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A dimensional approach to assessing personality functioning: examining personality trait domains utilizing *DSM-IV* personality disorder criteria

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Abstract

Background: This study compared a dimensional, trait domain approach to characterizing personality pathology with the traditional polythetic approach with respect to their associations with interpersonal functioning and personality traits from the five factor model.
Methods: Psychiatric inpatients (N = 1476) were administered the Structured Clinical Interview for *DSM-IV* Axis II personality disorders. Dimensional representations of trait domains were derived from reorganizing *DSM-IV* criteria into personality trait domains from *DSM-5* Alternative Model. Dimensional scores and personality disorder (PD) total criterion scores served as independent variables in predicting interpersonal profile clusters, as well as extraversion, agreeableness conscientiousness, neuroticism and openness from the five factor model traits.
Results: Trait domain scores and PD criteria totals were significantly correlated with submissive interpersonal style yet none proved significant in regression analyses. Avoidant and borderline PD total criteria were negatively associated with a normative interpersonal style. Combined trait domain of detachment and avoidant PD total criteria predicted a hostile/withdrawn interpersonal style. The trait domain of detachment was negatively associated with five factor traits of extroversion, whereas borderline PD total criteria were negatively associated with conscientiousness. Avoidant and borderline PD total criteria were positively associated with neuroticism.
Conclusions: The cross-cutting dimensional approach provided useful information in predicting a hostile/withdrawn interpersonal style as well as extroversion. Importantly, PD criterion scores and dimensional trait scores combined to predict this interpersonal style providing support to the alternative model of personality diagnosis in *DSM-5*. Clinicians are encouraged to assess dimensions of personality traits as these are related to interpersonal problems frequently encountered in psychiatric settings. While potentially useful, the dimensional approach articulated here did not yield substantial prediction of behavior.

1. Introduction

The clinical utility and predictive validity for the categorical diagnosis of personality disorders (PD) have substantial empirical support [1]; however, there is growing recognition that categorical diagnoses of personality disorders have a number of glaring shortcomings including high rates of co-morbidity among personality disorders [2–5], the loss of clinically relevant information inherent in all-or-nothing diagnosis, and excessive heterogeneity within personality disorders. Furthermore, research indicates that clinicians rely on implicit prototypes based on personality traits and broad domains of personality functioning rather than criteria counts to diagnose personality disorders [6,7]. Additionally, dimensional alternatives provide more reliable and valid approaches to personality assessment. The strongest evidence in support of dimensional approaches over traditional categorical diagnosis is the superiority of dimensional models in terms of predictive and incremental validity of associated personality constructs [8–16], clinical syndromes such as depression, anxiety and substance abuse [17] well-being, interpersonal and occupational functioning in prospective longitudinal studies [14,15,18], and a variety of health, morbidity, and physical disease outcomes [19].

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Based on an extant review of categorical and dimensional models of personality pathology, the *Diagnostic and Statistical Manual of Mental Disorders* Personality and Personality Disorders Work Group (Work Group) proposed a hybrid model to address numerous shortcomings of the current polythetic categorical model [20,21]. Krueger and colleagues presciently anticipated that *DSM-5* Task Force would adopt a conservative approach of retaining a categorical model in *DSM-5* because a novel dimensional system could create significant departures from familiar constructs and could jeopardize extensive clinical and research evidence related to some PDs [22]. In fact, the American Psychiatric Association Board of Trustees approved the final diagnostic criteria for the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* [23] that included a decision to retain the polythetic, categorical approach to diagnosis and retained all criteria and algorithms for diagnosing personality disorders of *DSM-IV*. *DSM-5* also introduced an alternative, hybrid model for diagnosing personality disorders located in Section 3 of the manual (the section containing "Emerging Measures and Models").

Personality disorders in the *DSM-5* Alternative Model are based on impairment in personality functioning (criterion A) and on pathological personality traits (criterion B). The number of specific PDs was reduced from 10 to 6 (antisocial, avoidant, borderline, narcissistic, obsessive–compulsive, and schizotypal) as well as a diagnosis of "personality disorder—trait specified" that can be made when criteria for a specific disorder are not met, but a personality disorder is assessed as present [23]. To assess personality traits, the Work Group proposed five broad, higher order personality trait domains (negative affectivity, detachment, antagonism, disinhibition, and psychoticism) composed of subordinate trait facets of personality functioning [20,21].

