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The relationship between the Five-Factor Model and latent DSM-IV personality disorder dimensions

Gerald Nestadt, M.B., B.Ch., M.P.H.[1], **Paul T. Costa Jr., Ph.D.**[4], **Fang-Chi Hsu, Ph.D.**[2], **Jack Samuels, Ph.D.**[1], **O. Joseph Bienvenu, M.D., Ph.D.**[1], and **William W. Eaton, Ph.D.**[3]

1*Department of Psychiatry and Behavioral Sciences, The Johns Hopkins University School of Medicine, Baltimore, MD*

2*Department of Biostatistics, The Johns Hopkins University Bloomberg School of Public Health, Baltimore, MD*

3*Department of Mental Hygiene, The Johns Hopkins University Bloomberg School of Public Health, Baltimore, MD*

4*Gerontology Research Center, National Institute on Aging, Baltimore, MD*

Abstract

This study compared the latent structure of the DSM-IV personality disorders to the Five-Factor Model (FFM) of general personality dimensions. The subjects in the study were 742 community-residing individuals who participated in the Hopkins Epidemiology of Personality Disorder Study. DSM-IV personality disorder traits were assessed by psychologists using the International Personality Disorder Examination, and personality disorder dimensions were derived previously using dichotomous factor analysis. The NEO-PI(R), a measure of the FFM, was administered to all subjects. The relationship between the two sets of personality-related constructs was examined using a construct validity framework and also using Pearson's correlation coefficients, multiple linear regression models, and spline regression models. The five personality disorder factors each exhibited small to moderate correlations with several NEO dimensions; together, the NEO domain and facet scores "explained" a fifth to a third of the variance in personality disorder dimensions. Examples of non-linear relationships between the personality dimensions were identified. There is a modest correspondence between the personality disorder dimensions and FFM traits, and the traits of FFM only partially explain the variance of the personality disorders. Dimensional measures of general personality may be a suitable alternative to the DSM-IV. Whether additional maladaptive traits would better define the domain of personality disorders remains an important objective for future research.

Introduction

Personality disorder diagnoses are used in clinical psychiatric practice to describe lifelong patterns of maladaptive emotional and behavioral responses. These constructs evolved out of clinical experience and diagnostic committee consensus, resulting in the ten contemporary, operationally-defined DSM-IV personality disorders on Axis II. While practitioners may find some of these diagnoses useful for characterizing particular forms of patient difficulties, many other practitioners identify other maladaptive traits and features than the current Axis II

Correspondence: Dr. Gerald Nestadt, Department of Psychiatry and Behavioral Sciences, Johns Hopkins Hospital, Meyer 4-181, 600 N. Wolfe Street, Baltimore, Maryland 21287, USA.

categories [1]. There is considerable debate concerning the most useful diagnostic approach to these disorders [2,3]. Recently there has been movement toward re-conceptualizing the personality disorder domain for DSM-V. A number of 3 or 4 higher –order dimensional models of personality pathology have been proposed, (Reviewed in Markon, Krueger and Watson [4]). Another approach being put forward involves using general personality dimensions, such as those in the Five-Factor Model (FFM) of general personality structure to characterize patients on axis II.

The Five-Factor Model (FFM) of personality is one of several possible general personality classification systems available for consideration. It emerged from both the lexical-semantic tradition and the personality questionnaire tradition and receives the greatest support in contemporary scientific circles, although it is by no means universally adopted [5]. The repeated confirmation of the five-factor structure of personality across populations, geography, and time is its greatest strength. The NEO-PI(R) is the most frequently cited measure of the FFM [6]. It is one of the methods that have been proposed for the next revision of the DSM [7].

The psychiatric and psychological traditions of personality assessment have remained relatively separate and isolated in the clinical arena, but the relationship between general and maladaptive personality traits is receiving greater attention in the scientific literature. Empirical research comparing the two methods suggests substantial common ground; multiple reports indicate that general personality dimensions are useful for describing personality disorders [8-13].

