

Borderline Personality Disorder From the Perspective of General Personality Functioning

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Abstract: The authors extended previous work on the hypothesis that borderline personality disorder (BPD) can be understood as a maladaptive variant of personality traits included within the 5-factor model (FFM) of personality. In each of 3 samples, an empirically derived prototypic FFM borderline profile was correlated with individuals' FFM profiles to yield a similarity score, an FFM borderline index. Results across all samples indicated that the FFM borderline index correlated as highly with existing borderline measures as they correlated with one another, and the FFM borderline index correlated as highly with measures of dysfunction, history of childhood abuse, and parental psychopathology as did traditional measures of BPD. Findings support the hypothesis that BPD is a maladaptive variant of FFM personality traits.

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The diagnostic approach to personality disorders in the American Psychiatric Association's (APA) *Diagnostic and Statistical Manual of Mental Disorders* (fourth edition; *DSM-IV*; APA, 2000) "represents the categorical perspective that Personality Disorders are qualitatively distinct clinical syndromes" (APA, 2000, p. 689). A number of researchers, however, have raised compelling concerns regarding the validity of this categorical model (Clark, Livesley, & Morey, 1997; Livesley, 1998, 2001a; Trull, 2000; Widiger, 1993) and have offered alternative dimensional models (Clark, 1993; Cloninger, Svrakic, Bayon, & Przybeck, 1999; Livesley, 1998; Widiger & Costa, 1994; Wiggins & Pincus, 1989).

One of the most widely studied of these dimensional models is the five-factor model (FFM) of personality (John & Srivastava, 1999; McCrae & Costa, 1999). Wiggins and Pincus (1989) were the first to provide published data on the relationship of the FFM to the APA (1980, 1987) personality dis-

orders, although many previous FFM studies had also provided relevant data (e.g., McCrae, Costa, & Busch, 1986). Since that original effort, over 50 additional published studies have focused on the relationship between the FFM and personality disorder symptomatology (Widiger & Costa, 2002). The results of these studies, using a variety of measures and populations, have indicated that borderline personality disorder symptoms (for example) are correlated positively with the FFM domain of Neuroticism and negatively with the FFM domains of Agreeableness and Conscientiousness (e.g., Ball, Tennen, Poling, Kranzler, & Rounsaville, 1997; Blais, 1997; Costa & McCrae, 1990; Duijsens & Diekstra, 1996; Dyce & O'Connor, 1998; Reynolds & Clark, 2001; Soldz, Budman, Demby, & Merry, 1993; Trull, 1992).

Although there is good evidence that the borderline diagnosis does identify valid and clinically meaningful maladaptive personality traits (Adams, Bernat, & Luscher, 2001; Gunderson, 2001; Paris, 1994), its

diagnostic criteria are not without problems. For example, Tyrer (1999) has suggested that some of the symptoms, such as episodes of wrist slashing or an overdose, are perhaps better understood as expressions of a time-limited mood disorder rather than a maladaptive personality trait. Thus, it may not be desirable for the FFM to reproduce all of the findings associated with the diagnosis. However, if the FFM is to become a viable alternative to the *DSM-IV* personality disorder diagnostic categories, it should reproduce the important clinical and theoretical components of the disorder's nomological network (Livesley, 2001b; Lynam & Widiger, 2001).

Four studies have examined more specifically the ability of the FFM to describe borderline personality disorder (Clarkin, Hull, Cantor, & Sanderson, 1993; Morey & Zanarini, 2000; Wilburg, Urnes, Friis, Pederson, & Karterud, 1999; Zweig-Frank & Paris, 1995). Clarkin et al. (1993) examined 62 female inpatients with borderline personality disorder and confirmed a close correspondence between facets of Neuroticism and borderline symptomatology. McCrae et al. (2001) calculated a .89 profile agreement score between the mean NEO Personality Inventory (Costa & McCrae, 1992) scores obtained by the 62 Clarkin et al. borderlines and the FFM borderline profile hypothesized by Widiger, Trull, Clarkin, Sanderson, and Costa (1994). The findings of Clarkin et al. were subsequently replicated by Wilburg et al. (1999).

Zweig-Frank and Paris (1995) obtained *DSM-III-R* personality disorder diagnoses on 150 female patients, 59 of whom completed the Revised NEO Personality Inventory (NEO-PI-R; Costa & McCrae, 1992) 2 years later. Twenty-nine of the follow-up participants had been originally diagnosed with borderline personality disorder; the others had been diagnosed with other personality disorders. Zweig-Frank and Paris (1995) found only a few marginal FFM differences between the 29 borderlines and the 30 nonborderlines and concluded that there were "few overall differences on the five factors between borderline and nonborderline patients" (p. 525). However, there are methodological issues that weaken the impact of their conclusions. The borderline and FFM assessments were conducted 2 years apart, and the test-retest reliability of the borderline diagnosis is problematic, at best (McDavid & Pilkonis, 1996; Zimmerman, 1994). In addition, Zweig-Frank and Paris focused primarily on group comparisons, using only the domains of the FFM. Current research suggests that better differentiation occurs at the level of the facets (Axelrod, Widiger, Trull, & Corbitt, 1997; Lynam & Widiger, 2001; Reynolds & Clark, 2001; Trull, Widiger, & Burr, 2001).