With the publication of *DSM-5*, a host of questions emerge in relation to the diagnosis of personality disorders with the alternative model, and the scientific community is compelled to examine the reliability, validity, and clinical utility of the alternative model under varying conditions. Among the questions facing researchers and clinicians is the degree to which the proposed trait domains add anything beyond the traditional polythetic model in predicting clinically relevant behavior associated with personality pathology. The current study aimed to address this question by assessing the validity of personality trait domains (negative affectivity, detachment, antagonism, disinhibition, and psychoticism) derived from *DSM-IV* individual personality disorder criterion in predicting interpersonal problems and five factor model personality constructs. To our knowledge, this is the first study to re-organize *DSM-IV* PD criteria into trait dimensions to assess the added value of trait domain scores in predicting interpersonal functioning.

Utilizing reconfigured data from the same measure and the same patient sample allows for a rigorous and conservative assessment of the validity of each diagnostic approach without confounds from utilizing different assessment methods with different sensitivity, specificity, reliability, and validity. For example, self-reported rates of PD criteria endorsement are significantly different than data gleaned from semi-structured interview methods [24–26]. The choice of examining trait domains and total criteria counts as dependent variables is based on evidence that important data are lost when interval data such as the total number of criteria are reduced to binary data in the form of traditional "yes, no" categorical PD distinctions [27].

Interpersonal problems were chosen as a dependent variable because impaired interpersonal functioning is one of two criteria from criteria A necessary for diagnosing a personality disorder in the alternative model [21,23], and because severity of interpersonal impairment is associated with severity of clinical symptoms and overall quality of life [28]. Problematic interpersonal functioning is a particularly salient issue for individuals with personality pathology, much of which interferes with social functioning and limits the potential for adaptive social relations [29]. Furthermore, the severity of interpersonal problems is negatively correlated with symptom improvement among individuals with borderline personality disorder [30].

2. Methods

2.1. Participants

The sample consisted of 1476 consecutively admitted inpatient adults (722 males and 754 females) from October 2010 to June 2013. All patients were engaged in a 6-to-8 week intensive multimodal treatment. Descriptions of the setting, treatment, and extant measures are available in detail elsewhere [31]. Patients were included in the study regardless of symptom severity or co-morbid diagnoses. Marital status was predominantly single (never married [58%], married [23%], and divorced/separated [15%], and did not respond [4%]). The majority were Caucasian (91%), with small percentages identifying as multiracial (5%), Asian (1.5%), American Indian (.7%), and Black/African American (.7%). Average age at admission was 33.5 years (SD = 14.0).

2.2. Measures

Demographic variables and history of psychiatric service usage were assessed using a standardized patient information survey [31]. Personality disorder diagnoses and criteria level data were assessed using the research version of the Structured Clinical Interview for *DSM-IV* Axis II personality disorders [SCID-II: 32]. Individual-level criteria were coded as absent (0) or present (1) for antisocial, avoidant, borderline, narcissistic, obsessive–compulsive, and schizotypal with no skip-outs. Total criteria scores were summed totals for each PD diagnosis. The decision to exclude 4 PD categories was based on data analyses carried out in August 2011 that identified exceptionally low prevalence rates for

schizoid (.01%), hysterical (0%), paranoid (<.01%), and dependent (0%). The principle investigator (JCF) decided to eliminate the above PDs from SCID interviews given the low base rates and based on the knowledge that the PD workgroup recommended a reduction to 6 PDs in the alternative model. Thus, the data represented in this manuscript reflect the data collection plan from 2012.

Interpersonal functioning was assessed utilizing the Inventory of Interpersonal Problems (IIP-32), a 32-item self-report measure assessing an array of interpersonal problems for which patients commonly seek psychotherapy [33,34]. The measure is based on a circumplex model of interpersonal behavior with eight scales assessing domineering/controlling, vindictive/self-centered, cold/distant, socially inhibited, nonassertive, overly accommodating, self-sacrificing, and intrusive/needy. Scores for each scale are calculated as item sums (range = 0–16) with higher values indicating greater interpersonal difficulty. Evidence for the reliability and validity is extensive and thoroughly reviewed by the developer [34].