This study evaluated the correspondence between general and maladaptive personality dimensions. The five NEO-PI-R domains and facets are used to measure general personality, and five personality disorder dimensions derived from exploratory factor analysis of 742 subjects in the Hopkins Epidemiology of Personality Disorders Study (HEPS) [14,15], to measure maladaptive personality. The five personality disorder dimensions that emerge from factor analysis of the DSM-IV personality disorder criteria are: compulsive, aloof, neurotic avoidant, impulsive callous, and egocentric. While these personality disorder factors are relatively similar to those reported by other investigators [16,17,18], an aim of the present study is to evaluate them from the framework of the dimensions of the FFM. Important questions concern whether the IPDE-derived personality disorder dimensions reflect relatively unitary dimensions corresponding to the major dimensions of general personality or, rather reflect varying blends. Alternatively, it is possible, of course, that the personality disorder dimensions are independent of the FFM dimensions, and should not be seen as merely maladaptive extreme variants of the universal or general personality trait dimensions.

In summary, we investigated two possible ways that the two personality constructs may relate. First, both may describe the same dimensions of personality, despite different methods. Second, although involving the same domains, abnormal personality may have a focused range of measurement, such that the personality disorder factors are related only to the extremes of the basic personality dimensions.

Method

The 742 subjects who participated in the HEPS are included in this study. The design and methods have been described in detail previously [14]. The subjects were identified and assessed originally, in 1981, as part of the Baltimore cohort of the Epidemiologic Catchment Area program. All available subjects (N = 1920) were re-interviewed between 1993 and 1996 [19,20]. From these 1920 subjects, we selected all those who were examined by psychiatrists in 1981, as well as all subjects who were identified by the DIS as having a lifetime diagnosis

of mania, depression, panic disorder, obsessive-compulsive disorder, alcohol use disorder, or drug use disorder at follow up. In addition, a 25% (222/884) random sample was selected from the remaining subjects.

The personality disorder assessments were conducted by four masters-level clinical psychologists between 1997 and 1999. The psychologists obtained informed consent prior to beginning the interview. The International Personality Disorder Examination (IPDE) [21], a semi-structured diagnostic instrument, was used for this purpose. All the relevant criteria for diagnosis of all DSM-IV and ICD-10 personality disorders were included. The psychologists were directed to evaluate abnormal personality traits manifest over the subject's entire adult life. Each criterion was rated '0' (absent), '1' (accentuated or exaggerated), '2' (criterion level or pathological), or '9' (missing or unknown). Additional information was obtained, regarding each subject, from an interview with a friend or relative. In 40 jointly rated interviews, the intraclass correlation coefficients for number of DSM-IV personality disorder traits rated present ('1' or '2') were: schizoid (0.81), schizotypal (0.58), paranoid (0.63), antisocial (0.80), borderline (0.76), histrionic (0.62), narcissistic (0.62), avoidant (0.89), dependent (0.76), and obsessive-compulsive (0.70).

All subjects completed the NEO-PI (R) questionnaire using either the 'paper-and-pencil' or computer-guided format. The NEO is scaled to produce domain scores for each of the five factors, neuroticism (N), extraversion (E), openness to experience (O), agreeableness (A), and conscientiousness (C). Each of the domains includes six facet scores. Raw scores were converted to T-scores for standardization [6]. The mean and standard deviation for each dimension are 50 and 10, respectively. Domain scores are slightly correlated with each other. The factor means and standard deviations for this sample were: neuroticism = 48.29 (S.D. = 9.82), extraversion = 48.29 (S.D. = 9.46), openness = 46.16 (S.D. = 9.38), agreeableness = 48.77 (S.D. = 10.31), and conscientiousness = 47.38 (S.D. = 9.90).

Scores for each of the five personality disorder dimensions were derived using dichotomous factor analysis [22], as reported in [14]. The factor scores for the five personality disorder dimensions were standardized to allow meaningful comparisons.

Statistical Analysis

The associations among the five personality disorder dimensions and the five NEO domain and 30 facet scores were investigated using Pearson correlation coefficients. Standardized linear regression models were used to explore the relationship of the NEO dimensions to each personality disorder factor score. Standardized regression coefficients were computed for each personality disorder factor score, with all five NEO domain scores in the model. The R-square was calculated for each regression model, to estimate the extent to which the five NEO domain scores could explain the variance of each of the personality disorder dimensions. This procedure was repeated including the thirty facet scores with the domain scores. The variability explained by the facets, after adjusting for the five domain scores, was estimated using the difference between the R-squares from the two models. We did not adjust the models to account for unreliability of the measures.

