generalize to the English-language instruments as well.

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