While mean-level scores are frequently employed in outcome research [35,36], the clinical and conceptual limitations inherent in the individual analysis of IIP domains have long been noted [34]. For example, patients with marked elevations on nonassertive and overly accommodating scales are likely to have significantly different personality profiles than patients characterized by elevations on nonassertive and vindictive/self-centered scales. Person-centered analyses—techniques including cluster analysis and forms of latent mixture modeling—previously have been used to assess complex patterns of interpersonal behavior as measured through IIP domains [37,38]. A recent study by Clapp and colleagues [39] utilized latent profile analysis (LPA) to isolate subgroups of psychiatric inpatients sharing common patterns of interpersonal behavior. Statistical models identified normative, submissive, and hostile/withdrawn profiles, with each patient group characterized by a unique configuration of IIP scores. The same LPA procedure was used in the current, non-overlapping sample to determine individual IIP-32 profiles.

The Big Five Inventory (BFI) is a 44-item self-report measure that utilizes short phrases to assess prototypic markers of the five factor model (FFM)—extraversion, agreeableness conscientiousness, neuroticism and openness. Psychometric properties of the BFI are excellent and its factor structure and convergent validity with other measures of the FFM are excellent [40].

2.3. Procedures

Patients completed self-report measures as part of a large scale outcomes and treatment monitoring initiative [31] in which assessments were integrated into treatment planning and monitoring of progress. In addition, patients and treatment teams were informed that the findings were used to evaluate the effectiveness of treatment and for research purposes. The project was approved by the Institutional Review Board of Baylor College of Medicine. The IIP-32 was phased out in June 2012 (as part of a strategic re-organization of the hospital-wide assessment protocol) resulting in a total of 549 patients with both SCID-II and IIP-32 data. The BFI was added to the new protocol in July 2012, resulting in a total of 481 patients with BFI and SCID-II data available for analysis.

Master's level researchers administered SCID-II interviews to all patients admitted to the adult programs at the hospital. Interviewers thoroughly assessed and coded each criterion after reviewing past psychiatric history, collateral information from family, psychosocial assessment, nursing staff assessment, and completing the SCID-II interview. This process combined the ecologically valid longitudinal evaluation of the "all available data" diagnostic approach [41] with the rigorous research diagnostic interviews.

After all data were collected, two research teams utilized a "crosswalk" table [20] that linked the *DSM-IV* personality disorders to the alternative models five personality disorder trait domains, and subordinate facets to assign the individual *DSM-IV* PD criteria to the five alternative model trait domains. The teams used this crosswalk table as a guide; however, some independent decisions were necessary including the decision that not all *DSM-IV* PD criteria fit the trait domains.

Utilizing SCID-II research diagnostic criteria, two research teams independently categorized *DSM-IV* personality disorder trait criteria from six PDs into the *DSM-5* workgroup proposed personality trait domains (negative affectivity, detachment, antagonism, disinhibition, and psychoticism). Each research group received the following materials: 1. *DSM-5* crosswalk table [20], 2. *DSM-IV* PD criteria set of 49 criteria making up the 6 PDs, and 3. *DSM-5* Personality Trait Rating Form (Supplemental Appendix A). Criteria that did not match to specific domains were not included. Consensus rating for each criterion required a super majority (>80% agreement or 4 out of 5 raters agreeing). Total scores for each trait domain were the sum of relevant criteria met for each subject and constituted the primary dependent variable. In the event of an impasse, the senior member of each team served as the arbiter to determine the final rating because both members had over 2 decades of clinical and research experience with personality disorders. Disagreements in final ratings between teams were resolved by the senior members of the two teams.

2.4. Data analysis

Data analyses were carried out utilizing SPSS for windows, version 19.1 (IBM software), M-Plus [42], and SAS 9.3. Data analysis proceeded in four steps: 1. inter-rater reliability (percent agreement) and internal consistency of the trait domains, 2. descriptive and correlational analyses of trait domains, total criterion counts of the 6 PDs, 3. latent profile modeling for the IIP-32, 4. correlational analyses of

trait domains and total criterion counts with IIP-32 profiles and five factor model personality traits, 5. logistic and linear regression analyses to assess the relative contribution of trait domain and total criterion count variables with significant correlations (based on results of step 4).