We conducted additional analyses to explore whether there were simply linear relationships between the basic and personality disorder dimensions, or whether relationships were more robust at higher or lower levels of basic personality. Twenty-five scatter plots were performed to examine relationships between each of the five basic personality dimensions and each of the five personality disorder dimensions (results not shown). Spline regressions were used to model possible non-linear relationships. The main goal was to find the most parsimonious model that explained the twenty-five relationships. We started with the simplest linear models, i.e. one

linear spline. If the effect of the linear spline was not significant by the F-test for the spline regression coefficient, the term would be deleted, and the original simpler model retained. If the linear spline had a significant effect, more complicated models, including quadratic and cubic splines, were considered. PROC GLM and CORR in the SAS software were used to conduct these analyses [23]. In each instance, model selection was based on the result of the F-test, comparing the simplest model with the more complicated model. A forward selection approach was used throughout. Two points of the respective NEO dimensions were selected as the "knots" for this purpose, 1 SD below and 1 SD above each mean (T-scores of 40 and 60, respectively).

Results

The correlations between the five personality disorder dimensions and the five general personality domains from the NEO are shown in TABLE 1a. With the exception of the Egocentric factor, four of the personality disorder factors has a unique NEO dimension as its highest correlate: neurotic avoidant with neuroticism (0.47), aloof with extraversion (-0.43), egocentric with extraversion and openness (0.28), impulsive callous with agreeableness (-0.33). In contrast, the compulsive factor had only a low correlation with conscientiousness (0.13). However, each of the personality disorder factors correlate significantly with at least two other NEO domains; compulsive with neuroticism (0.10) and agreeableness (-0.11); aloof with neuroticism (0.18), openness (-0.21), agreeableness (-0.09), and conscientiousness (0.12); neurotic avoidant with extraversion (-0.31) and conscientiousness (-0.29); impulsive callous with neuroticism (0.19) and conscientiousness (-0.25); and egocentric with extraversion (0.28) and agreeableness (-0.08).

Considering whether the five PD factors describe the same 'space' in personality structure as their five basic personality domain counterparts, we adopted a convergent-divergent construct validity framework [24], whereby correlations of 0.3 or higher indicate adequate convergence, and correlations of less than 0.16 indicate adequate divergence. Under these assumptions only three of the IPDE factors show convergent validity with the NEO factors: Neurotic Avoidant with N, Aloof with E, and Impulsive Callous with A. The Egocentric and Compulsive factors do not show convergent validity with the O and C factors, respectively (see TABLE 1a, convergent correlations found on diagonal).

Although the Neurotic Avoidant factor shows convergence with N, it does not show divergence with E and to a lesser extent with C. The Aloof factor shows moderate (i.e., r = 0.16 to 0.29) divergent correlations with N and O. The Egocentric factor shows a correlation with E as high as that with its intended factor, O. The Impulsive Callous factor shows moderate divergent correlations with N and C. Finally, the Compulsive factor shows little or no associations with any domains, whether convergent or divergent.

We next examined the personality disorder factor correlations with the facets of the NEO-PI-R. TABLE 1b shows the correlation between the NEO-PI(R) and the PD factors. Facets of Neuroticism by and large correlate with the Neurotic Avoidant factor, except that N2: Angry hostility & N5: Impulsiveness correlate highly with the Impulsive Callous factor and C5: Self Discipline and C1: Competence correlates more strongly with Neurotic Avoidant. Three of the six Extraversion facets correlate with the Aloof factor, except that E3: Assertiveness correlates more strongly negatively with Neurotic Avoidant, E5: Excitement seeking correlates more strongly with the Impulsive Callous factor and E4: Activity does not correlate highly with any of the PD factors. Openness facets are most highly correlated with Egocentricity, although Extraversion facets of E6: Positive Emotions and E3: Assertiveness also correlates highly with Egocentricity. Agreeableness facets correlate with the Impulsive Callous factor except the facet

A6: Tender mindedness is not highly correlated with any of the PD factors. None of the Conscientiousness facets correlate strongly with the Compulsive factor.