More recently, Morey and Zanarini (2000) compared the ability of the FFM, assessed by the NEO Five-Factor Inventory (NEO-FFI; Costa & McCrae, 1992), and the Revised Diagnostic Interview for Borderlines (DIB-R; Zanarini, Gunderson, Frankenburg, & Chauncey, 1989) to predict hypothesized correlates of borderline personality disorder (e.g., family history of mood disorder, childhood history of abuse, lifetime rate of suicide attempts, and level of functioning). They indicated that "the NEO-FFI representation of borderline personality disorder explained a significant portion of the variance in historical and outcome variables, indeed, in some cases more than the original diagnoses from which this representation had been derived" (Morey & Zanarini, 2000, p. 735), but they also emphasized that "there were aspects of the borderline personality disorder diagnosis not fully captured by the five-factor representation" (p. 735). For example, multiple regressions of the NEO-FFI five domain scores indicated substantial correlations with the cognitive, interpersonal, and affective components of the DIB-R assessment of borderline personality disorder but not with the DIB-R section devoted to impulse action patterns (i.e., substance abuse, sexual deviance, self-mutilation, and suicidality). In addition, variance in DIB-R borderline symptomatology not accounted for by the NEO-FFI correlated significantly with hypothesized correlates of the disorder, including, for example, a history of abuse in childhood. Although not explicitly represented within the borderline diagnostic criteria, physical and sexual abuse are often evident in the childhood of persons diagnosed with this disorder (Johnson, Cohen, Brown, Smailes, & Bernstein, 1999; Zanarini, 2000), and these experiences are considered to be important in theoretical models of its etiology (Gunderson, 2001; Zanarini, 2000). Morey and Zanarini reported that the NEO-FFI domain scores considered together correlated .23 ($p < .01$) with a history of abuse in childhood, comparable to the .26 correlation obtained by the DIB-R, but they emphasized that the variance in the DIB-R not accounted for by the NEO-FFI correlated .16 ($p < .01$) with a history of childhood abuse. Morey and Zanarini (2000) concluded that "diagnostic elements that are independent of this FFM representation of borderline personality appear to be valid elements of the disorder, as reflected by their association with theoretically important correlates" (p. 736).

We suggest, instead, that it is more impressive that a lengthy and extensive interview of borderline symptomatology covering a wide range of affective dyscontrol, cognitive aberrations, impulse dyscontrol, and dysfunctional interpersonal relationships

was able to explain only a small proportion of additional variance in childhood abuse, relative to a much briefer self-report measure of general personality functioning (Widiger & Costa, 1994). Although the NEO-FFI, used by Morey and Zanarini (2000), provides a reliable and valid assessment of the FFM domains (Costa & McCrae, 1992), the hypotheses regarding the relationship of the FFM to the personality disorders provided by Widiger et al. (1994) and Lynam and Widiger (2001) have been at the level of the facets within each of the five broad domains. Not all of the facets of FFM Conscientiousness, Antagonism, Openness, or Extraversion are expected to correlate with borderline personality disorder. For example, lack of deliberation is but one of six facets of FFM Conscientiousness, yet it is the aspect most strongly related to borderline impulsivity (Whiteside & Lynam, 2001). It is perhaps unrealistic to expect a combination of NEO-FFI domain scales (with only two items to assess each FFM facet) to relate as highly as the DIB-R (with 186 items specific to borderline personality disorder) with hypothesized correlates of borderline personality disorder.

The purpose of the current study is to extend FFM personality disorder research using an expert-consensus FFM borderline personality disorder profile as a basis for a more specific FFM borderline index. Our procedure was modeled after the effort of Miller, Lynam, Widiger, and Leukefeld (2001) to obtain an FFM NEO-PI-R score for psychopathy. Miller et al. first assessed the similarity between the expert-consensus FFM profile of the prototypic psychopath (obtained by averaging experts' ratings on each facet; scale ranged from 1 to 5, where 1 = *prototypic case is extremely low on this trait*, 5 = *prototypic case is extremely high on this trait*) with individuals' obtained NEO-PI-R profiles. This similarity index was then used as an index of psychopathy for each study participant. Miller et al. found that the NEO-PI-R psychopathy index correlated substantially with a self-report psychopathy inventory; with symptoms of antisocial personality disorder, substance abuse, and substance dependence; and with the occurrence of frequent and varied antisocial activities. Further, this index correlated negatively with internalizing symptoms of anxiety and depression. All of the findings replicated in magnitude results previously reported using incarcerated, Psychopathy Checklist-Revised (Hare, 1991) defined psychopaths.

The same procedure was used in the current study to obtain an FFM measure of borderline personality disorder. The FFM borderline prototype reported by Lynam and Widiger (2001) was matched empirically against an individual's NEO-PI-R (Costa & McCrae, 1992) profile to yield a

similarity score. The more similar an individual is to this FFM prototype, the more he or she could be said to exhibit the FFM borderline personality profile. This similarity index was then used as an FFM index of borderline personality disorder and compared empirically with existing measures of borderline personality disorder across a variety of samples and hypothesized correlates.

METHOD

Data were obtained from three independent samples of participants: (a) a large, nonclinical sample of undergraduates, a subset of which endorsed significant borderline personality disorder features (nonclinical-borderline features); (b) a sample of 52 clinical outpatients receiving treatment (Clinical Sample 1); and (c) a second sample of 46 clinical outpatients receiving treatment (Clinical Sample 2). Results from two of these data collections (nonclinical sample, Clinical Sample 2) have been reported in previous articles (Trull, 2001; Trull et al., 1998, 2001), but none of the findings in this article have been reported previously.

NONCLINICAL-BORDERLINE FEATURES SAMPLE

This sample is part of a larger longitudinal study examining the development of borderline personality disorder features in young adults (Trull, 2001). First, 4,927 freshmen at the University of Missouri were screened with items from the Personality Assessment Inventory–Borderline Features scale (PAI-BOR; Morey, 1991). This scale is a well-validated 24-item self-report measure of features of personality pathology associated with the borderline personality disorder (i.e., affective instability, identity problems, negative relationships, and self-harm). Individuals who scored higher than 38 on the PAI-BOR (two standard deviations above the mean score for community participants) and those who scored below this threshold (lower than 38) were identified. From these lists of above- and below-threshold scorers, individuals were randomly selected for additional testing. Above-threshold individuals were oversampled to ensure that the final sample would contain a reasonable number of these participants, and an effort was also made to sample an approximately even number of men and women from each threshold group.