To assess internal consistency of the proposed trait domains, a derivative of Chronbach's alpha was computed because Cronbach's coefficient alpha is inappropriate for non-continuous data. Item responses that are Likert-type or on an ordinal scale are often in violation of underlying test assumptions and will result in attenuated reliability estimates [43]. Ordinal alpha has been proposed as an alternative [43,44] and is based on the underlying polychoric rather than Pearson's correlations matrix. SAS 9.3 was used to obtain polychoric correlation matrices, and ordinal alpha was calculated based on Gadermann guidelines [44].

LPA was used to identify unobserved patterns of interpersonal difficulty based on scores across each IIP-32 domain. Models specifying from 1- to 5-class solutions were examined. Selection of a working model for subsequent evaluation was determined by statistical fit and overall interpretive value [45]. Fit indices considered for these data included AIC, BIC, and sample size adjusted BIC (aBIC) values; the Lo–Mendell–Rubin test (LMR); and the entropy criterion. AIC, BIC, and aBIC are standard information criteria wherein lower values represent incremental improvement of fit. The LMR, by contrast, provides a statistical comparison of the estimated model against a solution containing one fewer classes. Significant *p*-values indicate improved statistical fit relative to the more parsimonious model. Finally, entropy provides an index of the degree to which individual profiles are uniquely characteristic of a given class. Values range from 0 to 1 with entropy $\geq$.80 suggestive of adequate profile separation [46]. Although LPAs in these data were expected to replicate the 3-class solution previously identified by Clapp et al. [39], all model parameters were estimated freely with no constraints.

Logistic regression analyses were utilized with the interpersonal problems profiles to estimate relative contributions of PD trait domains and PD criteria totals. Linear regression models were utilized in predicting FFM personality traits. In all regression models independent variables were entered in a single block with total criterion counts for *DSM-IV* personality disorders and PD trait domain scores (significance level set at $p < .01$).

3. Results

Diagnostic profiles and past psychiatric history indicated high levels of functional impairment and co-morbidity consistent with severe mental illness [47]. Eighty-eight percent of patients in the sample were diagnosed with at least two co-occurring Axis I disorders with an average of 4.7 lifetime psychiatric disorders (*SD* = 3.1). Sixty percent manifested a major depressive disorder, 56% with a substance use disorder, 52% with an anxiety spectrum disorder, 18.6% with a bipolar spectrum disorder, and 9% with a psychotic spectrum disorder. Personality disorders were present in 35% of the sample with borderline (15.1%), avoidant (13.6%), obsessive–compulsive (5.8%), PDNOS (5.4%), antisocial (3.8%), narcissistic (2.8%) and schizotypal (.2%). Other markers indicative of severe mental illness included a high number of previous psychiatric hospitalizations (*M* = 2.3, *SD* = 3.2) and outpatient trials (*M* = 7.0, *SD* = 4.3).

Rater agreement for categorizing PD criteria into the trait domains ranged from good (antagonism = 70%), to excellent (negative affectivity = 80%, detachment = 88%, disinhibition = 100% and psychoticism = 86%). Overall reliability was in the excellent range (85%). Personality disorder criteria for the five trait domains were as follows: negative affectivity (avoidant 4; borderline 1, 2, 6), detachment (avoidant 1, 2, 3, 5; schizotypal 5, 6, 8, 9), antagonism (narcissistic 6, 7, 8, 9; borderline 8; antisocial 2, 4, 7), disinhibition (borderline 4, 5; antisocial 1, 3, 5, 6), and psychoticism (schizotypal 1, 2, 3, 4, 7; borderline 9). Ordinal alpha values for internal consistency for negative affectivity (α = .75), detachment (α = .84), antagonism (α = .83), disinhibition (α = .90), and psychoticism (α = .88) indicate that all trait domains possess acceptable to excellent internal consistency [48].

Distribution characteristics of the trait domain scores were adequate for parametric statistics with the exception of psychoticism that had a skewed distribution and therefore a square root transformation was computed to normalize the distribution. The standard and transformed variables were used in subsequent analyses with no difference in outcome, therefore the standard variable was reported in text and tables.

Bivariate correlations among the PD trait domains indicate that associations among the trait domains were in the small to medium size correlations. Table 1 presents Pearson correlations between trait domains and criteria counts for PD diagnoses. All correlations were significant

Table 1
Correlations among *DSM-5* PD trait domain and personality disorders total criteria counts (*N* = 1476).