Seven of thirty possible convergent correlations are 0.3 or higher, indicating a degree of convergence between the NEO facets and the PD factors, though it is clear that the PD factors and the Five-Factor facets do not share the same 'space'. The Neurotic Avoidant factor shows convergence for four out of the six N facets, and the Aloof factor for three of six E facets. The remaining three PD factors do not show convergence at 0.3 or higher with their intended Five-Factor facets, though the Egocentric and Impulsive Callous factors show moderate convergent correlations with 5 out of the 6 facets of O and A, respectively (see TABLE 1b, on the diagonal).

The Convergent/Divergent validity approach requires that to be valid a construct should correlate more strongly with criteria or related measures than it correlates with unrelated measures or constructs. A valid construct shows divergent validity by showing an absence of significant correlations with unrelated scales or measures. Examination of the off-diagonal correlations in TABLE 1b gives a means of assessing the divergent validity. Generally, the off-diagonal or non-convergent correlations should not be significant or 0.2 or greater in magnitude. TABLE 1b, shows that the Neurotic Avoidant factor lacks divergent validity in that it correlates 0.2 or higher with E3: Assertiveness, C1: Competence, and C5: Self-Discipline, The Aloof factor similarly shows shows correlations of 0.2 or above for N3: Depression, O3: Feelings, A1: Trust, and C1: Competence The Egocentric and Impulsive Callous factors also fail to show divergent validity: the Egocentric factor correlates as strongly with The E facets of E3, E5 and E6 facets of Extraversion as they do with the intended Openness facets. Impulsive Callous factor shows unwanted moderate correlations with a number of different facets N2: Angry Hostility, N5: Impulsiveness, E5: Excitement-Seeking, C1: Competence, C3: Dutifulness, and C6: Deliberation. Finally, the Compulsive factor shows little association with all the facets of the FFM, convergent or divergent.

Table 2 shows the results of the regression analyses, conducted to establish the independent relationship of each of the NEO domains to the personality disorder dimensions and to evaluate the variance of each personality disorder dimension "explained" by the NEO domains and their related facets. Neuroticism, Agreeableness, and Conscientiousness each make significant and independent contributions to the compulsive factor. Together, the NEO personality domains explain 8% of the variance. This is doubled when the facet scores are included in the regression equation (17%). Extraversion and Conscientiousness are both significantly related to the Aloof factor. The domains alone explain 19% of the variance for this factor. This increases to 31% with the inclusion of the facet scores in the model. Neuroticism, Extraversion, and Agreeableness each make significant contributions to the neurotic Avoidant factor. Twenty seven percent of the variance is explained by the domain scores, 34% with the facet scores included in the model. Agreeableness, Conscientiousness, and Extraversion are significantly related to the impulsive callous factor. The NEO domains explain 17% of the variance for this factor. This increases to 32% with the inclusion of the facet scores in the model. Extraversion, Openness, Neuroticism, and Agreeableness are significantly related to the Egocentric factor. Fourteen percent of the variance is explained by the domain scores, 21% with the facet scores included in the model.

Given that there were significant yet modest relationships between the general and personality disorder dimensions, we explored whether a non-linear relationship might better fit the data. In nine of twenty-five comparisons, a linear model did not fit the data best (results not shown). Three linear spline regression models illustrated alternate structures for these relationships. There was a significant inverse relationship between the Neurotic Avoidant scale and Extraversion (reported above). In the case of a single knot at a T-score of 40 on the Extraversion scale, the relationship between the Neurotic Avoidant scale and Extraversion was strengthened

at the very low scores of Extraversion, and was significantly different from the relationship at higher Extraversion scores (regression slope changed from -0.06 below a score of 40 to -0.03 above 40; F= 4.47; p=0.03). The relationship between the neurotic avoidant scale and neuroticism was strongly positive (reported above). This relationship was strengthened when Neuroticism scores above a T-score of 60 were compared to Neurotic Avoidant scores, and marginally significantly different from the relationship below this score (regression slope changed from 0.04 to 0.07; F=3.03; p=0.08). We reported, above, a significant inverse relationship between the Neurotic Avoidant scale and Conscientiousness. At Conscientiousness T-scores of above 60, this relationship was positive and significantly different from the regression line below this point (regression slope changed from -0.04 to 0.04: F= 9.42; p=0.002) (figure 1).