Each person who agreed by written informed consent to participate first completed the PAI-BOR a second time to ensure that she or he scored in the same range at retest (i.e., above [B+] or below threshold [B-]). Through this two-stage process, a total of 421 individuals completed the

initial phase of the study; 197 individuals in the B+ group, and 224 individuals in the B- group. The B+ group consisted of 119 women and 78 men, whereas the B- group consisted of 110 women and 114 men. Most participants were Caucasian (84%) and single (99.5%); some reported previous outpatient treatment for a psychological condition (25%), and a small percentage (1.7%) reported previous inpatient hospitalization. The present article focuses on the 407 individuals who provided complete data on the NEO-PI-R and on the borderline personality disorder measures.

The internal consistency of the PAI-BOR at its second administration was .92; test-retest reliability was .94 (Trull, 2001). Other measures administered at this time were the NEO-PI-R (Costa & McCrae, 1992), Minnesota Multiphasic Personality Inventory (MMPI) Borderline Personality Disorder scale (Morey, Waugh, & Blashfield, 1985), Structured Interview for *DSM-IV* Personality (SIDP-IV; Pfohl, Blum, & Zimmerman, 1997), Revised Diagnostic Interview for Borderlines (DIB-R; Zanarini et al., 1989), Inventory of Interpersonal Problems (IIP; Horowitz, Rosenberg, Baer, Ureno, & Villasenor, 1988), Family History-Research Diagnostic Criteria interview (FH-RDC; Endicott, Andreasen, & Spitzer, 1978), and Familial Experiences Interview (FEI; Ogata, 1988).

The NEO-PI-R (Costa & McCrae, 1992) is a self-report measure of the personality traits that are part of the FFM. The NEO-PI-R assesses the five major domains of the FFM (Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness), and each domain is further broken down into six trait facets. The NEO-PI-R scores have been shown to be internally consistent and reliable over time, and evidence supports the convergent and discriminant validity of the domain and facets scales. In the current sample, the internal consistency of NEO-PI-R domain scores was high: Neuroticism=.94; Extraversion=.90; Openness=.88; Agreeableness=.91; and Conscientiousness=.93. The MMPI Borderline Personality Disorder scale (Morey et al., 1985) is a 22-item scale consisting of original MMPI items that were judged to represent *DSM-III* criteria for borderline personality disorder and that discriminated between high and low scorers on the total scale score. Several studies have found that MMPI Borderline scores discriminate borderline patients from those with other personality disorders (Widiger & Coker, 2002). The internal consistency of MMPI Borderline items was .76.

The SIDP-IV (Pfohl et al., 1997) is a semistructured interview for the assessment of the criteria for the *DSM-IV* personality disorders, including borderline personality disorder (Kaye & Shea, 2000;

Widiger & Coker, 2002). The DIB-R (Zanarini et al., 1989) is a semistructured interview devoted to the assessment of borderline personality disorder. Scores from four major sections (affect, cognition, impulse actions patterns, and interpersonal relationships) are combined to calculate a total score (range=0–10). The interrater reliability (intraclass correlation coefficient) for the SIDP-IV and DIB-R borderline scores in the current study was .81 and .77, respectively.

The IIP (Horowitz et al., 1988) is a 127-item self-report measure of distress arising from interpersonal sources (assertiveness, sociability, intimacy, submissiveness, responsibility, and control). The mean score across all 127 IIP items (i.e., total IIP score) is used to represent the overall mean level of interpersonal distress and has been shown to be both a reliable and a valid measure of interpersonal distress (Kaye & Shea, 2000). The internal consistency of the IIP items in this study was .97.

An expanded version of the FH-RDC (Endicott et al., 1978) was administered to all participants to assess a history of mental disorders in their biological parents. A total of 21 individual diagnoses were evaluated for each biological parent, and we collapsed across individual categories to create higher order diagnostic categories for each biological parent (e.g., any psychotic disorder, any mood disorder, any anxiety disorder, any substance use disorder). The interrater reliability of FH-RDC parent diagnoses obtained in the current study ranged from a kappa of .67 to .93.

All participants also completed the FEI (Ogata, 1988), which assesses retrospectively physical and sexual abuse, physical neglect, loss, and other areas of family experience. The FEI has been used reliably in a number of childhood abuse studies, including prior research on borderline personality disorder (e.g., Silk, Lee, Hill, & Lohr, 1995). In addition, Nigg et al. (1991) provided validity data on the FEI (i.e., presence/absence of childhood abuse) by interviewing informants, typically a patient's mother or sibling. The primary FEI scores calculated for the present study were the presence/absence of physical or sexual abuse. The interrater reliability for FEI ratings of physical and sexual abuse obtained in the current study was .71 and .82, respectively.

Finally, each participant completed the Social Adjustment Scale (SAS; Weissman, 1990), a semistructured interview that contains items assessing major areas of functioning (e.g., work, social and leisure activities, relationships with extended family, marital/partnership role, and parental role). Studies have indicated good interrater reliability for SAS item scores, and SAS scores have been shown to discriminate between impaired (e.g., depressed) and

unimpaired individuals and to be sensitive to clinical improvement in patients (Weissman, 1990). In the present study, the interrater reliability (intraclass correlation) of the sum of SAS scores was .94.

CLINICAL SAMPLE 1

This sample of 52 outpatients was drawn from several outpatient clinics in Columbia, Missouri. Participants were recruited through flyers and advertisements soliciting participants for a study concerned with "personality features in adults." All participants were psychiatric outpatients screened for a history of brain damage, organic disorder, or developmental disability. Participants gave their written consent to be in the study and were paid \$5 per hour.

The sample was composed of 40 women and 12 men. The mean age was 36.0 years ($SD=14.4$); approximately 90% were White, and approximately 8% were African American. Half of the sample was single, 19% were married, and 31% were divorced, separated, or widowed. Across all participants, the average number of months in outpatient treatment was 50.6 ($SD=64.6$), 42% reported a previous psychiatric hospitalization, 67% were currently taking medication for their psychological condition, and 50% reported a family history of mental illness. This sample was generally well educated; 90% reported at least some college education.