	Avoidant	Obsessive–compulsive	Schizotypal	Borderline	Narcissistic	Antisocial
Negative affectivity	*r* = .52*	*r* = .25*	*r* = .19*	*r* = .81*	*r* = .28*	*r* = .15*
Detachment	*r* = .87*	*r* = .25*	*r* = .45*	*r* = .32*	*r* = .12*	*r* = .13*
Antagonism	*r* = .17*	*r* = .23*	*r* = .17*	*r* = .47*	*r* = .78*	*r* = .51*
Disinhibition	*r* = .24*	*r* = .10*	*r* = .22*	*r* = .66*	*r* = .27*	*r* = .74*
Psychoticism	*r* = .22*	*r* = .10*	*r* = .78*	*r* = .46*	*r* = .13*	*r* = .13*

* $p < .0001$.

Table 2
Fit indices for latent profile models of IIP-32 domains.

Model	AIC	BIC	aBIC	Ent	LMR
1-Class	24,524.6	24,593.6	24,542.8	–	–
2-Class	23,701.7	23,809.4	23,730.0	0.857	<.001
3-Class	23,393.4	23,539.8	23,431.9	0.843	<.001
4-Class	23,247.1	23,432.4	23,295.9	0.854	0.046
5-Class	23,043.5	23,267.5	23,102.4	0.851	0.687

IIP-32 = Inventory of Interpersonal Difficulties–32; AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; aBIC = Adjusted; Ent = Entropy criterion; LMR = Lo–Mendell–Rubin test.

($p < .0001$), yet most correlations ranged from small to medium size indicating that most correlations between trait domains and PD criteria totals appeared to assess related but non-overlapping latent constructs. Large effect size correlations were observed between negative affectivity and BPD total ($r = .81$, $p < .0001$), detachment and avoidant total ($r = .87$, $p < .0001$), antagonism and narcissistic total ($r = .78$, $p < .0001$), disinhibition and antisocial total ($r = .74$, $p < .0001$), and psychoticism and schizotypal total ($r = .78$, $p < .0001$) indicating a strong correspondence and likely overlap of constructs. Importantly, all five trait domains had moderate to large correlations with at least 2 PD criteria totals indicating that trait domain scores cut across PD types. Given these high correlations, variance inflation factors were computed and reviewed for all regression analyses.

3.1. Interpersonal profiles

LPA were conducted using MPlus 6.1 software. All models assumed conditional independence [49]. For IIP-32 domains, AIC, BIC, and aBIC values decreased across successive solutions. Entropy criteria were acceptable for all models (Table 2). Results of the LMR test indicated marginal improvement with the inclusion of a 4-class model whereas the 5-class solution failed to contribute significantly to overall fit. Given these results, profiles were examined for both the 3- and 4-class models.

Profiles extracted from the 3-class model were functionally identical to those independently reported by Clapp et al. [39] (Table 3). As in previous research, a normative group ($n = 195$) was identified, demonstrating IIP-32 scale scores typical of those found in non-clinical samples (37th to 55th percentile [34]). A subpopulation of submissive patients also was observed ($n = 218$), demonstrating primary elevations across nonassertive, overly accommodating, and self-sacrificing domains (95th to 99th percentile of normative samples). Finally, a subset of hostile/withdrawn patients was identified ($n = 136$), characterized by elevations across nonassertive, overly accommodating, and self-sacrificing scales (95th to 99th percentile of normative samples). Normative, submissive, and hostile/withdrawn profiles also were identified in the 4-class model. However, the final subgroup in this solution accounted for less than 10% of the sample with members demonstrating an undifferentiated profile characterized by high-average to severe scores across each IIP domain. Given these results, the 3-class solution was selected for further examination based on considerations of parsimony, interpretive quality, and evidence of stability across independent samples.