Discussion

This study builds upon prior work that posits two fundamental departures from the DSM approach to the diagnosis of personality disorders. The first is that the ten DSM-IV personality disorder diagnoses may be construed more parsimoniously in five dimensions. This alternative approach retains clinical utility and has empirical support [14]. Second, a dimensional, rather than a categorical approach, for the definition of personality disorder may have merit [25]. It is in the context of these approaches that many investigators have considered using various basic personality schemes as an alternative to the DSM-IV personality disorder categories.

We approached this issue in two ways. We studied the correlations between general and personality disorder dimensions, and the extent to which a measure of general personality explains the variation in personality disorder factors. We have also considered whether non-linear models improve the correspondence between the two schemes.

The results of this study indicate moderate correspondence between measures of general personality and personality disorder dimensions. Three of the five personality disorder factors correlated most strongly with a different and relevant FFM Factor. However, the Egocentric factor correlated equally with Extraversion and Openness, and the Compulsive factor showed only small correlations with relevant FFM dimensions, The Neurotic Avoidant factor is most strongly correlated with Neuroticism, the Aloof factor inversely with Extraversion, the Callous Impulsive factor inversely with Agreeableness, and the Compulsive, although relatively weakly, with Conscientiousness. For Openness, the highest correlation from among the 5 PD factors was found on the Egocentric factor. This indicates that the factorial structure of the personality disorders demonstrates a modest degree of correspondence to the structure of the general personality dimensions. However, the two factor structures do not share the same ‘space’ as convergent and divergent correlations demonstrate, and should not be considered as being the same. In each case more than one of the NEO domains is significantly associated with the personality disorder factors. This suggests either that the expression of personality disorder may depend upon a profile of the general dimensions rather than a simple one to one correspondence or that these particular disorder dimensions are not salient to more general personality dimensions. Another important point that is demonstrated in the present study is that the facets within each FFM domain are also critical for discriminating between personality disorders.

These conclusions are supported by empirical studies; Saulsman and Page [12] conducted a meta-analysis of such studies and concluded that there was a meaningful Five-Factor Model profile for each personality disorder. Maruta et al., [26] studied the relationship between the Dimensional Assessment of Personality Pathology-Basic Questionnaire (DAPP-BQ) and the NEO-PI-R in a volunteer Japanese population. They found correspondence between the four primary DAPP-BQ dimensions and four of the five FFM domains, but not the Openness to

Experience domain; they also suggest that certain personality disorder dimensions have limited overlap with the NEO-PI-R.

The five NEO domains together "explained" each of the personality disorder factors moderately [27]. Inclusion of the NEO facet scores in the regression models improved the extent to which the NEO dimensions explained the personality disorder factors. In total, one fifth to one third of the variance was explained by the NEO. This is moderately lower than other studies. For example, O'Connor and Dyce [28] found that the facet scores of the NEO explained on average 46% of the variance of personality disorder dimensions assessed using the MCMI-III [29] in college students. The larger correlations in that study may relate to the fact that the MCMI-III is a self-report inventory and/or that the Millon instrument represent different versions of the DSM constructs. The more moderate correlations found in the present study are due, in part, to a difference in both the method of measurement and nature of constructs represented, as well as to the unreliability of the instruments. Correcting for these sources of measurement error would increase the associations, perhaps substantially.