In addition to the NEO-PI-R, the Schedule for Nonadaptive and Adaptive Personality (SNAP; Clark, 1993), a 375-item true-false self-report measure, was also completed. The SNAP contains 12 trait scales and 3 temperament scales. In addition, the SNAP includes diagnostic scales to assess personality disorder characteristics, including a scale that assesses features of borderline personality disorder. In this clinical sample, the internal consistency coefficients of the SNAP trait and temperament scales ranged from .67 to .90, with a median value of .85. These values are comparable to those reported in the SNAP manual (Clark, 1993).

The Personality Disorder Interview-IV (PDI-IV; Widiger, Mangine, Corbitt, Ellis, & Thomas, 1995) is a semistructured interview used to assess the 10 *DSM-IV* personality disorders (APA, 1994). In this sample, only selected sections of the PDI-IV were administered, including the PDI-IV borderline personality disorder questions. Diagnostic criteria are rated on a 3-point scale, ranging from 0 to 2; 0 means the criterion is absent, 1 indicates its presence (APA, 1994), and 2 is used to indicate a more severely dysfunctional manifestation. Two interviewers, both master's level clinical psychology graduate students, administered the PDI-IV items.

Interviewers received extensive training before the study commenced, and all interviews were videotaped. Reliability checks were conducted on 30 randomly selected tapes, and the kappa for a borderline diagnosis was .84. Twelve percent of the sample was diagnosed with borderline personality disorder.

Participants also completed three sections of the Personality Diagnostic Questionnaire-IV (PDQ-4; Hyler, Skodol, Oldham, Kellman, & Doidge, 1992), used to assess antisocial, borderline, and histrionic symptom counts. The PDQ-4 is a true-false self-report measure of *DSM-IV* (APA, 1994) personality disorder symptoms. For this study, only the PDQ-4 borderline items were used.

CLINICAL SAMPLE 2

This sample consisted of 46 outpatients who were receiving treatment at a community mental health clinic in Columbia, Missouri (Trull et al., 1998). All participants gave written informed consent and completed two self-report inventories, the NEO-PI-R (Costa & McCrae, 1992) and the PDQ-R (Hyler et al., 1992), and an interview-based assessment of the FFM, the Structured Interview for the Assessment of the Five-Factor Model (SIFFM; Trull & Widiger, 1997). The SIFFM is a 120-item semistructured interview that assesses the five major domains of the FFM as well as the 30 first-order trait facets identified by Costa and McCrae (1992) that make up these dimensions. Answers to each SIFFM item (i.e., interview questions) are scored 0 (*absent*), 1 (*present and does not result in significant dysfunction*), or 2 (*present and may result in significant dysfunction*). Initial research on SIFFM scores indicates good to excellent internal consistency and test-retest reliability and excellent convergent and discriminant validity with the NEO-PI-R (Trull & Widiger, 1997; Trull et al., 1998).

Participants were assessed individually, which required up to 3 hr of time. They were paid \$15, and all gave written informed consent. Mean age was 32.3 years ($SD=8.3$; range=20–61 years), 78% were women, 54% had at least a college degree, 46% had never been married, 30% had at least one child, and the average annual income was \$12,350 ($SD=\$11,586$; range=\$1,200–\$55,000). Approximately 39% were taking medication for their psychological condition; most were taking an antidepressant. The median number of treatment sessions at the time of assessment was 17.5 (range=1–95). The average number of previous courses of outpatient treatment was 1.9 ($SD=1.7$; range=0–9). Approximately 20% had a history of at least one inpatient psychiatric hospitalization (range=1–5).

According to the clinic charts, 13% of the sample had a history of at least one suicide attempt, 9% had a history of self-mutilation, 20% had a history of substance abuse, 6% had a history of at least one arrest, 2% had a history of violent or assaultive behavior, 6% had a history of hallucinations, and 4% had a history of delusions. *DSM-IV* (APA, 1994) diagnostic information, provided by the treating clinician, was also gathered from the clinic charts. The most frequently occurring Axis I diagnoses were dysthymic disorder (46%), major depressive disorder (21.74%), and adjustment disorder (11%). The most prevalent Axis II diagnoses were personality disorder not otherwise specified (11%) and borderline personality disorder (11%).

RESULTS

We calculated similarity between the Lynam and Widiger (2001) expert-consensus FFM description of a prototypic borderline personality disorder and individuals' raw NEO-PI-R facet scores using an intraclass Q-correlation for each of the 407 nonclinical-borderline features participants, the 52 participants in Clinical Sample 1, and the 46 participants in Clinical Sample 2. This correlation is computed as an intraclass correlation in which the raw facet scores are double entered and treated as cases, and an individual and the prototype are treated as variables (in the first entry, individuals' scores on the 30 facets are contained in Variable A, and the scores on the 30 facets of the prototype are contained in Variable B; in the second entry, the data are reversed; these two columns of 60 data points are then correlated with one another to yield an intraclass correlation; Haggard, 1958). As an intraclass correlation, the similarity index assesses the similarity between an individual's NEO-PI-R profile and the expert consensus profile in terms of both shape and magnitude. Because the two sets of scores must be of the same metric and because the prototype facet scores range from 1 to 5 (Lynam & Widiger, 2001), individual NEO-PI-R items were transformed from a 0–4 scale to a 1–5 scale, with facet item averages serving as the facet scores. The mean NEO-PI-R FFM borderline index score for the nonclinical-borderline features sample was $-.09$ ($SD=.35$, range $=-.81-.74$), for Clinical Sample 1 it was $-.08$ ($SD=.30$; range $=-.65-.48$), and for Clinical Sample 2 it was $-.08$ ($SD=.30$; range $=-.77-.46$).