Pearson correlations (Table 4) indicate statistically significant associations among IIP-32 normative profile and four of five trait domains and four of six PD criterion counts with medium effect size correlations with detachment ($r = -.31$, $p < .0001$) as well as avoidant PD ($r = -.37$, $p < .0001$). Submissive profile was significantly correlated with four of five trait domains and three of six PD criterion counts, but all were small effect size correlations. Hostile/withdrawn profiles were significantly correlated with three of five trait domains and three of six PD criterion counts with medium effect size correlations with avoidant PD ($r = .27$, $p < .0001$). BFI extroversion was significantly correlated detachment ($r = -.45$, $p < .0001$) and avoidant PD ($r = -.42$, $p < .0001$), both representing medium effect size correlations. Agreeableness was significantly correlated with all trait domains and PD criterion counts, with medium effect size correlations with negative affectivity ($r = -.31$, $p < .0001$), antagonism ($r = -.42$, $p < .0001$), borderline ($r = -.33$, $p < .0001$) and narcissistic ($r = -.37$, $p < .0001$) PD total criterion counts. Conscientiousness was significantly correlated with three of five trait domains and two of six PD criterion counts, with medium effect size correlations with negative affectivity ($r = -.28$, $p < .0001$) and borderline PD ($r = -.32$, $p < .0001$). Neuroticism was significantly correlated with all five trait domains and three of six PD criterion counts, with medium effect size correlations with negative affectivity ($r = .42$, $p < .0001$), avoidant ($r = .32$, $p < .0001$), and borderline PD ($r = .41$, $p < .0001$).

Results of logistic regression (Table 5) indicate that lower avoidant and borderline PD total criteria scores are predictive of the normative profiles, while no trait domains or PD

Table 3
Conditional means of IIP-32 scales based on 3-class latent profile analysis.

Profile	*n*	DOM	VIND	DIST	INHIB	NASS	ACC	SACR	NEED
Normative	195	2.31	1.70	1.92	3.17	2.97	3.78	4.62	2.74
Submissive	218	2.68	1.91	4.20	8.17	10.84	10.88	10.08	4.55
Hostile/withdrawn	136	4.69	7.87	8.66	9.52	7.48	7.61	6.07	4.94

Variances for IIP-32 subscales are held constant for all groups in latent profile analysis. Standard deviation estimates across each domain were estimated as follows: domineering/controlling ($SD = 3.01$); vindictive/self-centered ($SD = 2.60$); cold/distant ($SD = 2.82$); socially inhibited ($SD = 3.58$); monassertive ($SD = 3.10$); overly accommodating ($SD = 2.82$); self-sacrificing ($SD = 3.35$); intrusive/needy ($SD = 3.45$).

Table 4
Correlations between personality factors and trait domains/PD criteria counts.

	IIP normative (n= 549)	IIP submissive (n= 549)	IIP hostile (n= 549)	Extroversion (n= 481)	Agreeableness (n= 481)	Conscientiousness (n= 481)	Neuroticism (n= 481)	Openness (n= 481)
Negative affectivity	r = −.22***	r = .06	r = .16***	r = −.05	r = −.31***	r = −.28***	r = .42***	r = −.02
Detachment	r = −.31***	r = .15**	r = .17***	r = −.45***	r = −.23**	r = −.15*	r = .16*	r = −.09
Antagonism	r = −.03	r = .16***	r = −.11*	r = .03	r = −.42***	r = −.10	r = .18*	r = .03
Disinhibition	r = −.13**	r = .12**	r = .02	r = −.02	r = −.17**	r = −.19**	r = .19*	r = −.02
Psychoticism	r = −.16***	r = .12**	r = .05	r = −.02	r = −.24***	r = −.11	r = .16*	r = .04
Avoidant	r = −.37***	r = .11**	r = .27***	r = −.42***	r = −.22***	r = −.23***	r = .32***	r = −.09
Obsessive–compulsive	r = −.17***	r = .09	r = .09	r = −.06	r = −23***	r = −.08	r = .19*	r = .07
Schizotypal	r = −.13**	r = .15**	r = .00	r = −.07	r = −.18**	r = −.08	r = .10	r = .02
Borderline	r = −.22***	r = .10	r = .12**	r = −.01	r = −.33***	r = −.32***	r = .41***	r = −.03
Narcissistic	r = .01	r = .16***	r = −.15***	r = .05	r = −.37***	r = −.12	r = .03	r = .10
Antisocial	r = .01	r = .05	r = −.05	r = −.03	r = −.18**	r = −.08	r = .06	r = .03

* p < .01.
** p < .001.
*** p < .0001.

criterion totals identified the submissive profiles. Finally, hostile/withdrawn profile was predicted by low levels of detachment and higher number of avoidant PD criteria. Results of linear regression models (Table 6) indicated that extraversion was associated with low detachment trait domain scores. Agreeableness was not significantly associated with any trait domains or PD criterion scores. Borderline PD total scores were associated with lower conscientiousness. Neuroticism was positively associated with borderline and avoidant PD criterion totals, but was not associated with any trait domain scores. Variance inflation factors were well below the conservative cut score of VIF ≥4 [50] for the final trimmed models, suggesting that collinearity did not impact the final regression models.