This study only compared personality disorder factors to the NEO-PI(R), a prominent example of the FFM of personality, and neither to other measures of basic personality nor alternate personality disorder measures. There are several such measures currently under investigation as alternatives to the DSM-IV nosology. These include the Temperament and Character Inventory TCI) [30], the Personality Assessment Schedule (PAS) [31], the Schedler & Westen Assessment Procedure (SWAP–200) [32], Eysenck Personality Questionnaire (EPQ) [33], Zuckerman Personality Questionnaire (ZKPQ) [34], Millon Clinical Multiaxial Inventory–III (MCMI–III) [29], Multidimensional Personality Questionnaire (MPQ) [35], Interpersonal Circumplex measure (IPC) [36]. Dimensional Assessment of Personality Pathology–Basic Questionnaire (DAPP–BQ) [37], Schedule for Nonadaptive & Adaptive Personality (SNAP) [38], and Personality Psychopathology–5 (PSY–5) [39]. There are several reports that describe the concordance of these other personality measures to personality disorder [40-43]; each have evidence for reasonable, though not complete, utility in describing DSM-IV personality disorders. The goal of this paper was to compare personality disorder factors with a prototypic measure of normal personality. Widiger & Simonsen [44] reviewed the relationship between the broad domains of several of the above measures and concluded that, with some exceptions, these alternate models share "a common hierarchical structure"; furthermore, from a hierarchical perspective, Markon et al [4] suggest that the FFM is the critical level of analysis for personality and psychopathology research. The NEO, and the five personality domains it measures, is therefore is an appropriate vehicle for studying the relationship between normal and pathological personality traits.

An additional source of variance between the general and personality disorder constructs needs to be considered. Although the personality disorder features may emerge from the temperamental constitution of the individual, as indicated by the correspondence between the two constructs, the relationship may be moderated by the effects of developmental experiences and cultural contexts. These effects may make a more substantial, or different, contribution to the features measured in the personality disorder construct than to those of basic personality.

Exploratory analyses suggested that there may be merit in considering non-linear relationships between basic personality measures and personality disorders. For example, the neurotic avoidant factor scores had stronger relationships at the extremes of both the extraversion and neuroticism dimensions. In both these examples, the relationship was accentuated at the extremes of the FFM dimensions, but there remained a significant relationship in the same direction, across the entire dimension. In the third example, the linear relationship showed a significant inverse relationship between the Neurotic Avoidant scores and conscientiousness. However, at of the high end of Conscientiousness, there was a significant reversal in the

direction of the relationship (higher conscientiousness scores were related to higher Neurotic Avoidant scores). A possible interpretation is that, in general, neurotic avoidant individuals are less Conscientiousness, but at extreme scores of Conscientiousness, this trait dimension promotes behaviors associated with Neurotic Avoidance. These findings represent exploratory efforts that overall do not endorse the hypothesis that the personality disorder dimensions are more related to the extremes of the basic personality dimensions. Nevertheless, examples such as these underscore the clinical richness that measuring dimensions of personality provide.

This study provides a unique perspective on the relationship between DSM-IV personality disorders and the FFM. It differs from previous studies that have investigated this relationship in several important ways. Issues related to treatment-seeking, that could influence findings in a clinic population, are unlikely to be influential in this community-residing sample, in which treatment did not affect selection into the sample. The sample size is large enough to have confidence in the results of the analyses presented. The DSM-IV personality disorder traits were assessed by clinical psychologists using a standardized interview, used internationally, and augmented with informant interviews. Notably, the structure of the NEO in this population does not differ substantially from other studied populations (Löckenhoff et al., unpublished manuscript).

Limitations

The study subjects were originally recruited in 1981 into the Baltimore ECA project. Over time the sample has been affected by loss to follow-up (e.g., through death, refusal to participate, or our inability to locate subjects) and by aging. Comparison between participant and non-participant subjects has revealed only minor demographic differences other than age, but a greater than expected loss of subjects diagnosed with antisocial personality disorder [14,45]. However, neither the latent structure of the personality disorder factors, nor its relationship to the five-factor model, are likely to be affected substantially by attrition or aging in this general population sample.

Subjects were interviewed using a semi-structured instrument, subjects with axis I disorders were not excluded, and only DSM-IV personality disorder criteria were used. Each of these issues could influence the results of the study. The IPDE may evaluate traits differently from another semi-structured instrument, and it certainly evaluates traits differently than a self-report instrument; the subjects' clinical mental state could influence the assessment of personality traits; and inclusion of different traits (e.g., traits that are considered desirable) could affect the derived factor solution.