CONVERGENT VALIDITY

Table 1 indicates that the FFM borderline index correlated as highly with the direct and specific measures of borderline personality disorder as the

latter correlated with each other. These findings were replicated with the data obtained in Clinical Sample 1. The FFM borderline index correlated as highly with the PDQ-4 and SNAP self-report assessments of borderline personality disorder as they correlated with each other. A significant but smaller correlation was obtained with the PDI-IV interview-based measure of borderline symptoms, but this correlation was again similar in magnitude to that obtained with the two self-report measures. Finally, the results from Clinical Sample 2 indicated that the relationship of the FFM borderline index with the PDQ-R self-report assessment replicated across self-report (NEO-PI-R; Costa & McCrae, 1992) and interview measures (SIFFM; Trull & Widiger, 1997) of the FFM. The convergent validity of the FFM borderline index across the self-report and interview-based methods of assessment was quite good ($r=.81$, $p<.001$).

DISCRIMINANT VALIDITY

We also examined the discriminant validity of the FFM borderline index relative to the antisocial and avoidant personality disorders. Table 2 provides the discriminant validity coefficients (assessments for personality disorders other than borderline were available only for the SIDP-IV, SNAP, and PDQ-R). Given the questionable discriminant validity of the borderline diagnosis (Widiger & Coker, 2002), we did not expect the FFM borderline index to obtain perfect discrimination. In line with this expectation, the FFM borderline index did at times correlate significantly with the antisocial and avoidant measures. Nevertheless, discriminant validity correlations were significantly lower than the correlations with the SIDP-IV borderline score, $t(404) = -3.4$ and -4.8 , respectively, $p<.01$, and the SNAP borderline score, $t(49) = -2.5$ and -2.5 , respectively, $p<.05$. The FFM borderline index correlated as highly with the PDQ-R Avoidant scale as it did with the PDQ-R borderline scale, $t(43) = .22$, $p<.10$, but the correlation with the PDQ-R Antisocial scale was significantly lower, $t(43) = -3.4$, $p<.01$.

COMPONENTS OF BORDERLINE PERSONALITY DISORDER

The top portion of Table 3 provides the correlations of the NEO-PI-R FFM borderline index with the four components of the DIB-R (i.e., affect, cognition, impulse actions, interpersonal relations) along with the correlations obtained by the other three measures of borderline personality disorder (i.e., MMPI, PAI, and SIDP-IV). It is evident from Table 3 that the FFM, by itself,

accounted for 7% to 27% of the variance in the DIB-R borderline subscales. In addition, the FFM borderline index was generally as highly correlated with the components of the DIB-R (including impulse actions) as with the two borderline self-report inventories.

The PAI-BOR also includes subscales for the assessment of core components of borderline personality disorder (i.e., Affective Instability, Identity Problems, Self-Harm, Negative Relations). The lower portion of Table 3 provides the correlations of the NEO-PI-R FFM borderline index with the four PAI components. The FFM borderline index accounted for 38% to 53% of the variance in the borderline subscales and often obtained the highest correlations.

Table 3 also provides the correlations of each borderline personality disorder scale with the DIB-R and PAI borderline subscales after the variance within the respective subscales that were accounted for by the NEO-PI-R FFM borderline index was removed (i.e., the residual values). Consistent with the results of Morey and Zanarini (2000), the MMPI, PAI, DIB-R, and SIDP-IV borderline scales were able to account for additional variance in a component of borderline personality disorder (as assessed by either the DIB-R or the PAI) that was not explained by the NEO-PI-R FFM borderline index. However, it is also apparent from Table 3 that in each instance there was a substantial decrease in the variance accounted for by the MMPI, PAI, DIB-R, and SIDP-IV borderline scales after the variance accounted for by the NEO-PI-R borderline index was removed (e.g., reduction from 22% to 3% of the affective component of the DIB-R accounted for by the MMPI after NEO-PI-R FFM variance was removed).

Not included in Table 3 are the correlations with the NEO-PI-R borderline index after variance accounted for by the traditional measures of borderline personality disorder was removed. These analyses were also conducted, and in each instance the FFM borderline index demonstrated significant incremental validity. For example, the NEO-PI-R borderline index correlated .30, .28, .31, and .34 ($p < .001$ in each case) with the PAI Affective Instability, Identity Problems, Self-Harm, and Negative Relations subscales after variance accounted for by the MMPI was removed. The NEO-PI-R borderline index correlated .35 ($p < .001$), .10 ($p < .05$), .16 ($p < .01$), and .11 ($p < .05$) with the DIB-R Affect, Cognition, Impulse Action, and Interpersonal Relations subscales after the variance that could be accounted for by the SIDP-IV was removed.

Table 1. Convergent Validity of Five-Factor Model Borderline Score With Other Borderline Measures

Measure	PAI	MMPI	SIDP-IV	DIB-R
Nonclinical borderline features sample ($n=407$)				
FFM NEO	.77***	.65***	.47***	.54***
PAI		.70***	.45***	.58***
MMPI			.40***	.51***
SIDP-IV				.64***
	PDQ-4	SNAP	PDI-IV	
Clinical sample 1 ($n=52$)				
FFM NEO	.68***	.68***	.41**	
PDQ-4		.61***	.53***	
SNAP			.42***	
	PDQ-R	FFM SIFFM		
Clinical sample 2 ($n=46$)				
FFM NEO	.55***	.81***		
PDQ-R		.56***		

Note. PAI = Personality Assessment Inventory (Morey, 1991); MMPI = Morey et al. (1985) Minnesota Multiphasic Personality Inventory personality disorder scales; SIDP-IV = Structured Interview for the Assessment of *DSM-IV* Personality Disorders (Pfohl et al., 1997); DIB-R = Revised Diagnostic Interview for Borderlines (Zanarini et al., 1989); FFM NEO = five-factor model borderline index assessed by the NEO Personality Inventory Revised (Costa & McCrae, 1992); PDQ-4 = Personality Diagnostic Questionnaire-IV (Hyler et al., 1992); SNAP = Schedule for Nonadaptive and Adaptive Personality (Clark, 1993); PDI-IV = Personality Disorder Interview-IV (Widiger et al., 1995); FFM SIFFM = five-factor model borderline index assessed by the Structured Interview for the Five Factor Model (Trull & Widiger, 1997); PDQ-R = Personality Diagnostic Questionnaire-Revised (Hyler et al., 1992). ** $p < .01$. *** $p < .001$.