4. Discussion

Patients with personality disorders generally exhibit poorer treatment outcomes compared to those without personality

Table 5
Logistic regression predicting inventory of interpersonal problems profiles (n = 549).

IIP-32 profiles	Independent variable	β	Wald	p	χ^2	−2Log likelihood	R^2
Normative	Avoidant PD	−0.86	26.1	.000			
	Schizotypal PD	−0.45	1.4	.25			
	Borderline PD	−0.31	6.6	.01			
	Negative affect	0.45	5.2	.02			
	Detachment	0.45	2.9	.08			
	Disinhibition	0.11	0.5	.46			
	Psychoticism	−0.16	0.00	.96			
	Model summary				109.9	604.4	.25
Submissive	Avoidant PD	−0.10	0.6	.43			
	Schizotypal PD	0.14	0.2	.65			
	Narcissistic PD	0.19	2.6	.13			
	Detachment	0.32	2.3	.13			
	Antagonism	0.06	0.1	.76			
	Disinhibition	0.01	0.8	.38			
	Psychoticism	−0.14	0.3	.61			
	Model summary				28.1	586.5	.07
Hostile/withdrawn	Avoidant PD	0.65	28.5	.000			
	Borderline PD	0.16	4.0	.05			
	Narcissistic PD	−0.30	4.7	.03			
	Negative Affect	−0.12	0.5	.47			
	Detachment	−0.59	10.5	.001			
	Antagonism	−0.20	1.2	.20			
	Model summary				79.3	659.4	.18

Nagelkerke R^2 is an approximation of R^2.

Table 6
Linear regression predicting five factor domains (n = 481).

Criterion Variable	Independent variable	β	t	p	R	R^2	F	p
Extroversion	Avoidant PD	−0.16	−1.5	.13				
	Detachment	−0.31	−3.0	.003				
	Model summary				.46	.21	29.6	.000
Agreeableness	Avoidant PD	0.16	1.1	.25				
	Obsessive–compulsive PD	0.66	−1.3	.18				
	Schizotypal PD	0.13	1.0	.29				
	Narcissistic PD	−0.10	−.74	.46				
	Borderline PD	−0.02	−.13	.89				
	Negative affect	−0.19	−1.5	.13				
	Detachment	−0.27	−1.9	.63				
	Antagonism	−0.29	−2.3	.02				
	Disinhibition	0.14	1.1	.29				
	Psychoticism	−0.19	−1.6	.12				
	Model summary				.51	.26	7.1	.000
	Avoidant PD	−0.12	−1.6	.11				
Conscientiousness	Borderline PD	−0.27	−2.5	.01				
	Negative affect	−0.00	−0.02	.99				
	Model summary				.34	.11	9.6	.000
	Avoidant PD	0.35	2.7	.007				
	Obsessive–compulsive PD	0.06	0.9	.34				
Neuroticism	Borderline PD	0.38	2.6	.01				
	Negative affect	0.06	0.5	.61				
	Detachment	−0.21	−1.8	.07				
	Antagonism	0.02	0.3	.77				
	Disinhibition	−0.16	−1.8	.08				
	Psychoticism	−0.67	−0.9	.37				
	Model summary				.48	.23	8.3	.000

Big Five Inventory (BFI).

disorders [51] indicating a relatively strong cohort effect; yet, a growing body of research points to the heterogeneity within specific personality disorders. The high prevalence of co-occurrence across personality disorders underscores the lack of specificity in traditional categorical models and the all-or-nothing personality diagnoses provide limited information for treatment planning and prognosis for individual patients. The *DSM-5* alternative model emphasizes a multidimensional approach assessing impairment in self and interpersonal functioning as the core constituents of personality psychopathology, coupled with characterization of pathological personality trait domains [21]. This dimensional approach is intended to enhance clinical utility by attending to pathological personality traits in individual patients whether or not they meet full criteria for a personality disorder. Clinical application of the *DSM-5* alternative model involves reviewing all five broad personality domains, thus encouraging assessment of personality functioning that cuts across specific personality disorders [52]. In this respect, the dimensional trait domains of the alternative model are more closely aligned with the proposed changes to the *International Classification of Diseases* (*ICD-11*) in which assessment of severity of personality and dimensions of personality functioning will be assessed [53].