Implications

This study lends measured support to the correspondence between the structure of personality disorders and that of the FFM of general personality. Each of the personality disorder factors is related to several FFM domains. The breadth of personality disorder pathology is not entirely encompassed by the NEO domains, although the facets contribute substantially to personality disorder variance. Additional clinical material, beyond the NEO, seems necessary to describe the personality disorder dimensions. Instruments like the Dimensional Assessment of Personality Pathology-Basic Questionnaire (DAPP-BQ) [37], Schedule for Nonadaptive and Adaptive personality (SNAP) [38], and the Structured Interview for the Five-Factor Model (SIFFM) [46] that combine FFM personality dimensions with additional clinical traits, allowing the clinician to capture varied manifestations of personality pathology, may be a more useful alternative to the DSM-IV personality disorder structure.

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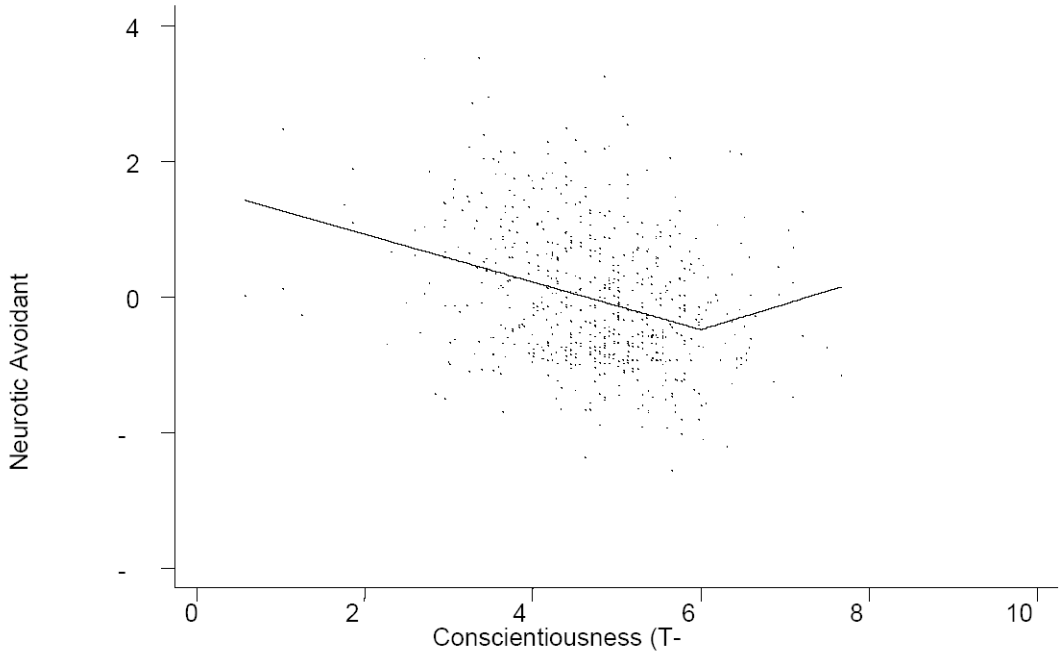

Figure 1.
The relationship (spline) between Conscientiousness and Neurotic Avoidant scores, with a "knot" at a T-score of 60 on the Conscientiousness dimension.

TABLE 1a

Correlation coefficients between the NEO and personality disorder dimensions

	Neurotic Avoidant	Aloof	Egocentric	Impulsive Callous	Compulsive
Neuroticism (N)	0.47***	0.18***	0.06	0.19***	0.10*
Extraversion (E)	-0.31***	-0.43***	0.28***	0.05	-0.04
Openness (O)	-0.03	-0.21***	0.28***	0.05	0.02
Agreeableness (A)	0.03	-0.09*	-0.08*	-0.33***	-0.11**
Conscientiousness (C)	-0.29***	-0.12**	0.05	-0.25***	0.13**

Footnote: Pearson correlation coefficient;

* .005 < p-value ≤ .05;