Table 2. Discriminant Validity of Five-Factor Model Borderline Score

		SIDP-IV ^a			SNAP ^b			PDQ-4 ^c		
FFM NEO		1	2	3	1	2	3	1	2	3
1. BDL	.47	.31	.22	.68	.38	.40	.55	.06	.51	
2. ANT	.27	.47	-.13	.25	.35	-.28	.32	.33	.12	
3. AVD	.27	-.11	.52	.39	-.02	.85	.16	-.12	.64	

Note. Convergent correlations appear in boldface. FFM NEO = five-factor model borderline index assessed by the NEO Personality Inventory Revised (Costa & McCrae, 1992); SIDP-IV = Structured Interview for the Assessment of *DSM-IV* Personality Disorders (Pfohl et al., 1997); SNAP = Schedule for Nonadaptive and Adaptive Personality (Clark, 1993); PDQ-4 = Personality Diagnostic Questionnaire-IV (Hyler et al., 1992); BDL = borderline; ANT = antisocial; AVD = avoidant.

a Nonclinical borderline features sample ($n = 407$).

b Clinical Sample 1 ($n = 52$).

c Clinical Sample 2 ($n = 46$).

Table 3. Correlations and Residual Correlations of Five-Factor Model and Other Borderline Scores With Facets of Borderline Personality Disorder ($n = 407$)

DIB-R subscales	FFM NEO	MMPI	MMPI Residual	PAI	PAI Residual	SIDP-IV	SIDP-IV Residual
Affect	.52***	.47***	.16**	.57***	.21***	.43***	.22***
Cognition	.29***	.13**	-.06	.32***	.11*	.45***	.29***
Impulse actions	.36***	.37***	.15*	.32***	.04	.45***	.29***
Interpersonal relations	.26***	.26**	.11*	.34***	.16**	.35***	.24***
PAI subscales	FFM NEO	MMPI	MMPI Residual	DIB-R	PAI Residual	SIDP-IV	SIDP-IV Residual
Affective instability	.73***	.68***	.30***	.55***	.22***	.46***	.16*
Identity problems	.62***	.62***	.27***	.49***	.19***	.35***	.08
Self-harm	.63***	.51***	.12*	.44***	.13*	.31***	.02
Negative relations	.62***	.56***	.20***	.49***	.20***	.40***	.12*

Note. Residual value is the correlation of the respective borderline scale with the DIB-R or PAI subscale after variance within the subscale accounted for by the FFM NEO has been removed. DIB-R = Revised Diagnostic Interview for Borderlines (Zanarini et al., 1989); FFM NEO = five-factor model borderline index assessed by the NEO Personality Inventory Revised (Costa & McCrae, 1992); MMPI = Morey et al. (1985) Minnesota Multiphasic Personality Inventory Borderline scale; PAI = Personality Assessment Inventory (Morey, 1991); SIDP-IV = Structured Interview for the Assessment of *DSM-IV* Personality Disorders (Pfohl et al., 1997).

* $p < .05$. ** $p < .01$. *** $p < .001$.

CORRELATES OF BORDERLINE PERSONALITY DISORDER

Table 4 provides the correlations of the FFM NEO-PI-R borderline index with hypothesized correlates of borderline personality disorder in the nonclinical-borderline features sample ($n=407$). It is evident that the FFM NEO-PI-R borderline index correlated as highly as four explicit measures of borderline personality disorder did with two of three measures of dysfunction, including an interview-based measure of general level of functioning (SAS) and a self-report measure of interpersonal dysfunction (IIP).

Consistent with the results of Morey and Zanarini (2000), a significant proportion of variance in general dysfunction (ranging in value from 6% to 12%) was accounted for by the DIB-R after the variance explained by the NEO-PI-R FFM borderline index was removed. However, it is also apparent from Table 4 that only negligible amounts of variance in childhood sexual or physical abuse or in parental history of mood or substance use disorder were accounted for by the PAI, MMPI, SIDP-IV, or DIB-R after the variance that could be accounted for by the NEO-PI-R FFM borderline index was removed. In addition, the NEO-PI-R FFM index itself demonstrated incremental validity in accounting for dysfunction after variance explained by the DIB-R was removed (residual correlations of $-.14$, $.31$, and $.29$ with the SCID, IIP, and SAS, respectively; $p < .01$ in

each case) and for dysfunction assessed by the SAS after variance explained by the PAI was removed (residual $r = .16$, $p < .001$).

DISCUSSION

The results of this study indicate that the similarity of a person's FFM personality trait profile to the prototypic FFM profile for borderline personality disorder correlated substantially with self-report and interview measures of BPD, as highly as these measures correlated with each another. The NEO-PI-R FFM borderline index also correlated substantially with specific components of borderline personality disorder assessed by the PAI and correlated as highly as the self-report measures did with the DIB-R components of borderline personality disorder.