The *DSM-5* work group proposed specific trait facets and domains with the understanding that future empirical research would further clarify the psychometric and clinical utility of the proposed facets and domains. The current study examined the utility of re-organizing existing *DSM-IV* PD criteria into dimensional trait domains as a means of characterizing general level of severity of those pathological personality trait domains. The findings partially support the value of conceptualizing personality functioning as a set of interrelated trait domains. Re-organizing individual PD criteria into the five proposed trait domains yielded good to excellent reliability across two rating teams. The five trait domains cut across diagnostic categories indicating novel re-organization of *DSM-IV* PD criteria. The results of the correlational analyses indicate that the trait domains are related; however, the magnitude of most correlations indicated that the domains are generally independent. Furthermore, it was clear that the trait domains cut across every personality disorder assessed with significant correlations for each trait domain and PD criteria total score. The results of the logistic and linear regression analyses indicated that trait domains contributed to the prediction of 1 of 3 interpersonal profiles and 1 of 5 FFM personality traits.

These results demonstrate modest predictive validity by adding components of a dimensional approach to conceptualizing personality pathology. Clinicians normally conceptualize and diagnose according to a short list of causally central symptoms or traits that make up implicit prototypes

of the disorders [54]. When surveyed regarding the utility and practical application of differing diagnostic approaches, clinicians report that categorical diagnosis and symptom counting approaches are clinically impractical [55–58]. A dimensional approach to assessing four to five traits appears to be far more clinically relevant, and is more predictive of interpersonal problems that contribute to the individual patient seeking treatment. From a pragmatic standpoint, assessing four to five central personality traits may result in more reliable diagnosis of personality pathology (regardless of diagnostic labels) and can help focus the clinician's treatment plan to target interpersonal and self-functioning impairments illuminated by the assessment.

The large sample of psychiatric inpatients with a high burden of illness and personality pathology is a significant strength of this study. While the trait domains accounted for a relatively limited amount of the variance in predicting interpersonal problems and the FFM variables, the trait domains derived from research interviews do not share method variance with self-report dependent variables, thus constricting the magnitude of the associations [59]. Nonetheless, several limitations are noteworthy. The smaller subset with IIP and BFI data does not fully represent the patient population under investigation. Regression analyses estimated relationships among trait domains and concurrent interpersonal problems rather than prospectively and were based on self-report rather than observer ratings from family members. The selected dependent variables (IIP-32 and BFI five factor model personality traits) are a fraction of the potentially important outcomes relevant to personality disorder research. Finally, the sample does not include outpatient or normal controls and is composed of individuals with severe mental illness with relatively high levels of PD traits. While studying a sample of patients with this level of psychopathology is advantageous from the perspective of examining trait domains within a high-risk population, the generalization of results to outpatient populations is limited.

In light of the limitations, the findings of this study are in line with the theoretical structure of the alternative model for assessing personality trait domains, and they provide support for discrete features of the trait domains. The results also add to a growing body of research indicating that combining categorical assessments with dimensional ratings optimizes the prediction of important psychosocial outcomes [60–63]. Clinicians and patients may benefit from an assessment of personality trait domains because it may help focus attention on the complex nature of their patients' psychopathology and target the problematic traits for intervention in order to bring about long-term positive outcomes [20]. Approaching the clinical assessment of five broad domains of personality functioning may provide a coherent conceptual frame and may be particularly useful in treatment planning and communicating with patients [64]. The personality trait domain approach articulated in this study may be especially well-suited as a research component of the National Institute of Mental Health *Research Domains Criteria* (RDoC) initiative to develop new ways of classifying mental disorders based on dimensions of observable behavior and neurobiological measures [65–67].

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Appendix A. Supplementary data

Supplementary data to this article can be found online at http://dx.doi.org/10.1016/j.comppsych.2014.09.001.

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