** .0005 < p-value ≤ .005;

*** p-value ≤ .0005.

TABLE 1b

Correlations: NEO facets with personality disorder dimensions

	Neurotic Avoidant factor	Aloof factor	Egocentric factor	Impulsive Callous factor	Compulsive factor
N1: Anxiety	**.38**(**)	.12(**)	.04	.05	.06
N2: Angry Hostility	*.22*(**)	.15(**)	.15(**)	*.28*(**)	*.19*(**)
N3: Depression	**.45**(**)	*.22*(**)	.06	.15(**)	.02
N4: Self-Consciousness	**.43**(**)	*.17*(**)	-.04	.04	.11(**)
N5: Impulsiveness	*.16* (**)	-.06	.08(*)	*.23*(**)	.00
N6: Vulnerability	**.43**(**)	.15(**)	-.01	.13(**)	.07
E1: Warmth	*-.19*(**)	**-.37**(**)	*.16*(**)	-.12(**)	-.10(*)
E2: Gregariousness	*-.20*(**)	**-.40**(**)	.11(**)	-.08	-.13(**)
E3: Assertiveness	**-.34**(**)	*-.26*(**)	*.27*(**)	.07	.07
E4: Activity	*-.19* (**)	*-.22* (**)	*.19*(**)	.08(*)	.09(*)
E5: Excitement-Seeking	-.08(*)	*-.16*(**)	*.21*(**)	*.25*(**)	-.07
E6: Positive Emotions	*-.26*(**)	**-.31**(**)	*.22*(**)	.00	-.03
O1: Fantasy	.08(*)	-.15(**)	*.17*(**)	.11(**)	-.01
O2: Aesthetics	.02	-.11(**)	*.20*(**)	-.03	-.02
O3: Feelings	.02	*-.27*(**)	*.24*(**)	.01	.11(**)
O4: Actions	*-.16* (**)	-.13(**)	*.18* (**)	.02	-.03
O5: Ideas	-.06	-.04	*.22*(**)	.07	.00
O6: Values	-.03	-.14(**)	.06	.01	.02
A1: Trust	*-.18*(**)	*-.25*(**)	-.05	*-.25*(**)	-.15(**)
A2: Straightforwardness	.03	-.01	-.10(*)	*-.28*(**)	-.02
A3: Altruism	-.05	*-.17*(**)	.06	*-.19*(**)	-.09(*)
A4: Compliance	.10(*)	.04	*-.17*(**)	*-.29*(**)	-.11(**)
A5: Modesty	*.18*(**)	.09(*)	-.13(**)	*-.18*(**)	.00
A6: Tender-Mindedness	.05	-.08	.10(**)	-.11(**)	-.09(*)
C1: Competence	**-.30**(**)	*-.20*(**)	.07	*-.22*(**)	.06
C2: Order	-.12(**)	-.07	.06	-.09(*)	*.16*(**)
C3: Dutifulness	-.09(*)	-.14(**)	-.02	*-.28*(**)	*.16*(**)
C4: Achievement Striving	*-.27*(**)	-.11(**)	.14(**)	-.07	.10(*)
C5: Self-Discipline	**-.33**(**)	-.06	.00	*-.16*(**)	.02
C6: Deliberation	-.13(**)	.04	-.04	*-.28* (**)	.08(*)

Note: Correlations of 0.3 or higher in bold; Correlations of 0.16 - 0.29 in italic;

* p<=.05;

** p<=.01

TABLE 2

Standardized regression coefficients for FFM personality traits predicting personality disorder dimensions

	Neurotic Avoidant	Aloof	Egocentric	Impulsive Callous	Compulsive
N	0.42***	0.05	0.17***	0.08+	0.20***
E	-0.19***	-0.43***	0.26***	0.19***	-0.09+
O	0.07+	-0.02	0.18***	0.03	0.04
A	0.16***	-0.06	-0.10*	-0.28***	-0.14***
C	-0.04	0.10*	0.03	-0.21***	0.30***
R^2	0.27	0.19	0.14	0.17	0.08
R^2 [a]	0.34	0.31	0.21	0.32	0.17

Footnote:

[a] R^2 with all the facets added.

+ p-value > 0.05;

* .05 < p-value ≤ .05;

** .0005 < p-value ≤ .005;

*** p-value ≤ .0005.

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