The self-report and interview-based measures of borderline personality disorder did at times account for additional variance in borderline symptomatology that was unaccounted for by the FFM borderline index. However, the extent of the additional variance was in most instances negligible. For example, some additional variance in PAI self-harm was accounted for by the MMPI and the DIB-R after the variance due to the FFM borderline index was removed, but this represented only 1% of additional variance for the MMPI and 2% for the DIB-R. In addition, the FFM borderline index often outperformed the direct and explicit measures of borderline personality disorder. For

Table 4. Relationship of Borderline Scores With Measures of Functioning and Correlates of Borderline Personality Disorder ($n = 407$)

Measure	FFM NEO	PAI	PAI Residual	MMPI	MMP Residual	SIDP-IV	SIDP-IV Residual	DIB-R	DIB-R Residual
Global functioning (SCID)	-.42***	-.51***	-.19***	-.40***	-.14***	-.46***	-.29***	-.54***	-.35***
Interpersonal functioning (IIP)	.53***	.65***	.28***	.47***	.15***	.39***	.16***	.49***	.24***
Global dysfunction (SAS)	.52***	.49***	.09	.33***	-.02	.39***	.15**	.52***	.28***
Childhood sexual abuse	.19***	.24***	.11*	.21***	.09	.21***	.10	.18***	.14***
Childhood physical abuse	.20***	.19***	.04	.16**	.03	.20***	.11*	.23***	.12*
Biol. parent—any disorder	.26***	.31***	.09	.26***	.07	.20***	.06	.25***	.09
Biol. father—substance use disorder	.23***	.24***	.05	.20***	.04	.14**	.03	.18***	.05
Biol. father—mood disorder	.09	.21***	.14***	.11*	.05	.10*	.06	.13*	.08
Biol. mother—substance use disorder	.05	.10*	.04	.04	-.01	.06	.02	.06	.02
Biol. mother—mood disorder	.21***	.23***	.05	.22***	.07	.19***	.09	.26***	.14*

Note. Residual value is the correlation of the borderline scale with the variable (e.g., global functioning) after variance accounted for by the FFM NEO has been removed from the variable. Note that higher SCID Global Functioning scores indicate better functioning. FFM NEO = five-factor model borderline index assessed by the NEO Personality Inventory Revised (Costa & McCrae, 1992); PAI = Personality Assessment Inventory Borderline Features scale (Morey, 1991); MMPI = Morey et al. (1985) Minnesota Multiphasic Personality Inventory Borderline scale; SIDP-IV = Structured Interview for the Assessment of *DSM-IV* Personality Disorders (Pfohl et al., 1997); DIB-R = Revised Diagnostic Interview for Borderlines (Zanarini et al., 1989); SCID = Structured Clinical Interview for *DSM-IV* Axis I disorders (First et al., 1995); IIP = Inventory of Interpersonal Problems (Horowitz et al., 1988); SAS = Social Adjustment Scale (Weissman, 1990); Biol. = biological.

* $p < .05$. ** $p < .01$. *** $p < .001$.

example, the FFM borderline index accounted for 40% of the variance in self-harm assessed by the PAI, whereas the MMPI accounted for only 26% of PAI self-harm, the DIB-R accounted for only 19%, and the SIDP-IV accounted for only 10%. The FFM borderline index accounted for 12% additional variance in the DIB-R assessment of borderline affectivity after variance that could be accounted for by the SIDP-IV was removed. The cross-method convergent validity of the FFM borderline index was substantial and exceeded any convergent validity obtained with the traditional measures of borderline personality disorder.

The FFM borderline index also replicated the correlations of the PAI, MMPI, SIDP-IV, and DIB-R borderline scales with hypothesized correlates of borderline personality disorder. These correlates included global and interpersonal dysfunction, history of childhood sexual and physical abuse, and parental history of mood and substance-related disorders. The PAI, MMPI, SIDP-IV, and DIB-R measures of borderline personality disorder did account for significant proportions of variance in global and interpersonal dysfunction after the variance that could be accounted for by the FFM borderline index was removed. However, the amount of additional variance in parental history of mood or substance use

disorders was negligible, and the NEO-PI-R index, in turn, demonstrated incremental validity over these traditional measures of borderline personality disorder (including the DIB-R) in accounting for dysfunction. These findings are discrepant with Morey and Zanarini (2000) and are perhaps largely due to our use of a more specific measure of the FFM conceptualization of borderline personality.

Consistent with the findings of Morey and Zanarini (2000), the results of the current study do indicate that the FFM borderline index was unable to account fully for all of the variance within currently used measures of borderline personality disorder. However, this same shortcoming is present in all of the existing borderline measures, as none of them can account for all of the variance within each other. One potential explanation for the inability of the FFM borderline index to account for all of the variance within the DIB-R is that there are aspects of borderline personality disorder that are not within the domain of the FFM (Morey & Zanarini, 2000). Benjamin (1993) has argued that some extremely deviant and dysfunctional behaviors, such as wrist slashing, are difficult to conceptualize as being simply a maladaptive variant of a common personality trait. On the other hand, behaviors that exemplify the tail end of a distribution may only appear to be qualitatively different

from the behaviors that exemplify the middle of a distribution. Brutally assaulting a defenseless victim, failing to speak for years to one's relatives because of a lack of interest in close relationships, passive submission to denigrating exploitation, and self-mutilation are not behaviors that are seen in the average person nor within most of the members of a population, but they could be behavioral manifestations of the tail end of a distribution of traits that are present to varying degrees throughout the population (Livesley, Jang, & Vernon, 1998; Tyrer, 2001).

Another explanation for the inability of the NEO-PI-R borderline index to account for all of the variance in currently used measures of borderline personality disorder is that these measures might simply be providing more specific, thorough, and/or differentiated assessments of maladaptive variants of the personality traits included within the FFM. It is important to recognize that the PAI, MMPI, PDQ-R, SIDP-IV, DIB-R, SNAP, and PDI-IV are inventories and interviews with numerous items developed specifically to assess borderline personality disorder psychopathology. Whereas the DIB-R devotes approximately 2 hr to administer 186 questions written specifically for the assessment of borderline psychopathology, none of the NEO-PI-R items were written specifically to assess borderline psychopathology. It should not be surprising, then, for the DIB-R to outperform the NEO-PI-R FFM borderline index in the assessment of borderline personality disorder symptomatology and psychopathology. It is perhaps more revealing that the NEO-PI-R FFM borderline index, which was developed for the assessment of general personality functioning, performed as well as the DIB-R in most instances and outperformed the DIB-R in some instances.

Similar conclusions have been made with respect to comparisons of assessments by the SNAP, NEO-PI-R, and Dimensional Assessment of Personality Psychopathology–Basic Questionnaire (DAPP-BQ; Livesley et al., 1998). For example, Reynolds and Clark (2001) reported that the 15 SNAP scales outperformed the NEO-PI-R facet scales in predicting personality disorder symptoms, but they emphasized that “the maladaptive personality traits assessed by the SNAP were strongly represented in the facet scales of the NEO-PI-R” (Reynolds & Clark, 2001, p. 216). They suggested that the primary reason that the SNAP outperformed the NEO-PI-R was that “the FFM measures assess normal-range traits [whereas] the SNAP primarily assesses extreme variants of normal-range traits that are maladaptive and clinically relevant” (Reynolds & Clark, 2001, p. 218). In other words, it is not that the SNAP and the NEO-PI-R are assessing qualitatively different domains of personality func-

tioning. Rather, the SNAP and NEO-PI-R are covering largely the same domains of personality functioning, but the SNAP, relative to the NEO-PI-R, is providing more focus on the maladaptive variants of FFM personality traits.

Researchers and clinicians who are interested solely in the assessment of borderline personality disorder symptomatology might be well served by using the DIB-R rather than the NEO-PI-R, as the DIB-R will provide a much more specific and thorough assessment of borderline personality disorder than will be provided by the NEO-PI-R (Zanarini et al., 1989). Researchers and clinicians whose interest is confined largely to maladaptive personality traits might be better served by using the SNAP, DAPP-BQ, SIDP-IV, MMPI, PAI, PDQ-4, or PDI-IV, as these instruments will provide more specific and thorough assessments of maladaptive personality functioning than will be provided by the NEO-PI-R (Clark & Harrison, 2001; Kaye & Shea, 2000; Widiger & Coker, 2002). However, researchers and clinicians whose interest also includes general personality functioning as well as maladaptive personality traits might be well served by using the NEO-PI-R, as it will provide a more thorough coverage of normal personality functioning, allow a screening assessment of all the personality disorders, and indicate the relations of the personality disorders to general personality functioning.

Often neglected in comparisons of predictive utility and validity is a consideration of parsimony and conceptual utility. To the extent that personality disorders can be understood from the FFM perspective, basic science research on general personality functioning can be brought to bear. Research on the structure (John & Srivastava, 1999), genetics (Plomin & Caspi, 1999), neurobiology (Depue, 1996), and development (Caspi, 1997) of personality can be applied to the personality disorders to generate theory and to extend our understanding of their mechanisms and treatment (Livesley, 2001a). For example, there has been considerable research using pharmacologic challenge and animal models that has informed neurobiological theories of neuroticism (negative affectivity), constraint (conscientiousness), and extraversion (Depue, 1996). Similarly, there has been considerable interest in the relationship of temperament to general personality functioning (Clark & Watson, 1999; Halverson, Kohnstamm, & Martin, 1994). To the extent that borderline personality disorder is a maladaptive variant of general personality functioning, the findings of this neurobiological and temperament research can inform our understanding of the neurobiology and development of borderline personality disorder. As acknowledged by Morey and Zanarini (2000),

"from this perspective, the FFM could indicate a temperament vulnerability to a disorder that is then triggered by developmental events (such as childhood neglect or abuse)" (p. 737).

Conceptualizing borderline personality disorder from the perspective of the FFM may also be helpful in resolving disputes concerning the disorder (Clark et al., 1997; Widiger, 1993). For example, borderline personality disorder is among the more comorbid diagnoses within clinical settings (Adams et al., 2001; Gunderson, 2001). This comorbidity has been so extensive that the validity of the diagnosis has been questioned (Clark et al., 1997; Livesley, 1998; Widiger, 1993). From the perspective of the FFM, personality disorders are expected to be comorbid to the degree that they assess the same facets of the FFM. Lynam and Widiger (2001) indicated that much of the borderline diagnostic co-occurrence with other personality disorders is consistent with its FFM conceptualization.

It is important in future research to replicate and extend the results of this study in a larger clinical sample. A limitation of this study is the relatively small sample of clinic patients (52 in the first sample, and 46 in the second) and, concomitantly, the relatively low number of persons who met diagnostic criteria for borderline personality disorder in each sample. On the other hand, almost 200 form-frustrated cases of borderline personality disorder were obtained from an extensive sample of approximately 5,000 college students. In addition, two clinical samples (total number of clinic patients = 98) provided independent replications. Although it is possible that a sample of even more severely dysfunctional borderline patients would not replicate the findings obtained in this study (e.g., perhaps more incremental validity would be obtained by the SIDP-IV in samples weighed heavily in favor of borderline symptomatology that is relatively specific to this instrument), prior studies of more severely dysfunctional borderline patients have obtained findings consistent with FFM hypotheses (e.g., Clarkin et al., 1993; Wilburg et al., 1999), and a full range of borderline psychopathology was obtained in the current study.

Our findings also have more general implications for the assessment and study of other personality disorders that could also be addressed in future research. For example, it is of interest in future research to determine whether results obtained in the current study for borderline personality disorder would also be obtained with FFM indices of other personality disorders, such as the dependent, narcissistic, schizotypal, or antisocial. For example, laboratory and follow-up studies have indicated that persons with a dependent personality disorder

have a weak and ineffectual self-image and an excessive need to please others that contribute to a variety of maladaptive interpersonal consequences and episodes of depression (Bornstein, 1992). Laboratory and follow-up studies have similarly indicated that persons with narcissistic personality traits have a vulnerable self-esteem and may at times react aggressively to signs of threats to their self-esteem (Baumeister, Smart, & Boden, 1996). It remains to be seen whether FFM dependency and narcissistic indices, assessed by the correlation of individuals' FFM profiles with the prototypic FFM profiles for these personality disorders, can reproduce the findings obtained with explicit measures of these *DSM-IV* personality disorders.

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